ENCLOSURE 2

VOLUME 10

ST. LUCIE PLANT
UNIT 1 AND UNIT 2

IMPROVED TECHNICAL SPECIFICATIONS CONVERSION

ITS SECTION 3.5
EMERGENCY CORE COOLING SYSTEMS (ECCS)

Revision 0

LIST OF ATTACHMENTS

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ATTACHMENT 1

3.5.1, Safety Injection Tanks (SITs)

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

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

SAFETY INJECTION TANKS (SITs)

LIMITING CONDITION FOR OPERATION

LCO 3.5.1 3.5.1 ~~Each reactor coolant system~~ [Four] safety injection tank[s] shall be OPERABLE ~~with:~~

SR 3.5.1.1 ~~a.~~ ~~The~~ [Verify each SIT] isolation valve [is fully] open~~,~~

SR 3.5.1.2 ~~b.~~ ~~Between~~ [Verify borated water volume in each SIT is ≥] 1090 and [≤] 1170 cubic feet ~~of borated water,~~

SR 3.5.1.4 ~~c.~~ ~~A minimum~~ [Verify] boron concentration [in each SIT is ≥] ~~of~~ 1900 ppm~~,~~ and [≤ 2200 ppm] — M01

SR 3.5.1.3 ~~d.~~ ~~A~~ nitrogen cover~~-~~pressure ~~of between~~ [in each SIT is ≥] 230 and [≤] 280 psig.

Applicability **APPLICABILITY**: MODES 1, 2 and 3 with pressurizer pressure ≥ 1750 psia

ACTION:

Condition A ~~a.~~ ~~With~~ ~~o~~One SIT inoperable due to [level] boron concentration not within limits, or [one SIT inoperable] due to ~~an~~ inability to verify ~~the required water volume~~ or ~~nitrogen cover-~~pressure, restore ~~the inoperable~~ SIT to OPERABLE status with 72 hours;

Required Action A.1

Required Action C.1, C.2 otherwise, be in ~~at least HOT STANDBY~~ [MODE 3] within ~~the next~~ 6 hours and ~~in HOT SHUTDOWN~~ [Reduce pressurizer pressure to < 1750 psia] within ~~the following~~ ~~6~~ [12] hours. — A02

Condition B ~~b.~~ ~~With~~ ~~o~~One SIT inoperable ~~due to~~ [for] reasons other than ~~those stated in~~ ACTION-a, restore ~~the inoperable~~ SIT to OPERABLE status within 24 hours ;

Required Action B.1

Required Action C.1, C.2 otherwise, be in ~~at least HOT STANDBY~~ [MODE 3] within ~~the next~~ 6 hours and ~~in HOT SHUTDOWN~~ [Reduce pressurizer pressure to < 1750 psia] within ~~the following~~ ~~6~~ [12] hours. — A02

[Add proposed Action D] — A03

SURVEILLANCE REQUIREMENTS

~~4.5.1 Each safety injection tank shall be demonstrated OPERABLE:~~

SR 3.5.1.1, SR 3.5.1.2, SR 3.5.1.3 ~~a.~~ In accordance with the Surveillance Frequency Control Program ~~by:~~

SR 3.5.1.2 SR 3.5.1.3 ~~1.~~ Verify~~ing that the~~ borated water volume and nitrogen cover~~-~~pressure [in each SIT is] ~~in the tanks are~~ within ~~their~~ limits~~, and~~

SR 3.5.1.1 ~~2.~~ Verify~~ing that~~ each safety injection tank isolation valve is open.

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (continued)

NOTE Only required to be performed for affected SIT. A04

SR 3.5.1.4 ~~b.~~ In accordance with the Surveillance Frequency Control Program and once within 6 hours after each solution volume increase of ≥ 1% of tank volume [that is not the result of addition from the RWT.] ~~by~~ verifying~~ing the~~ boron concentration [in each SIT is ≥ 1900 ppm and ≤ 2200 ppm.] ~~of the safety injection tank solution~~. ~~This latter surveillance is not required when the volume increase makeup source is the RWT and the RWT has not been diluted since verifying that the RWT boron concentration is equal to or greater than the safety injection tank boron concentration limit~~. LA01

SR 3.5.1.5 ~~c.~~ In accordance with the Surveillance Frequency Control Program ~~when the RCS pressure is above 1750 psia, by~~ verifying~~ing that~~ power ~~to the~~ [removed from each SIT] isolation valve operator ~~is removed~~ ~~by maintaining the breaker open under administrative control~~. A05 LA02

~~d. In accordance with the Surveillance Frequency Control Program by verifying that each safety injection tank isolation valve opens automatically under each of the following conditions:~~

~~1. When the RCS pressure exceeds 350 psia, and~~

~~2. Upon receipt of a safety injection test signal.~~

LA04

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3/4.5.1 SAFETY INJECTION TANKS (SITs)

LIMITING CONDITION FOR OPERATION

LCO 3.5.1 — 3.5.1 ~~Each Reactor Coolant System~~ [Four] safety injection tank[s] shall be OPERABLE ~~with:~~

SR 3.5.1.1 — ~~a.~~ [Verify each SIT] ~~The~~ isolation valve [is fully] open.

SR 3.5.1.2 — ~~b.~~ ~~A contained~~ [Verify] borated water volume [in each SIT is ≥] ~~of between~~ 1420 and [≤] 1556 cubic feet~~,~~

SR 3.5.1.4 — ~~c.~~ [Verify] ~~A~~ boron concentration [in each SIT is ≥] ~~of between~~ 1900 [ppm] and [≤] 2200 ppm ~~of boron, and~~

SR 3.5.1.3 — ~~d.~~ ~~A~~ nitrogen cover-pressure ~~of between~~ [in each SIT is ≥] 500 and [≤] 650 psig.

~~**NOTE**~~

~~When in MODE 3 with pressurizer pressure is less than 1750 psia, at least three safety injection tanks shall be OPERABLE, each with a minimum pressure of 235 psig and a maximum pressure of 650 psig and a contained water volume of between 1250 and 1556 cubic feet with a boron concentration of between 1900 and 2200 ppm of boron. With all four safety injection tanks OPERABLE, each tank shall have a minimum pressure of 235 psig and a maximum pressure of 650 psig and a contained water volume of between 833 and 1556 cubic feet with a boron concentration of between 1900 and 2200 ppm of boron.~~

LA03

Applicability — **APPLICABILITY:** MODES 1, 2 and 3 with pressurizer pressure ≥ 1750 psia.

ACTION:

Condition A / Required Action A.1 / Required Action C.1, C.2 — ~~a.~~ ~~With~~ one SIT inoperable ~~due~~ to [level] boron concentration not within limits, or [one SIT inoperable] due to ~~an~~ inability to verify ~~the required~~ water volume or ~~nitrogen cover-~~pressure, restore ~~the inoperable~~ SIT to OPERABLE status with 72 hours; otherwise, be in ~~at least HOT STANDBY~~ [MODE 3] within ~~the next~~ 6 hours and ~~in HOT SHUTDOWN~~ [Reduce pressurizer pressure to < 1750 psia] within ~~the following~~ ~~6~~ [12] hours. A02

Condition B / Required Action B.1 / Required Action C.1, C.2 — ~~b.~~ With one SIT inoperable ~~due to~~ [for] reasons other than ~~those stated in~~ ACTION-a, restore ~~the inoperable~~ SIT to OPERABLE status within 24 hours; otherwise, be in ~~at least HOT STANDBY~~ [MODE 3] within ~~the next~~ 6 hours and ~~in HOT SHUTDOWN~~ [Reduce pressurizer pressure to < 1750 psia] within ~~the following~~ ~~6~~ [12] hours. A02

[Add proposed Action D] A03

SURVEILLANCE REQUIREMENTS

~~4.5.1.1 Each safety injection tank shall be demonstrated OPERABLE:~~

SR 3.5.1.1, SR 3.5.1.2, SR 3.5.1.3 — ~~a.~~ In accordance with the Surveillance Frequency Control Program ~~by:~~

SR 3.5.1.2, SR 3.5.1.3 — ~~1.~~ Verify~~ing that the~~ borated water volume and nitrogen cover~~-~~pressure [in each SIT is] ~~in the tanks are~~ within ~~their~~ limits~~, and~~

SR 3.5.1.1 — ~~2.~~ Verify~~ing that~~ each safety injection tank isolation valve is open.

MERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

NOTE Only required to be performed for affected SIT. A03

SR 3.5.1.4 ~~b.~~ In accordance with the Surveillance Frequency [≥] Control Program and once within 6 hours after each solution volume increase of ~~greater than or equal to~~ 1% of tank volume [that is not the result of addition from the RWT.] ~~by~~ verify~~ing the~~ boron concentration [in each SIT is ≥ 1900 ppm and ≤ 2200 ppm.] ~~of the safety injection tank solution~~. ~~This latter surveillance is not required when the volume increase makeup source is the RWT and the RWT has not been diluted since verifying that the RWT boron concentration is equal to or greater than the safety injection tank boron concentration limit~~. LA01

SR 3.5.1.5 ~~c.~~ In accordance with the Surveillance Frequency Control Program ~~when the RCS pressure is above 700 psia, by~~ verify~~ing that~~ power ~~to the~~ [removed from each SIT] isolation valve operator ~~is disconnected by maintaining the breaker open by administrative controls~~. LA05 LA02

~~d. In accordance with the Surveillance Frequency Control Program by verifying that each safety injection tank isolation valve opens automatically under each of the following conditions:~~

~~1. When an actual or simulated RCS pressure signal exceeds 515 psia, and~~

~~2. Upon receipt of a safety injection test signal.~~ LA04

DISCUSSION OF CHANGES
ITS 3.5.1, SAFETY INJECTION TANKS (SITs)

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 3.5.1 Actions a. and b. require in part, “otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours” when a SIT cannot be restored to OPERABLE status within the required time. ITS 3.5.1 Required Action C.2 requires, when the Required Actions and associated Completion Times are not met, reducing pressurizer pressure to < 1750 psia. This changes the end state in CTS 3.5.1 Actions a. and b. from MODE 4 to MODE 3 with pressurizer pressure < 1750 psia.

The purpose of CTS 3.5.1 Action a. and b. is to place the plant in a condition in which the equipment is no longer required. CTS 3.5.1 Action a. and b. provide appropriate actions to take for an inoperable SIT when the unit is in MODE 1, 2, or 3 with pressurizer pressure is ≥ 1750 psia. The SIT is not required to be OPERABLE when pressurizer pressure is < 1750 psia. Below 1750 psia, the rate of RCS blowdown is such that the ECCS pumps can provide adequate injection to ensure that peak clad temperature remains below 10 CFR 50.46 limit of 2200°F. Therefore, in accordance with CTS 3.0.2 (ITS LCO 3.0.2), when pressurizer pressure is < 1750 psia, the requirements to be in MODE 4 in CTS 3.5.1 Action a. and b. are no longer required to be completed. The SITs, with pressurizer pressure below 1750 psia, are no longer required to be OPERABLE.

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 SITs 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 CTS 3.5.1 does not contain a specific ACTION for two or more SITs inoperable. With two or more SITs inoperable, CTS 3.0.3 would be entered. ITS 3.5.1 ACTION D directs entry into LCO 3.0.3 when two or more SITs are inoperable. This changes the CTS by specifically stating to enter LCO 3.0.3 in this System Specification.

This change is acceptable because the action taken with two or more SITs inoperable is unchanged. Adding this ACTION is consistent with the ITS convention of directing entry into LCO 3.0.3 when multiple ACTIONS are presented in the ITS, and entry into these multiple ACTIONS could result in a loss of safety function. This change is designated as administrative because it does not result in a technical change to the CTS.

A04 Unit 1 CTS 4.5.1.b, and Unit 2 CTS 4.5.1.1.b state, in part, that verification of the boron concentration of the SIT solution is required once within 6 hours after each solution volume increase of ≥ 1% of tank volume; however, this surveillance is not required when the volume increase makeup source is the RWT and the RWT has not been diluted since verifying that the RWT boron concentration is equal to or greater than the SIT boron concentration limit.

The purpose of the Unit 1 CTS 4.5.1.b, and Unit 2 CTS 4.5.1.1.b Surveillance Frequency is to designate the Frequency, as well as certain requirements or special conditions. ITS SR 3.5.1.4 adds a Note to the Surveillance Frequency that states "Only required to be performed for affected SIT." The CTS Surveillance Frequency is implicit that the Surveillance be performed for only the affected SIT, that being the SIT subject to the solution volume increase. CTS does not contain this Note. This changes the CTS by adding the ITS SR 3.5.1.4 Note to clarify that the Surveillance is only required to be performed for the affected SIT. This change is acceptable because ITS SR 3.5.1.4 Note clarifies that the Surveillance is only required to be performed for the affected SIT. This change is designated as administrative because it does not result in technical changes to CTS.

A05 **Unit 1 only:** Unit 1 CTS 4.5.1.c requires verification that power be removed from each SIT isolation valve operator when RCS pressure is above 1750 psia. ITS SR 3.5.1.5 requires verification that power be removed from each SIT isolation valve operator when pressurizer pressure is greater than or equal to a specific pressure. This changes the CTS by deleting the specific pressure at which power be removed from the SIT isolation valve operators.

The purpose of the CTS requirement is to ensure power is removed from each SIT isolation valve operator when RCS pressure is above a specific value to further ensure that an active failure could not result in the undetected closure of an SIT motor operated isolation valve. This pressure value is typically above the pressure the SITs are required to be OPERABLE. For instance, the ISTS 3.5.1 Applicability is, in part, with pressurizer pressure ≥ 700 psia and ISTS SR 3.5.1.5 requires power to be removed from the isolation valve operator ≥ 2000 psia. Per the requirements of CTS 4.0.1 (ITS SR 3.0.1) and CTS 4.0.4 (ITS SR 3.0.4), SRs must be met prior to entry into the Applicability, which in the case of CTS 3.5.1 (ITS LCO 3.5.1) is MODES 1 and 2, and MODE 3 with pressurizer pressure ≥ 1750 psia. Conversely, as stated in the ITS Bases of SR 3.0.1, Surveillances do not have to be performed when the unit is in a MODE or other specified condition for which the requirements of the associated LCO are not applicable. Therefore, it is unnecessary to specifically require power to the valve operator be removed "when in MODE 3 with pressure ≥ 1750 psia" and this additional wording has been removed from Unit 1 ITS SR 3.5.1.5. As such, this additional wording has been removed from Unit 2 ITS SR 3.5.1.5.

This change is acceptable because ITS SR 3.5.1.5 requires essentially the same verification by requiring that power be removed from each SIT isolation valve operator when the SITs are required to be OPERABLE (i.e., when pressurizer pressure is greater than or equal to 1750 psia for Unit 1. This change is designated as administrative because it does not result in technical changes to CTS because the Surveillance requirement will continue to require power to the

SIT isolation valve operator to be removed when the SITs are required to be OPERABLE (i.e., in MODES 1 and 2, and MODE 3 with pressurizer pressure ≥ 1750 psia).

MORE RESTRICTIVE CHANGES

M01 **Unit 1 only:** CTS 3.5.1.c requires a minimum SIT boron concentration of 1900 ppm but does not require a maximum boron concentration. ITS SR 3.5.1.4 requires verification that SIT boron concentration is within both a minimum and maximum limit. Similarly, Unit 2 CTS 3.5.1.c requires boron concentration within a minimum 1900 ppm and a maximum 2200 ppm. This changes the Unit 1 CTS by adding a SIT boron concentration maximum limit of 2200 ppm.

The purpose of CTS 3.5.1.c is to provide a SIT minimum boron concentration limit to ensure that, following a LOCA with a minimum level in the SIT, the reactor will remain subcritical in the cold condition following mixing of the SIT and RCS water volumes. The SIT maximum boron concentration limit is based on boron precipitation in the core following a LOCA which could result in reduced heat removal capability between the fuel cladding and the reactor coolant. This change is acceptable, because the maximum boron concentration limit provides assurance that the SIT is capable of performing its function when required. This change is designated as more restrictive because it adds a SIT maximum boron concentration limit to the CTS.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* PSL Unit 1 CTS 4.5.1.b, and PSL Unit 2 CTS 4.5.1.1.b state that verification of boron concentration of the SIT solution is required once within 6 hours after each solution volume increase of ≥ 1% of tank volume, and that the Surveillance is not required when the volume increase makeup source is the RWT and the RWT has not been diluted since verifying that the RWT boron concentration is equal to or greater than the SIT boron concentration limit. ITS SR 3.5.1.4 states that verification of boron concentration of each SIT is required once within 6 hours after each solution volume increase of ≥ 1% of tank volume that is not the result of addition from the refueling water tank. ITS does not include a Surveillance Frequency requirement that retains the statement that the RWT has not been diluted since verifying that the RWT boron concentration is equal to or greater than the SIT boron concentration limit. This changes the CTS by relocation of the CTS requirement to the ITS Bases. The ITS 3.5.1.4 Bases will include that it is not necessary to verify boron concentration if the added water is from the RWT, because the boron concentration of the water contained in the RWT is within the SIT boron concentration requirements.

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 SR3.5.1.4 retains the CTS PSL Unit 1 CTS 4.5.1.b, and PSL Unit 2 CTS 4.5.1.1.b, requirement by stating that verification of boron concentration of the SIT solution is required once within 6 hours after each solution volume increase of ≥ 1% of tank volume that is not the result of addition from the refueling water tank. 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 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* PSL Unit 1 CTS 4.5.1.c, and PSL Unit 2 CTS 4.5.1.1.c require verifying that power to the (SIT) isolation valve operator is removed / disconnected by maintaining the breaker open under administrative control. ITS SR 3.5.1.5 states verify power is removed from each SIT isolation valve operator. ITS does not include the detailed requirement that the breaker to the isolation valve operator be maintained open under administrative control. This changes the CTS by relocation of the administrative control details to the ITS Bases. The ITS 3.5.1.5 Bases will include that removal of power to the SIT isolation valve operators is conducted under administrative control.

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 3.5.1.5 retains the requirement to ensure power is removed from the SIT isolation valve operator. ITS SR 3.5.1.5 states verify power is removed from each SIT isolation valve operator. This change is acceptable because these types of procedural details will continue to 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 **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 3.5.1 LCO Note states "When in MODE 3 with pressurizer pressure less than 1750 psia, at least three safety injection tanks shall be OPERABLE, each with a minimum pressure of 235 psig and a maximum pressure of 650 psig and a contained water volume of between 1250 and 1556 cubic feet with a boron concentration of between 1900 and 2200 ppm of boron. With all four safety injection tanks OPERABLE, each tank shall have a minimum pressure of 235 psig and a maximum pressure of 650 psig and a contained water volume of between 833 and 1556 cubic feet with a boron concentration of between 1900 and 2200 ppm of boron." ITS 3.5.1 does not include this requirement. PSL Unit 2 CTS 3.5.1 Applicability is MODES 1, 2, and 3 with pressurizer pressure ≥ 1750 psia. The SIT is not required to be OPERABLE when pressurizer pressure is < 1750 psia. Therefore, in accordance with CTS 3.0.2 (ITS LCO 3.0.2), when pressurizer pressure is < 1750 psia, the requirements in the Note are no longer required. Similarly, DOC A02 changes the end state in CTS 3.5.1 Actions a. and b. from MODE 4 to MODE 3 with pressurizer pressure < 1750 psia. This changes the CTS by relocating the requirements in the Note to the Technical Requirements Manual.

The removal of SIT requirements when in MODE 3 with pressurizer pressure < 1750 psia is acceptable because this type of information is not necessary to be included in the Technical Specifications in order to provide adequate protection of public health and safety. The ITS retains the requirements for SITs to be OPERABLE when in MODES 1, 2, and 3 with pressurizer pressure ≥ 1750 psia. When pressurizer pressure is below 1750 psia the ECCS pumps can provide adequate injection to ensure that peak clad temperature remains below the 10 CFR 50.46 limit of 2200°F. Therefore, the SITs are not required to be OPERABLE and the SIT motor operated isolation valves may be closed to isolate the SITs from the RCS during plant shutdown or startup. Also, this change is acceptable because these types of procedural details will continue to be 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 these SIT requirements are not required by the CTS 3.5.1 and ITS 3.5.1 Applicability, that being MODES 1 and 2, and MODE 3 with pressurizer pressure ≥ 1750 psia.

LA04 *(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)* PSL Unit 1 CTS 4.5.1.d states "In accordance with the Surveillance Frequency Control Program by verifying that each safety injection tank isolation valve opens automatically under each of the following conditions: When the RCS pressure exceeds 350 psia, and Upon receipt of a safety injection test signal." PSL Unit 2 CTS 4.5.1.1.d states "In accordance with the Surveillance Frequency Control Program by verifying that each safety injection tank isolation valve opens automatically under each of the following conditions: When an actual or simulated RCS pressure signal exceeds 515 psia, and Upon receipt of a safety injection test signal.

ITS 3.5.1 does not include this requirement. ITS SR 3.5.1.1 requires verification that each SIT isolation valve is fully open when in MODES 1 and 2, and MODE 3 with pressurizer pressure ≥ 1750 psia. Additionally, ITS SR 3.5.1.5 requires verification that power is removed from each SIT isolation valve operator when pressurizer pressure is ≥ 1750 psia. ITS SR 3.5.1.1 and SR 3.5.1.5 provide assurance the each SIT isolation valve is open and remains open (power removed from its valve operator) when in MODES 1 and 2, and MODE 3 with pressurizer pressure ≥ 1750 psia.

The SITs are not required to be OPERABLE when pressurizer pressure is < 1750 psia. Therefore, in accordance with CTS 3.0.2 (ITS LCO 3.0.2), when pressurizer pressure is < 1750 psia, the requirements in PSL Unit 1 CTS 4.5.1.d and PSL Unit 2 CTS 4.5.1.1.d are no longer required. Similarly, DOC A02 changes the end state in CTS 3.5.1 Actions a. and b. from MODE 4 to MODE 3 with pressurizer pressure < 1750 psia. This changes the CTS by relocating the requirements in the PSL Unit 1 CTS 4.5.1.d and PSL Unit 2 CTS 4.5.1.1.d.

The removal of SIT requirements when in MODE 3 with pressurizer pressure < 1750 psia is acceptable because this type of information is not necessary to be included in the Technical Specifications in order to provide adequate protection of public health and safety. The ITS retains the requirements for SITs to be OPERABLE when in MODES 1, 2, and 3 with pressurizer pressure ≥ 1750 psia. 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 these SIT requirements are not required by the CTS 3.5.1 and ITS 3.5.1 Applicability, that being MODES 1 and 2, and MODE 3 with pressurizer pressure ≥ 1750 psia.

LA05 **Unit 2 only:** Unit 2 CTS 4.5.1.1.c requires verification that the power be removed from each SIT isolation valve operator when RCS pressure is above 700 psia. ITS SR 3.5.1.5 requires verification that power be removed from each SIT isolation valve operator. This changes the CTS by deleting the specific pressure at which power be removed from the SIT isolation valve operators.

The purpose of the CTS requirement is to ensure power is removed from each SIT isolation valve operator when RCS pressure is above a specific value to further ensure that an active failure could not result in the undetected closure of an SIT motor operated isolation valve. This pressure value is typically above the pressure the SITs are required to be OPERABLE. For instance, the ISTS 3.5.1 Applicability is, in part, with pressurizer pressure ≥ 700 psia and ISTS SR 3.5.1.5 requires power to be removed from the isolation valve operator ≥ 2000 psia. Per the requirements of CTS 4.0.1 (ITS SR 3.0.1) and CTS 4.0.4 (ITS SR 3.0.4), SRs must be met prior to entry into the Applicability, which in the case of CTS 3.5.1 (ITS LCO 3.5.1) is MODES 1 and 2, and MODE 3 with pressurizer pressure ≥ 1750 psia. Conversely, as stated in the ITS Bases of SR 3.0.1, Surveillances do not have to be performed when the unit is in a MODE or other specified condition for which the requirements of the associated LCO are not applicable. Therefore, it is unnecessary to specifically require power to the valve operator be removed in MODE 3 with RCS pressure ≥ 700 psia. Unit 2 CTS 3.5.1 Applicability does not require the SITs to be OPERABLE until in at least MODE 3 with pressurizer pressure ≥ 1750 psia. As such, this additional wording has been removed from Unit 2 ITS SR 3.5.1.5. This changes the CTS by relocating this requirement in CTS 3.5.1 to the Technical Requirements Manual.

The removal of this SIT requirement when in MODE 3 with pressurizer pressure < 1750 psia is acceptable because this type of information is not necessary to be included in the Technical Specifications in order to provide adequate protection of public health and safety. The ITS retains the requirements for SITs to be OPERABLE when in MODES 1, 2, and 3 with pressurizer pressure ≥ 1750 psia. When pressurizer pressure is below 1750 psia the ECCS pumps can provide adequate injection to ensure that peak clad temperature remains below the 10 CFR 50.46 limit of 2200°F. Therefore, the SITs are not required to be OPERABLE and the SIT motor operated isolation valves may be closed to isolate the SITs from the RCS during plant shutdown or startup. Also, this change is acceptable because these types of procedural details will continue to be 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 these SIT requirements are not required by the CTS 3.5.1 and ITS 3.5.1 Applicability, that being MODES 1 and 2, and MODE 3 with pressurizer pressure ≥ 1750 psia.

LESS RESTRICTIVE CHANGES

None

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

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Safety Injection Tanks (SITs)

LCO 3.5.1 — LCO 3.5.1 [Four] SITs shall be OPERABLE. (2)

3.5.1 Applicability — APPLICABILITY: MODES 1 and 2,
MODE 3 with pressurizer pressure ≥ [700] 1750 psia. (2)

ACTIONS

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION 3.5.1.a ACTION 3.5.1.a	A. One SIT inoperable due to boron concentration not within limits. OR One SIT inoperable due to the inability to verify level or pressure.	A.1 Restore SIT to OPERABLE status.	72 hours
	B. One SIT inoperable for reasons other than Condition A.	B.1 Restore SIT to OPERABLE status.	24 hours
ACTION 3.5.1.a. 3.5.1.b	C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3. AND C.2 Reduce pressurizer pressure to < [700] 1750 psia. (2)	6 hours 12 hours
ACTION 3.5.1.b	D. Two or more SITs inoperable.	D.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

CTS	SURVEILLANCE		FREQUENCY	
LCO 3.5.1.a SR 4.5.1.1.a.2	SR 3.5.1.1	Verify each SIT isolation valve is fully open.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2
LCO 3.5.1.b SR 4.5.1.1.a.1	SR 3.5.1.2	Verify borated water volume in each SIT is ≥ [28% narrow range (1802 cubic feet) and ≤ 72% narrow range (1914 cubic feet)]. 1170 1090	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2
LCO 3.5.1.d SR 4.5.1.1.a.1	SR 3.5.1.3	Verify nitrogen cover pressure in each SIT is ≥ [615] psig and ≤ [655] psig. 230 280	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY	
LCO 3.5.1.c SR 4.5.1.1.b DOC M01	SR 3.5.1.4 Verify boron concentration in each SIT is ≥ [1500] 1900 ppm and ≤ [2800] 2200 ppm.	[31 days OR In accordance with the Surveillance Frequency Control Program] AND --------NOTE-------- Only required to be performed for affected SIT ------------------------ Once within 6 hours after each solution volume increase of ≥ [1]% of tank volume that is not the result of addition from the refueling water tank	2 2
SR 4.5.1.1.c	SR 3.5.1.5 Verify power is removed from each SIT isolation valve operator when pressurizer pressure is ≥ [2000] psia.	[31 days OR In accordance with the Surveillance Frequency Control Program]	2 3

CTS

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Safety Injection Tanks (SITs)

LCO 3.5.1 | LCO 3.5.1 [Four] SITs shall be OPERABLE. (2)

3.5.1 Applicability | APPLICABILITY: MODES 1 and 2,
MODE 3 with pressurizer pressure ≥ ~~[700]~~ 1750 psia. (2)

ACTIONS

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION 3.5.1.a	A. One SIT inoperable due to boron concentration not within limits.	A.1 Restore SIT to OPERABLE status.	72 hours
	<u>OR</u>		
ACTION 3.5.1.a	One SIT inoperable due to the inability to verify level or pressure.		
	B. One SIT inoperable for reasons other than Condition A.	B.1 Restore SIT to OPERABLE status.	24 hours
ACTION 3.5.1.a. 3.5.1.b	C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3.	6 hours
		<u>AND</u>	
		C.2 Reduce pressurizer pressure to < ~~[700]~~ 1750 psia. (2)	12 hours
ACTION 3.5.1.b	D. Two or more SITs inoperable.	D.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
LCO 3.5.1.a SR 4.5.1.1.a.2	SR 3.5.1.1	Verify each SIT isolation valve is fully open.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2
LCO 3.5.1.b SR 4.5.1.1.a.1	SR 3.5.1.2	Verify borated water volume in each SIT is ≥ [28% narrow range (1802 cubic feet) and ≤ 72% narrow range (1914 cubic feet)]. 1556 1420	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2
LCO 3.5.1.d SR 4.5.1.1.a.1	SR 3.5.1.3	Verify nitrogen cover pressure in each SIT is ≥ [615] psig and ≤ [655] psig. 500 650	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
LCO 3.5.1.c SR 4.5.1.1.b	SR 3.5.1.4	Verify boron concentration in each SIT is ≥ [1500] ppm and ≤ [2800] ppm. 1900 2200	[31 days OR In accordance with the Surveillance Frequency Control Program] AND --------NOTE-------- Only required to be performed for affected SIT ------------------------ Once within 6 hours after each solution volume increase of ≥ [1]% of tank volume that is not the result of addition from the refueling water tank	2 2
SR 4.5.1.1.c	SR 3.5.1.5	Verify power is removed from each SIT isolation valve operator when pressurizer pressure is ≥ [2000] psia.	[31 days OR In accordance with the Surveillance Frequency Control Program]	2 3

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.1, SAFETY INJECTION TANKS (SITs)

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. The purpose ISTS 3.5.1.5 is to ensure power is removed from each SIT isolation valve operator when RCS pressure is above a specified value to further ensure that an active failure could not result in the undetected closure of an SIT motor operated isolation valve. This pressure value is intended to be above the pressure the SITs are required to be OPERABLE. However, the CTS Applicability is MODES 1 and 2, and MODE 3 with pressurizer pressure ≥ 1750 psia and the equivalent Surveillances (Unit 1 CTS 4.5.1.c and Unit 2 CTS 4.5.1.1.c) require power to be removed to the isolation valve operators above 1750 psia or less. Per the requirements of ISTS SR 3.0.1 and ISTS SR 3.0.4, SRs must be met prior to entry into the Applicability, which in the case of ITS LCO 3.5.1 is MODES 1 and 2, and MODE 3 with pressurizer pressure ≥ 1750 psia. Conversely, as stated in the ITS Bases of SR 3.0.1, Surveillances do not have to be performed when the unit is in a MODE or other specified condition for which the requirements of the associated LCO are not applicable. Therefore, it is unnecessary to specifically require power to the valve operator be removed "when in MODE 3 with pressure ≥ 1750 psia" and this additional wording has been removed.

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

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.1 Safety Injection Tanks (SITs)

BASES

BACKGROUND

The functions of the [four] SITs are to supply water to the reactor vessel during the blowdown phase of a loss of coolant accident (LOCA), to provide inventory to help accomplish the refill phase that follows thereafter, and to provide Reactor Coolant System (RCS) makeup for a small break LOCA. 2

The blowdown phase of a large break LOCA is the initial period of the transient during which the RCS departs from equilibrium conditions, and heat from fission product decay, hot internals, and the vessel continues to be transferred to the reactor coolant. The blowdown phase of the transient ends when the RCS pressure falls to a value approaching that of the containment atmosphere.

The refill phase of a LOCA follows immediately where reactor coolant inventory has vacated the core through steam flashing and ejection out through the break. The core is essentially in adiabatic heatup. The balance of the SITs' inventory is then available to help fill voids in the lower plenum and reactor vessel downcomer to establish a recovery level at the bottom of the core and ongoing reflood of the core with the addition of safety injection (SI) water.

The SITs are pressure vessels partially filled with borated water and pressurized with nitrogen gas. The SITs are passive components, since no operator or control action is required for them to perform their function. Internal tank pressure is sufficient to discharge the contents to the RCS, if RCS pressure decreases below the SIT pressure.

Each SIT is piped into one RCS cold leg via the injection lines utilized by the High Pressure Safety Injection and Low Pressure Safety Injection (HPSI and LPSI) systems. Each SIT is isolated from the RCS by a motor operated isolation valve and ~~two~~ check valves in series. The motor operated isolation valves are normally open, with power removed from the valve motor to prevent inadvertent closure prior to or during an accident. 1

The SIT gas and water volumes, gas pressure, and outlet pipe size are selected to allow three of the four SITs to partially recover the core before significant clad melting or zirconium water reaction can occur following a LOCA. The need to ensure that three SITs are adequate for this function is consistent with the LOCA assumption that the entire contents of one SIT will be lost via the break during the blowdown phase of a LOCA.

BASES

APPLICABLE SAFETY ANALYSES

The SITs are taken credit for in both the large and small break LOCA analyses at full power (Ref. 1). These are the Design Basis Accidents (DBAs) that establish the acceptance limits for the SITs. Reference to the analyses for these DBAs is used to assess changes to the SITs as they relate to the acceptance limits.

In performing the LOCA calculations, conservative assumptions are made concerning the availability of SI flow. These assumptions include signal generation time, equipment starting times, and delivery time due to system piping. In the early stages of a LOCA with a loss of offsite power, the SITs provide the sole source of makeup water to the RCS. (The assumption of a loss of offsite power is required by regulations.) This is because the LPSI pumps, HPSI pumps, and charging pumps cannot deliver flow until the diesel generators (DGs) start, come to rated speed, and go through their timed loading sequence. In cold leg breaks, the entire contents of one SIT are assumed to be lost through the break during the blowdown and reflood phases.

The limiting large break LOCA is a double ended guillotine cold leg break at the discharge of the reactor coolant pump.

During this event, the SITs discharge to the RCS as soon as RCS pressure decreases to below SIT pressure. As a conservative estimate, no credit is taken for SI pump flow until the SITs are empty. This results in a minimum effective delay of over 60 seconds, during which the SITs must provide the core cooling function. The actual delay time does not exceed 30 seconds. No operator action is assumed during the blowdown stage of a large break LOCA.

The worst case small break LOCA also assumes a time delay before pumped flow reaches the core. For the larger range of small breaks, the rate of blowdown is such that the increase in fuel clad temperature is terminated solely by the SITs, with pumped flow then providing continued cooling. As break size decreases, the SITs and HPSI pumps both play a part in terminating the rise in clad temperature. As break size continues to decrease, the role of the SITs continues to decrease until they are not required, and the HPSI pumps become solely responsible for terminating the temperature increase.

This LCO helps to ensure that the following acceptance criteria, established by 10 CFR 50.46 (Ref. 2) for the ECCS, will be met following a LOCA:

BASES

APPLICABLE SAFETY ANALYSES (continued)

a. Maximum fuel element cladding temperature is ≤ 2200°F,

b. Maximum cladding oxidation is ≤ 0.17 times the total cladding thickness before oxidation,

c. Maximum hydrogen generation from a zirconium water reaction is ≤ 0.01 times the hypothetical amount that would be generated if all of the metal in the cladding cylinders surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react, and

d. The core is maintained in a coolable geometry.

Since the SITs discharge during the blowdown phase of a LOCA, they do not contribute to the long term cooling requirements of 10 CFR 50.46.

Since the SITs are passive components, single active failures are not applicable to their operation. The SIT isolation valves, however, are not single failure proof; therefore, whenever the valves are open, power is removed from their operators and the switch is key locked open.

These precautions ensure that the SITs are available during an accident (Ref. 3). With power supplied to the valves, a single active failure could result in a valve closure, which would render one SIT unavailable for injection. If a second SIT is lost through the break, only two SITs would reach the core. Since the only active failure that could affect the SITs would be the closure of a motor operated outlet valve, the requirement to remove power from these eliminates this failure mode.

The minimum volume requirement for the SITs ensures that three SITs can provide adequate inventory to reflood the core and downcomer following a LOCA. The downcomer then remains flooded until the HPSI and LPSI systems start to deliver flow.

The maximum volume limit is based on maintaining an adequate gas volume to ensure proper injection and the ability of the SITs to fully discharge, as well as limiting the maximum amount of boron inventory in the SITs.

BASES

APPLICABLE SAFETY ANALYSES (continued)

1090

A minimum of ~~25% narrow range level, corresponding to [1790]~~ cubic feet of borated water, and a maximum of ~~75% narrow range level, corresponding to [1927]~~ cubic feet of borated water, are used in the safety analyses as the volume in the SITs. ~~To allow for instrument inaccuracy, a [28]% narrow range (corresponding to [1802] cubic feet) and a [72]% narrow range (corresponding to [1914] cubic feet) are specified. The analyses are based upon the cubic feet requirements; the percentage figures are provided for operator use because the level indicator provided in the control room is marked in percentages, not in cubic feet.~~ 2 3 2 2 3

1170

The minimum nitrogen cover pressure requirement ensures that the contained gas volume will generate discharge flow rates during injection that are consistent with those assumed in the safety analyses.

The maximum nitrogen cover pressure limit ensures that excessive amounts of gas will not be injected into the RCS after the SITs have emptied.

230 280

A minimum pressure of ~~[593]~~ psig and a maximum pressure of ~~[632]~~ psig are used in the analyses. ~~To allow for instrument accuracy, a [615] psig minimum and [655] psig maximum are specified.~~ The maximum allowable boron concentration of ~~[2800]~~ ppm is based upon boron precipitation limits in the core following a LOCA. Establishing a maximum limit for boron is necessary since the time at which boron precipitation would occur in the core following a LOCA is a function of break location, break size, the amount of boron injected into the core, and the point of ECCS injection. Post LOCA emergency procedures directing the operator to establish simultaneous hot and cold leg injection are based on the worst case minimum boron precipitation time. Maintaining the maximum SIT boron concentration within the upper limit ensures that the SITs do not invalidate this calculation. An excessive boron concentration in any of the borated water sources used for injection during a LOCA could result in boron precipitation earlier than predicted. 4 2

2200

1900

The minimum boron requirements of ~~[1500]~~ ppm are based on beginning of life reactivity values and are selected to ensure that the reactor will remain subcritical during the reflood stage of a large break LOCA. During a large break LOCA, all control element assemblies (CEAs) are assumed not to insert into the core, and the initial reactor shutdown is 2

BASES

APPLICABLE SAFETY ANALYSES (continued)

accomplished by void formation during blowdown. Sufficient boron concentration must be maintained in the SITs to prevent a return to criticality during reflood. ~~Although this requirement is similar to the basis for the minimum boron concentration of the refueling water tank (RWT), the minimum SIT concentration is lower than that of the RWT since the SITs need not account for dilution by the RCS.~~ 1

The SITs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO establishes the minimum conditions required to ensure that the SITs are available to accomplish their core cooling safety function following a LOCA. ~~[~~Four~~]~~ SITs are required to be OPERABLE to ensure that 100% of the contents of ~~[~~three~~]~~ of the SITs will reach the core during a LOCA. 2

This is consistent with the assumption that the contents of one tank spill through the break. If the contents of fewer than three tanks are injected during the blowdown phase of a LOCA, the ECCS acceptance criteria of 10 CFR 50.46 (Ref. 2) could be violated.

For an SIT to be considered OPERABLE, the isolation valve must be fully open, power removed above ~~[2000] psig~~ 1750 psia, and the limits established in the SR for contained volume, boron concentration, and nitrogen cover pressure must be met. 2

APPLICABILITY

In MODES 1 and 2, and MODE 3 with RCS pressure ≥ ~~700~~ 1750 psia, the SIT OPERABILITY requirements are based on an assumption of full power operation. Although cooling requirements decrease as power decreases, the SITs are still required to provide core cooling as long as elevated RCS pressures and temperatures exist. 2

This LCO is only applicable at pressures ≥ ~~700~~ 1750 psia. Below ~~700~~ 1750 psia, the rate of RCS blowdown is such that the ECCS pumps can provide adequate injection to ensure that peak clad temperature remains below the 10 CFR 50.46 (Ref. 2) limit of 2200°F. 2

In MODE 3, at pressures < ~~700~~ 1750 psia, and in MODES 4, 5, and 6, the SIT motor operated isolation valves are closed to isolate the SITs from the RCS during unit shutdown and startup. ~~This allows RCS cooldown and depressurization without discharging the SITs into the RCS or requiring depressurization of the SITs.~~ 5

BASES

ACTIONS

A.1

If the boron concentration of one SIT is not within limits, it must be returned to within the limits within 72 hours. In this condition, ability to maintain subcriticality or minimum boron precipitation time may be reduced, but the reduced concentration effects on core subcriticality during reflood are minor. Boiling of the ECCS water in the core during reflood concentrates the boron in the saturated liquid that remains in the core. In addition, the volume of the SIT is still available for injection. Since the boron requirements are based on the average boron concentration of the total volume of three SITs, the consequences are less severe than they would be if an SIT were not available for injection. Thus, 72 hours is allowed to return the boron concentration to within limits.

The combination of redundant level and pressure instrumentation for any single SIT provides sufficient information so that it is not worthwhile to always attempt to correct drift associated with one instrument, with the resulting radiation exposures during entry into containment, as there is sufficient time to repair one in the event that a second one became inoperable. Because these instruments do not initiate a safety action, it is reasonable to extend the allowable outage time for them. While technically inoperable, the SIT will be available to fulfill its safety function during this time and, thus, this Completion Time results in a negligible increase in risk.

B.1

If one SIT is inoperable, for reasons other than boron concentration or the inability to verify level or pressure, the SIT must be returned to OPERABLE status within 24 hours. In this Condition, the required contents of three SITs cannot be assumed to reach the core during a LOCA as is assumed in Appendix K (Ref. 5).

CE NPSD-994 (Ref. 6) provides a series of deterministic and probabilistic findings that support the 24 hour Completion Time as having no affect on risk as compared to shorter periods for restoring the SIT to OPERABLE status.

BASES

ACTIONS (continued)

C.1 and C.2

If the SIT cannot be restored to OPERABLE status 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 3 within 6 hours and pressurizer pressure reduced to < ~~700~~ 1750 psia 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. 2

D.1

If more than one SIT is inoperable, the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.5.1.1

Verification that each SIT isolation valve is fully open, as indicated in the control room, before power is removed from its valve operator, ensures that SITs are available for injection and ensures timely discovery if a valve should be partially closed. If an isolation valve is not fully open, the rate of injection to the RCS would be reduced. Although a motor operated valve should not change position with power removed, a closed valve could result in not meeting accident analysis assumptions. ~~[A 12 hour Frequency is considered reasonable in view of other administrative controls that ensure the unlikelihood of a mispositioned isolation valve.~~ 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 3.5.1.2 and SR 3.5.1.3

SIT borated water volume and nitrogen cover pressure should be verified to be within specified limits in order to ensure adequate injection during a LOCA. [Due to the static design of the SITs, a 12 hour Frequency usually allows the operator sufficient time to identify changes before the limits are reached. Operating experience has shown this Frequency to be appropriate for early detection and correction of off normal trends. 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
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SR 3.5.1.4

Thirty-one days is reasonable for verification to determine that each SIT's boron concentration is within the required limits, because the static design of the SITs limits the ways in which the concentration can be changed. 2
[The 31 day Frequency is adequate to identify changes that could occur from mechanisms such as stratification or inleakage. Sampling the affected SIT within 6 hours after a 1% volume increase will identify whether inleakage has caused a reduction in boron concentration to below the required limit. It is not necessary to verify boron concentration if the added water is from the RWT, because the boron concentration of the water contained in the RWT is within the SIT boron concentration requirements. This is consistent with the recommendations of NUREG-1366 (Ref. 4) and assumes the RWT has not been diluted since the last time the RWT boron concentration was verified to be within limits. 6

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 3.5.1.5

Verification that power is removed from each SIT isolation valve operator when the pressurizer pressure is ≥ 2000 psia ensures that an active failure could not result in the undetected closure of an SIT motor operated isolation valve. If this were to occur, only two SITs would be available for injection, given a single failure coincident with a LOCA. [Since installation and removal of power to the SIT isolation valve operators is conducted under administrative control, the 31 day Frequency was chosen to provide additional assurance that power is removed.

R

2

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.
---]

This SR allows power to be supplied to the motor operated isolation valves when RCS pressure is < 2000 psia, thus allowing operational flexibility by avoiding unnecessary delays to manipulate the breakers during unit startups or shutdowns.

1

BASES

U | Chapter 15 | 1 | 2

REFERENCES

1. FSAR, ~~Section [6.3]~~.

2. 10 CFR 50.46.

U | Section 6.3 | 1 | 2

3. FSAR, ~~Chapter [15]~~.

4. Draft NUREG-1366, February 1990.

5. 10 CFR 50 Appendix K.

6. CE NPSD-994, "CEOG Joint Applications Report for Safety Injection Tank AOT/STI Extension," May 1995.

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.1 Safety Injection Tanks (SITs)

BASES

BACKGROUND

The functions of the [four] SITs are to supply water to the reactor vessel during the blowdown phase of a loss of coolant accident (LOCA), to provide inventory to help accomplish the refill phase that follows thereafter, and to provide Reactor Coolant System (RCS) makeup for a small break LOCA. 2

The blowdown phase of a large break LOCA is the initial period of the transient during which the RCS departs from equilibrium conditions, and heat from fission product decay, hot internals, and the vessel continues to be transferred to the reactor coolant. The blowdown phase of the transient ends when the RCS pressure falls to a value approaching that of the containment atmosphere.

The refill phase of a LOCA follows immediately where reactor coolant inventory has vacated the core through steam flashing and ejection out through the break. The core is essentially in adiabatic heatup. The balance of the SITs' inventory is then available to help fill voids in the lower plenum and reactor vessel downcomer to establish a recovery level at the bottom of the core and ongoing reflood of the core with the addition of safety injection (SI) water.

The SITs are pressure vessels partially filled with borated water and pressurized with nitrogen gas. The SITs are passive components, since no operator or control action is required for them to perform their function. Internal tank pressure is sufficient to discharge the contents to the RCS, if RCS pressure decreases below the SIT pressure.

Each SIT is piped into one RCS cold leg via the injection lines utilized by the High Pressure Safety Injection and Low Pressure Safety Injection (HPSI and LPSI) systems. Each SIT is isolated from the RCS by a motor operated isolation valve and ~~two~~ check valves in series. The motor operated isolation valves are normally open, with power removed from the valve motor to prevent inadvertent closure prior to or during an accident. 1

The SIT gas and water volumes, gas pressure, and outlet pipe size are selected to allow three of the four SITs to partially recover the core before significant clad melting or zirconium water reaction can occur following a LOCA. The need to ensure that three SITs are adequate for this function is consistent with the LOCA assumption that the entire contents of one SIT will be lost via the break during the blowdown phase of a LOCA.

BASES

APPLICABLE SAFETY ANALYSES

The SITs are taken credit for in both the large and small break LOCA analyses at full power (Ref. 1). These are the Design Basis Accidents (DBAs) that establish the acceptance limits for the SITs. Reference to the analyses for these DBAs is used to assess changes to the SITs as they relate to the acceptance limits.

In performing the LOCA calculations, conservative assumptions are made concerning the availability of SI flow. These assumptions include signal generation time, equipment starting times, and delivery time due to system piping. In the early stages of a LOCA with a loss of offsite power, the SITs provide the sole source of makeup water to the RCS. (The assumption of a loss of offsite power is required by regulations.) This is because the LPSI pumps, HPSI pumps, and charging pumps cannot deliver flow until the diesel generators (DGs) start, come to rated speed, and go through their timed loading sequence. In cold leg breaks, the entire contents of one SIT are assumed to be lost through the break during the blowdown and reflood phases.

The limiting large break LOCA is a double ended guillotine cold leg break at the discharge of the reactor coolant pump.

During this event, the SITs discharge to the RCS as soon as RCS pressure decreases to below SIT pressure. As a conservative estimate, no credit is taken for SI pump flow until the SITs are empty. This results in a minimum effective delay of over 60 seconds, during which the SITs must provide the core cooling function. The actual delay time does not exceed 30 seconds. No operator action is assumed during the blowdown stage of a large break LOCA.

The worst case small break LOCA also assumes a time delay before pumped flow reaches the core. For the larger range of small breaks, the rate of blowdown is such that the increase in fuel clad temperature is terminated solely by the SITs, with pumped flow then providing continued cooling. As break size decreases, the SITs and HPSI pumps both play a part in terminating the rise in clad temperature. As break size continues to decrease, the role of the SITs continues to decrease until they are not required, and the HPSI pumps become solely responsible for terminating the temperature increase.

This LCO helps to ensure that the following acceptance criteria, established by 10 CFR 50.46 (Ref. 2) for the ECCS, will be met following a LOCA:

BASES

APPLICABLE SAFETY ANALYSES (continued)

a. Maximum fuel element cladding temperature is ≤ 2200°F,

b. Maximum cladding oxidation is ≤ 0.17 times the total cladding thickness before oxidation,

c. Maximum hydrogen generation from a zirconium water reaction is ≤ 0.01 times the hypothetical amount that would be generated if all of the metal in the cladding cylinders surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react, and

d. The core is maintained in a coolable geometry.

Since the SITs discharge during the blowdown phase of a LOCA, they do not contribute to the long term cooling requirements of 10 CFR 50.46.

Since the SITs are passive components, single active failures are not applicable to their operation. The SIT isolation valves, however, are not single failure proof; therefore, whenever the valves are open, power is removed from their operators and the switch is key locked open.

These precautions ensure that the SITs are available during an accident (Ref. 3). With power supplied to the valves, a single active failure could result in a valve closure, which would render one SIT unavailable for injection. If a second SIT is lost through the break, only two SITs would reach the core. Since the only active failure that could affect the SITs would be the closure of a motor operated outlet valve, the requirement to remove power from these eliminates this failure mode.

The minimum volume requirement for the SITs ensures that three SITs can provide adequate inventory to reflood the core and downcomer following a LOCA. The downcomer then remains flooded until the HPSI and LPSI systems start to deliver flow.

The maximum volume limit is based on maintaining an adequate gas volume to ensure proper injection and the ability of the SITs to fully discharge, as well as limiting the maximum amount of boron inventory in the SITs.

BASES

APPLICABLE SAFETY ANALYSES (continued)

A minimum of ~~25% narrow range level, corresponding to [1790]~~ 1420 cubic feet 2 3
of borated water, and a maximum of ~~75% narrow range level,~~
~~corresponding to [1927]~~ 1556 cubic feet of borated water, are used in the safety 2
analyses as the volume in the SITs. ~~To allow for instrument inaccuracy, a~~
~~[28]% narrow range (corresponding to [1802] cubic feet) and a [72]%~~
~~narrow range (corresponding to [1914] cubic feet) are specified. The~~ 2 3
~~analyses are based upon the cubic feet requirements; the percentage~~
~~figures are provided for operator use because the level indicator provided~~
~~in the control room is marked in percentages, not in cubic feet.~~

The minimum nitrogen cover pressure requirement ensures that the contained gas volume will generate discharge flow rates during injection that are consistent with those assumed in the safety analyses.

The maximum nitrogen cover pressure limit ensures that excessive amounts of gas will not be injected into the RCS after the SITs have emptied.

A minimum pressure of ~~[593]~~ 500 psig and a maximum pressure of ~~[632]~~ 650 psig
are used in the analyses. ~~To allow for instrument accuracy, a [615] psig~~ 4
~~minimum and [655] psig maximum are specified.~~ The maximum
allowable boron concentration of ~~[2800]~~ 2200 ppm is based upon boron 2
precipitation limits in the core following a LOCA. Establishing a maximum limit for boron is necessary since the time at which boron precipitation would occur in the core following a LOCA is a function of break location, break size, the amount of boron injected into the core, and the point of ECCS injection. Post LOCA emergency procedures directing the operator to establish simultaneous hot and cold leg injection are based on the worst case minimum boron precipitation time. Maintaining the maximum SIT boron concentration within the upper limit ensures that the SITs do not invalidate this calculation. An excessive boron concentration in any of the borated water sources used for injection during a LOCA could result in boron precipitation earlier than predicted.

The minimum boron requirements of ~~[1500]~~ 1900 ppm are based on beginning 2
of life reactivity values and are selected to ensure that the reactor will remain subcritical during the reflood stage of a large break LOCA. During a large break LOCA, all control element assemblies (CEAs) are assumed not to insert into the core, and the initial reactor shutdown is

BASES

APPLICABLE SAFETY ANALYSES (continued)

accomplished by void formation during blowdown. Sufficient boron concentration must be maintained in the SITs to prevent a return to criticality during reflood. ~~Although this requirement is similar to the basis for the minimum boron concentration of the refueling water tank (RWT), the minimum SIT concentration is lower than that of the RWT since the SITs need not account for dilution by the RCS.~~ 1

The SITs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO establishes the minimum conditions required to ensure that the SITs are available to accomplish their core cooling safety function following a LOCA. ~~[~~Four~~]~~ SITs are required to be OPERABLE to ensure that 100% of the contents of ~~[~~three~~]~~ of the SITs will reach the core during a LOCA. 2

This is consistent with the assumption that the contents of one tank spill through the break. If the contents of fewer than three tanks are injected during the blowdown phase of a LOCA, the ECCS acceptance criteria of 10 CFR 50.46 (Ref. 2) could be violated.

For an SIT to be considered OPERABLE, the isolation valve must be fully open, power removed above ~~[2000] psig~~ 1750 psia, and the limits established in the SR for contained volume, boron concentration, and nitrogen cover pressure must be met. 2

APPLICABILITY

In MODES 1 and 2, and MODE 3 with RCS pressure ≥ ~~700~~ 1750 psia, the SIT OPERABILITY requirements are based on an assumption of full power operation. Although cooling requirements decrease as power decreases, the SITs are still required to provide core cooling as long as elevated RCS pressures and temperatures exist. 2

This LCO is only applicable at pressures ≥ ~~700~~ 1750 psia. Below ~~700~~ 1750 psia, the rate of RCS blowdown is such that the ECCS pumps can provide adequate injection to ensure that peak clad temperature remains below the 10 CFR 50.46 (Ref. 2) limit of 2200°F. 2

In MODE 3, at pressures < ~~700~~ 1750 psia, and in MODES 4, 5, and 6, the SIT motor operated isolation valves are closed to isolate the SITs from the RCS during unit shutdown and startup. ~~This allows RCS cooldown and depressurization without discharging the SITs into the RCS or requiring depressurization of the SITs.~~ 5

BASES

ACTIONS

A.1

If the boron concentration of one SIT is not within limits, it must be returned to within the limits within 72 hours. In this condition, ability to maintain subcriticality or minimum boron precipitation time may be reduced, but the reduced concentration effects on core subcriticality during reflood are minor. Boiling of the ECCS water in the core during reflood concentrates the boron in the saturated liquid that remains in the core. In addition, the volume of the SIT is still available for injection. Since the boron requirements are based on the average boron concentration of the total volume of three SITs, the consequences are less severe than they would be if an SIT were not available for injection. Thus, 72 hours is allowed to return the boron concentration to within limits.

The combination of redundant level and pressure instrumentation for any single SIT provides sufficient information so that it is not worthwhile to always attempt to correct drift associated with one instrument, with the resulting radiation exposures during entry into containment, as there is sufficient time to repair one in the event that a second one became inoperable. Because these instruments do not initiate a safety action, it is reasonable to extend the allowable outage time for them. While technically inoperable, the SIT will be available to fulfill its safety function during this time and, thus, this Completion Time results in a negligible increase in risk.

B.1

If one SIT is inoperable, for reasons other than boron concentration or the inability to verify level or pressure, the SIT must be returned to OPERABLE status within 24 hours. In this Condition, the required contents of three SITs cannot be assumed to reach the core during a LOCA as is assumed in Appendix K (Ref. 5).

CE NPSD-994 (Ref. 6) provides a series of deterministic and probabilistic findings that support the 24 hour Completion Time as having no affect on risk as compared to shorter periods for restoring the SIT to OPERABLE status.

BASES

ACTIONS (continued)

C.1 and C.2

If the SIT cannot be restored to OPERABLE status 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 3 within 6 hours and pressurizer pressure reduced to < ~~700~~ 1750 psia 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. 2

D.1

If more than one SIT is inoperable, the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.5.1.1

Verification that each SIT isolation valve is fully open, as indicated in the control room, before power is removed from its valve operator, ensures that SITs are available for injection and ensures timely discovery if a valve should be partially closed. If an isolation valve is not fully open, the rate of injection to the RCS would be reduced. Although a motor operated valve should not change position with power removed, a closed valve could result in not meeting accident analysis assumptions. ~~[A 12 hour Frequency is considered reasonable in view of other administrative controls that ensure the unlikelihood of a mispositioned isolation valve.~~ 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 3.5.1.2 and SR 3.5.1.3

SIT borated water volume and nitrogen cover pressure should be verified to be within specified limits in order to ensure adequate injection during a LOCA. ~~[Due to the static design of the SITs, a 12 hour Frequency usually allows the operator sufficient time to identify changes before the limits are reached. Operating experience has shown this Frequency to be appropriate for early detection and correction of off normal trends.~~ 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 3.5.1.4

~~Thirty-one days is reasonable for verification to determine that each SIT's boron concentration is within the required limits, because the static design of the SITs limits the ways in which the concentration can be changed. [The 31 day Frequency is adequate to identify changes that could occur from mechanisms such as stratification or inleakage.~~ 2 Sampling the affected SIT within 6 hours after a 1% volume increase will identify whether inleakage has caused a reduction in boron concentration to below the required limit. It is not necessary to verify boron concentration if the added water is from the RWT, because [the boron concentration of] the water contained in the RWT is within the SIT boron concentration requirements [and assumes the RWT has not been diluted since the last time the RWT boron concentration was verified to be within limits.] 6 This is consistent with the recommendations of NUREG-1366 (Ref. 4).

~~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 3.5.1.5

Verification that power is removed from each SIT isolation valve operator ~~when the pressurizer pressure is ≥ 2000 psia~~ ensures that an active failure could not result in the undetected closure of an SIT motor operated isolation valve. If this were to occur, only two SITs would be available for injection, given a single failure coincident with a LOCA~~. [Since installation and r~~ R removal of power to the SIT isolation valve operators is conducted under administrative control~~, the 31 day Frequency was chosen to provide additional assurance that power is removed~~. 2 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.~~
~~--]~~

~~This SR allows power to be supplied to the motor operated isolation valves when RCS pressure is < 2000 psia, thus allowing operational flexibility by avoiding unnecessary delays to manipulate the breakers during unit startups or shutdowns.~~ 1

BASES

REFERENCES

U, Chapter 15

1. FSAR, ~~Section [6.3]~~. 1 2

2. 10 CFR 50.46.

U, Section 6.3

3. FSAR, ~~Chapter [15]~~. 1 2

4. Draft NUREG-1366, February 1990.

5. 10 CFR 50 Appendix K.

6. CE NPSD-994, "CEOG Joint Applications Report for Safety Injection Tank AOT/STI Extension," May 1995.

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.1, BASES, SAFETY INJECTION TANKS (SITs)

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. The SIT instrument range percentage values, with and without allowance for instrument inaccuracy, that correspond to the minimum and maximum SIT volumes in cubic feet of borated water are deleted. The analyses are based upon the cubic feet requirements; the percentage values are provided for operator use. Plant procedures implement ITS SR 3.5.1.2 to verify borated water volume in each SIT and include appropriate unit of measurement and instrument accuracy allowances. Therefore, the instrument values and associated description for operator use are unnecessary. The SIT volume values retained in ITS 3.5.1.2 reflect the SIT volume values assumed in the PSL safety analysis. .

4. The SIT instrument range values with allowance for instrument inaccuracy, correspond to the minimum and maximum SIT nitrogen pressures are deleted. The analyses are based upon the actual pressures; the instrument accuracy values are provided for operator use. Plant procedures implement ITS SR 3.51.3 to verify nitrogen cover pressure in each SIT and include appropriate unit of measurement and instrument accuracy allowances. Therefore, the instrument accuracy range in the ITS Bases is unnecessary. The SIT nitrogen cover pressure values retained in ITS 3.5.1.3 reflect the SIT pressure values assumed in the PSL safety analysis.

5. The ISTS Bases statement regarding why an SIT is isolated when not within the ITS Applicability is changed to state that the SIT isolation valves are closed to isolate the SITs from the RCS during unit shutdown and startup. Plant procedures implement shutdown and startup requirements including when the SITs may and may not be isolated from the RCS. This change is consistent with the ITS SR 3.5.1.5 description.

6. Additional clarification is added from the CTS to the Bases of ITS 3.5.1.4 to state that the SIT boron concentration verification is unnecessary because the boron concentration of the water contained in the RWT is within the SIT boron concentration requirements. This assumes the RWT has not been diluted since the last time the RWT boron concentration was verified to be within limits.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.5.1, SAFETY INJECTION TANKS (SITs)

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

ATTACHMENT 2

3.5.2 ECCS - Operating

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

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - OPERATING

LIMITING CONDITION FOR OPERATION

LCO 3.5.2 3.5.2 Two ~~independent~~ ECCS ~~subsystems~~ trains shall be OPERABLE ~~with each subsystem comprised of:~~ LA01

~~a. One OPERABLE high-pressure safety injection (HPSI) pump,~~

~~b. One OPERABLE low-pressure safety injection pump,~~

~~c. An independent 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 Recirculation Actuation Signal, and~~

~~NOTE~~
~~One ECCS subsystem charging pump shall satisfy the flow path requirements of Specification 3.1.2.2.a or 3.1.2.2.d. The second ECCS subsystem charging pump shall satisfy the flow path requirements of Specification 3.1.2.2.b or 3.1.2.2.e.~~ LA02

~~d. One OPERABLE charging pump.~~ LA01

Applicability **APPLICABILITY:** MODES 1, 2 and 3 with pressurizer pressure ≥ 1750 psia.

ACTION:

Condition A / Required Action A.1 / Required Action C.1, C.2

~~a.~~ ~~1.~~ ~~With~~ one ~~ECCS~~ LPSI subsystem inoperable ~~only because its associated train is inoperable~~, restore ~~the inoperable~~ subsystem to OPERABLE status within 7 days or in accordance with the Risk Informed Completion Time Program, or be in ~~at least HOT STANDBY~~ MODE 3 within ~~the next~~ 6 hours and ~~in HOT SHUTDOWN~~ Reduce pressurizer pressure to < 1750 psia within ~~the following 6~~ 12 hours. A02

Condition B / Required Action B.1 / Required Action C.1, C.2

~~2.~~ ~~With~~ one ~~ECCS subsystem~~ or more trains train(s) inoperable for reasons other than condition a.~~1.~~, restore ~~the inoperable subsystem~~ to OPERABLE status within 72 hours or in accordance with the Risk Informed Completion Time Program, or be in ~~at least HOT STANDBY~~ MODE 3 within ~~the next~~ 6 hours and ~~in HOT SHUTDOWN~~ Reduce pressurizer pressure to < 1750 psia within ~~the following 6~~ 12 hours. A02 L01

~~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.~~ L02

Add proposed Action D L01

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS

4.5.2 ~~Each ECCS subsystem shall be demonstrated OPERABLE:~~

SR 3.5.2.1 ~~a.~~ In accordance with the Surveillance Frequency Control Program by verifying ~~that~~ the following valves are in the ~~indicated~~ position~~s~~ with power to the valve operator~~s~~ 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

SR 3.5.2.2, SR 3.5.2.3 ~~b.~~ In accordance with the Surveillance Frequency Control Program by:

SR 3.5.2.2 ~~1.~~ Verify~~ing that~~ each [ECCS] 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.*

SR 3.5.2.3 ~~2.~~ Verify~~ing~~ 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.~~ (LA03)

~~d.~~ In accordance with the Surveillance Frequency Control Program by:

1. Verifying proper operation of the open permissive interlock (OPI) and the valve open/high SDCS pressure alarms for isolation valves V3651, V3652, V3480, V3481. (See ITS 3.4.14)

SR 3.5.2.9 ~~2.~~ [Verify by] ~~A~~ visual inspection [each ECCS train] ~~of the~~ containment sump ~~and verifying that the subsystem~~ suction inlet~~s~~ are not restricted by debris and [the suction inlet] ~~that the sump components~~ (trash racks~~,~~ [and] screens~~, etc.~~) show no evidence of structural distress or [abnormal] corrosion.

SR 3.5.2.2 Note * Not required to be met for system vent flow paths opened under administrative control.

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.6, SR 3.5.2.7, SR 3.5.2.8 — e. In accordance with the Surveillance Frequency Control Program, during shutdown, by: L03

SR 3.5.2.6 — 1. Verifying that each [ECCS] automatic valve in the flow paths [that is not locked, sealed, or otherwise secured in position,] actuates to its correct position on [an actual or simulated] a Safety Injection Actuation Signal. L04 L05 LA01

SR 3.5.2.7 — 2. Verifying that each [ECCS] of the following pumps start[s] automatically upon receipt of a Safety Injection [on an actual or simulated] Actuation Signal; L05

a. High-Pressure Safety Injection Pumps.

b. Low-Pressure Safety Injection Pumps.

c. Charging Pumps.

LA01

SR 3.5.2.8 — 3. Verifying that upon receipt of an actual or simulated Recirculation Actuation Signal: each low-pressure safety injection pump stops, each containment sump isolation valve opens, each refueling water tank outlet valve closes, and each safety injection system recirculation valve to the refueling water tank closes. LA04

SR 3.5.2.4 — f. By verifying that each [ECCS] of the following pumps develops the specified total developed head [at the test flow point is greater than or equal to the required developed head in accordance with the] when tested pursuant to the INSERVICE TESTING PROGRAM.

1. High-Pressure Safety Injection pumps.

2. Low-Pressure Safety Injection pumps.

LA01

SR 3.5.2.5 — [Add proposed SR 3.5.2.5] M01

SR 3.5.2.10 — [Add proposed SR 3.5.2.10] [Add proposed SR 3.5.2.11] M02

A01

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EMERGENCY CORE COOLING SYSTEMS

3/4.5.2 ECCS SUBSYSTEMS - OPERATING

LIMITING CONDITION FOR OPERATION

LCO 3.5.2 — 3.5.2 Two independent Emergency Core Cooling System (ECCS) subsystems [trains] shall be OPERABLE with each subsystem comprised of:

a. One OPERABLE high pressure safety injection pump,

b. One OPERABLE low pressure safety injection pump, and

c. An independent 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 Recirculation Actuation Signal, and

LA01

NOTE

One ECCS subsystem charging pump shall satisfy the flow path requirements of Specification 3.1.2.2.a or 3.1.2.2.d. The second ECCS subsystem charging pump shall satisfy the flow path requirements of Specification 3.1.2.2.b or 3.1.2.2.e.

LA02

d. One OPERABLE charging pump.

LA01

Applicability — **APPLICABILITY**: MODES 1, 2, and 3 with pressurizer pressure ≥ 1750 psia.

ACTION:

Condition A
Required Action A.1

a. 1. With one ECCS subsystem inoperable only because its associated [LPSI] train is inoperable, restore the inoperable subsystem to OPERABLE status within 7 days or in accordance with the Risk Informed Completion Time Program, or be in at least HOT STANDBY [MODE 3] within the next 6 hours and in HOT SHUTDOWN [Reduce pressurizer pressure to < 1750 psia] within the following 6 hours. [12]

Required Action C.1, C.2

A02 L01

Condition B
Required Action B.1

2. With one [or more trains] ECCS subsystem [train(s)] inoperable for reasons other than condition a.1., restore the inoperable subsystem to OPERABLE status within 72 hours or in accordance with the Risk Informed Completion Time Program, or be in at least HOT STANDBY [MODE 3] within the next 6 hours and in HOT SHUTDOWN [Reduce pressurizer pressure to < 1750 psia] within the following 6 hours. [12]

Required Action C.1, C.2

A02

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.

L02

Add proposed Action D — L01

EMERGENCY CORE COOLING SYSTEMS

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: L07

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

SR 3.5.2.2 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.*

SR 3.5.2.3 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: LA03

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:

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. See ITS 3.4.14

SR 3.5.2.2 Note * Not required to be met for system vent flow paths opened under administrative control.

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.1 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.

each ECCS train / Verify by / and / abnormal

3. Verifying that a minimum total of 173 cubic feet of solid granular trisodium phosphate dodecahydrate (TSP) is contained within the TSP storage baskets.

4. Verifying that when a representative sample of 70.5 ± 0.5 grams of TSP from a TSP storage basket is submerged, without agitation, in 10.0 ± 0.1 gallons of 120 ± 10°F borated water representative of the RWT, the pH of the mixed solution is raised to greater than or equal to 7 within 4 hours.

See ITS 3.5.5

SR 3.5.2.6, SR 3.5.2.7, SR 3.5.2.8 f. In accordance with the Surveillance Frequency Control Program, during shutdown, by: L03

SR 3.5.2.6 1. Verifying that each automatic valve in the flow paths actuates to its correct position on SIAS and/or RAS test signals. L04 L05

ECCS / that is not locked, sealed, or otherwise secured in position, / an actual or simulated actuation

SR 3.5.2.7 2. Verifying that each of the following pumps start automatically upon receipt of a Safety Injection Actuation Test Signal: L05

ECCS / s / on an actual or simulated

a. High-Pressure Safety Injection pumps. LA01

b. Low-Pressure Safety Injection pumps.

c. Charging Pumps

SR 3.5.2.8 3. Verifying that upon receipt of an actual or simulated Recirculation Actuation Signal: each low-pressure safety inject ion pump stops, each containment sump isolation valve opens, each refueling water tank outlet valve closes, and each safety injection system recirculation valve to the refueling water tank closes. LA04

SR 3.5.2.4 g. By verifying that each of the following pumps develops the specified total developed head when tested pursuant to the INSERVICE TESTING PROGRAM:

ECCS / at the test flow point is greater than or equal to the required developed head in accordance with the

1. High-Pressure Safety Injection pumps. LA01

2. Low-Pressure Safety Injection pumps.

SR 3.5.2.9 h. By verifying the correct position of each electrical and/or mechanical position stop for the following ECCS throttle valves:

is in the / each / listed below

1. During valve stroking operation or following maintenance on the valve and prior to declaring the valve OPERABLE when the ECCS subsystems are required to be OPERABLE. L06

SR 3.5.2.5 — Add proposed SR 3.5.2.5 M01

SR 3.5.2.10 — Add proposed SR 3.5.2.10 — Add proposed SR 3.5.2.11 M02

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

SR 3.5.2.9 ~~2.~~ In accordance with the Surveillance Frequency Control Program.

HPSI System Valve Number		**LPSI System Valve Number**	
~~a.~~	HCV 3616/3617	~~a.~~	HCV 3615
~~b.~~	HCV 3626/3627	~~b.~~	HCV 3625
~~c.~~	HCV 3636/3637	~~c.~~	HCV 3635
~~d.~~	HCV 3646/3647	~~d.~~	HCV 3645
~~e.~~	V3523/V3540		

DISCUSSION OF CHANGES
ITS 3.5.2, ECCS - OPERATING

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 3.5.2 Actions a.1 and a.2 require in part, “or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.” when one ECCS subsystem cannot be restored to OPERABLE status within the required time. ITS 3.5.2 Required Action C.2 requires, when the Required Actions and associated Completion Times are not met, reducing pressurizer pressure to < 1750 psia within 12 hours (i.e., within the following 6 hours). This changes the end state in CTS 3.5.2 Actions a.1 and a.2 from HOT SHUTDOWN (MODE 4) to MODE 3 with pressurizer pressure < 1750 psia.

The purpose of CTS 3.5.2 Action a.1 and a.2 is to place the plant in a condition in which the equipment is no longer required. CTS 3.5.2 Action a.1 and a.2 provide appropriate actions to take for an inoperable ECCS subsystem when the unit is in MODE 1, 2, or 3 with pressurizer pressure is ≥ 1750 psia. The ECCS subsystems are not required to be OPERABLE when pressurizer pressure is < 1750 psia, as stated in CTS 3.5.2. Therefore, in accordance with CTS 3.0.2 (ITS LCO 3.0.2), when pressurizer pressure is < 1750 psia, the requirements to be in MODE 4 in CTS 3.5.1 Action a.1 and a.2 are no longer required to be completed. The ECCS subsystems, with pressurizer pressure below 1750 psia, are no longer required to be OPERABLE.

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 ECCS subsystems 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

M01 CTS 3.5.2 requires an OPERABLE charging pump. Unit 1 CTS 4.5.2.e.2 and f., and Unit 2 4.5.2.f.2 and g., require performance testing of the ECCS subsystems. CTS does not include a Surveillance Requirement for performance testing of the charging pumps. ITS SR 3.5.2.5 requires verification that the charging pumps develop a minimum required flow. ITS SR 3.5.2.5 requires this SR to be conducted in accordance with the INSERVICE TESTING PROGRAM. This changes the CTS by adding the ITS requirement to verify each charging pump develops a minimum required flow.

The purpose of ITS SR 3.5.2.5 is to verify charging flow within a testing Frequency required in accordance with the INSERVICE TESTING PROGRAM. This change is acceptable because it provides additional assurance that each charging pump will be capable of performing its function. This change is designated as more restrictive, because it adds an SR to the CTS.

M02 CTS 4.5.2 does not contain surveillances for boric acid makeup tank (BAMT) volume and the BAMT concentration for the charging pump ECCS function. Similarly, ISTS 3.5.2 does not contain a surveillance for the BAMT volume and the boron concentration for the charging pump ECCS function. The ISTS 3.5.2 assumes the RWT as the ECCS water source for LPSI, HPSI, and charging ECCS subsystems. The PSL design connects the ECCS charging subsystem to the BAMTs. Though the charging subsystem can be aligned to the RWT, and the charging pump suction automatically aligns to the RWT on Volume Control Tank low level, the RWT to charging pump suction valve gets a close signal on a safety injection actuation signal. This changes the CTS by adding Surveillance Requirements for the BAMTs.

The Note to CTS 3.5.2.d refers to CTS 3.1.2.2 for charging subsystem flow path requirements and CTS 3.1.2.2 refers to CTS 3.1.2.8 for BAMT requirements including volume and boron concentration, respectively. However, these boration requirements are not related to the ECCS OPERABILITY but, rather, provide boration requirements to ensure the capability to restore shutdown margin during normal operations. The boration related Specifications, including CTS 3.1.2.2 and 3.1.2.8, are relocated to a licensee controlled document (e.g, Technical Requirements Manual). See DOC LA02 for a discussion of changes related to the relocation of the CTS 3.1.2.2 and 3.1.2.8 references in CTS 3.5.2.d Note.

The new ITS SR 3.5.2.10 and ITS SR 3.5.2.11 require verification that each BAMT volume is greater than or equal to the specified minimum required volume, and that each BAMT boron concentration is greater than or equal to the specified minimum required boron concentration. These Surveillances are necessary to periodically verify that a sufficient usable BAMT water volume level and boron concentration are available to the charging pump for injection during a small break LOCA (SBLOCA). PSL performed an engineering evaluation for the SBLOCA Analysis and determined that a minimum BAMT water volume of 3675 gallons for each tank provides adequate volume to meet the charging pump flow requirement credited in the SBLOCA analysis. A minimum BAMT water volume of 4000 gallons was selected to provide additional margin for future variations in the analysis. Additionally, although boron concentration from the charging flow is not directly credited in the SBLOCA analysis to maintain subcriticality, a minimum boron concentration that is equivalent to the minimum RWT boron concentration (i.e., ≥ 1900 ppm) is used for the charging pump flow.

The minimum boron concentration in the BAMT is important for the post-LOCA return to criticality analysis. This analysis determines the minimum sump boron concentration at the time of simultaneous hot/cold leg injection to confirm return to criticality does not occur. This analysis uses the minimum boron from the available sources, which includes the BAMTs. Currently, the analysis is strictly based on the RCS boron and minimum RWT boron concentration. With the

BAMT boron requirement being added to ITS 3.5.2, ECCS -Operating, the minimum BAMT boron concentration must be at least equal to the RWT minimum boron concentration. The maximum BAMT boron concentration is used in the post-LOCA long term boron precipitation analysis. The current analysis considers the volume of two full BAMTs (9975 gallons/tank) at a boron concentration that bounds the current maximum specified BAMT boron concentration parameters (volume and boron concentration). Thus, there is no need to specify a maximum boron concentration in ITS 3.5.2, ECCS – Operating.

PSL controls periodic Frequencies for Surveillances in accordance with the Surveillance Frequency Control Program (SFCP) per CTS 6.8.4.o (Unit 1) and CTS 6.8.4.q (Unit 2). Therefore, SR 3.5.2.10 and SR 3.5.2.11 will be performed at a Frequency in accordance with the Surveillance Frequency Control Program with an initial Frequency of 7 days consistent with the ISTS SR 3.5.4.2 Frequency for the RWT, and consistent with the CTS 4.1.2.8.a Frequency for the BAMT volume and boron concentration. The initial Frequency considers that the BAMT volume and boron concentration are normally stable. This changes the CTS by adding a Surveillance Requirement to verify that each BAMT volume is greater than or equal to the specified minimum required volume in accordance with the Surveillance Frequency Control Program and by adding a Surveillance Requirement to verify that each BAMT boron concentration is greater than or equal to the specified minimum required boron concentration in accordance with the Surveillance Frequency Control Program.

The purpose of this Surveillance is to assure that the necessary quality of systems and components is maintained. The Frequency is proposed to be specified in accordance with the Surveillance Frequency Control Program and is acceptable because the periodic Frequency is placed under licensee control pursuant to the methodology described in NEI 04-10, which is specified in ITS Section 5.5. The SFCP provides the necessary administrative controls to require that surveillances related to testing, calibration and inspection are conducted at a frequency to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met. Florida Power & Light Company (FPL) has determined that the control of the periodic Frequency in accordance with the SFCP is consistent with the intent of TSTF-425, Revision 3, and with the NRC's model SE dated July 6, 2009 (*74 FR 32001*). The proposed Frequency of SR 3.5.2.10 is a periodic frequency and does not meet the scope exclusion criteria identified in Section 1.0, "Introduction," of the TSTF-425 model SE.

The SFCP was established as described in 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.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 3.5.2 states, in part, that two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of: (a) one OPERABLE high pressure safety injection (HPSI) pump, (b) one OPERABLE low pressure safety injection pump, (c) an independent 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 recirculation actuation signal, and (d) one OPERABLE charging pump. Similarly, Unit 1 CTS 4.5.2.e.2 and f, and Unit 2 CTS 4.5.2.f.2 and g, state, in part, the ECCS pumps (i.e., HPSI, LPSI, Charging) to be tested that are part of an OPERABLE ECCS train. ITS 3.5.2 does not contain this level of detail of what constitutes OPERABILITY. This changes the CTS by moving details concerning what constitutes an OPERABLE ECCS train, and that the two systems must be "independent" 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 two ECCS trains to be OPERABLE and 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 3.5.2.d Note states “One ECCS subsystem charging pump shall satisfy the flow path requirements of Specification 3.1.2.2.a or 3.1.2.2.d. The second ECCS subsystem charging pump shall satisfy the flow path requirements of Specification 3.1.2.2.b or 3.1.2.2.e” ITS LCO 3.5.2 does not include details associated with the flow path requirements necessary to support a ECCS charging subsystem. This changes the CTS by removing details related to a ECCS charging subsystem and relocating required details to the ITS Bases.

As stated in the NRC safety evaluation (SE) associated with the Unit 2 extended power uprate (See NRC to FPL letter dated July 9, 2012; NRC ADAMS Accession No. ML12268A167), the purpose of the CTS Note is to assure that ECCS sources credited in the LOCA analysis are available to support the charging subsystems. ITS LCO 3.5.2 states that two ECCS trains shall be OPERABLE. The details of the OPERABILITY requirements associated with the

ECCS trains are addressed by the Surveillance Requirements and the ITS Bases.

The purpose of CTS 3.1.2.2 requirements (referenced in CTS 3.5.2.d Note) is to ensure a means to control the chemical neutron absorber (boron) concentration in the Reactor Coolant System (RCS) is available and to provide adequate requirements to restore shutdown margin during normal operations. These boration requirements are not related to the ECCS OPERABILITY requirements. Referencing reactivity control Specifications for compliance with ECCS is inappropriate and could result in requirements inconsistent with the LOCA analysis. In addition, the boration-related Specifications, including the Specifications referenced in the CTS 3.5.2.d Note are relocated to a licensee controlled document (e.g., Technical Requirements Manual) - see ITS 3.1 Deleted - Relocated Specifications. Therefore, to avoid confusion between boration requirements, as specified in CTS 3.1.2.2, and the charging subsystem requirements to support ECCS OPERABILITY, the ITS Bases relocates sufficient detail to the ITS Bases to assure that ECCS sources (e.g., charging subsystems) credited in the LOCA analysis are available. The proposed ITS Bases states, in part:

> "Charging pump flow paths take suction from OPERABLE BAMTs (e.g. volume within required limit) and supplies the RCS via the normal charging lines.
>
> One charging pump flow path taking suction from either a single BAMT via the associated boric acid makeup pump, or both BAMTs via both boric acid makeup pumps. A second charging pump flow path taking suction from either a single BAMT via gravity feed valves, or both BAMTs via gravity feed valves."

The removal of these details for charging pump flow paths to meet operability 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 LCO 3.5.2 and the associated Surveillance Requirements retain sufficient requirements to assure two OPERABLE ECCS trains, which includes two OPERABLE charging subsystems. 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 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)* Unit 1 CTS 4.5.2.c and Unit 2 4.5.2.d state "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: For all accessible areas of the containment prior to establishing CONTAINMENT INTEGRITY, and at least once daily of the areas affected within containment by the containment entry and during the final entry when CONTAINMENT INTEGRITY is established." ITS 3.5.2 does not include these Surveillances. This changes the CTS by removing the Surveillance for visual inspections inside Containment and relocating them to the Technical Requirements Manual.

The removal of these visual inspections from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications in order to provide adequate protection of public health and safety. The ITS retains the Surveillance to perform a visual inspection of each ECCS train containment sump suction inlet to ensure that it is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion. Periodic inspections of each ECCS train containment sump suction inlet ensure that it is unrestricted and stays in proper operating condition. 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 visual inspections inside Containment are being removed from the Technical Specifications.

LA04 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* Unit 1 CTS 4.5.2.e.3 and Unit 2 4.5.2.f.3 each state "Verifying that upon receipt of an actual or simulated Recirculation Actuation Signal: each low-pressure safety injection pump stops, each containment sump isolation valve opens, each refueling water tank outlet valve closes, and each safety injection system recirculation valve to the refueling water tank closes." ITS does not contain details for automatic valve positioning in response to an actuation signal. ITS SR 3.5.2.6 and ITS SR 3.5.2.8 demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SIAS and on an RAS, and that the LPSI pumps stop on receipt of an actual or simulated RAS. This changes the CTS by deleting the details that state, in part, that upon receipt of an actual or simulated Recirculation Actuation Signal, each containment sump isolation valve opens, each refueling water tank outlet valve closes, and each safety injection system recirculation valve to the refueling water tank closes.

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. The ITS still retains the Surveillance Requirements to demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SIAS and on an RAS. 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 4 - Relaxation of Required Action)* CTS 3.5.2 Action a.2 states that with one ECCS subsystem inoperable for reasons other than condition a.1 (i.e. one LPSI subsystem inoperable), restore the inoperable subsystem to OPERABLE status within 72 hours or in accordance with the Risk Informed Completion Time. ITS 3.5.2 Action B states, with “one or more” trains inoperable for reasons other than Condition A, restore the train(s) to OPERABLE status within 72 hours or in accordance with the Risk Informed Completion Time. Additionally, ITS 3.5.2 Action D states that with less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available, enter LCO 3.0.3 immediately. CTS does not provide an action for the condition with less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS subsystem.

This changes the CTS by allowing combinations of equipment in each train to be credited with meeting the ECCS safety function provided 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is available. For example, under the CTS an inoperable HPSI pump in one train and an inoperable LPSI pump in the other train would require an immediate entry into CTS 3.0.3. Under the ITS, the same condition would allow 72 hours before requiring a shutdown because the remaining OPERABLE HPSI pump and LPSI pump are capable of producing flow equivalent to a single OPERABLE ECCS train.

The purpose of CTS 3.5.2 Action a.2 is to limit the period of time the plant can operate without redundant ECCS trains. This change is acceptable because the Required Actions are used to establish remedial measures that must be taken in response to degraded conditions in order to minimize risk associated with continued plant operation while providing time to repair inoperable equipment. The Required Actions are consistent with safe operation under the specified Condition, considering the OPERABILITY status of the remaining ECCS equipment, a reasonable time for repairs or replacement of required equipment, and the low probability of a design basis accident occurring during the time period. ITS 3.5.2 Action B continues to ensure that the capability of the equivalent of an ECCS train is available and limits the time in this condition to 72 hours. The ECCS in this condition can still perform its safety function, assuming no single failure occurs. ITS 3.5.2 Action D continues to ensure that there are necessary actions to place the plant in a safe condition outside of the Mode of Applicability since the ECCS safety function for 100% ECCS flow equivalent to a single ECCS train is no longer available. 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 9 – Deletion of Reporting Requirements)* Unit 1 CTS 3.5.2 Action b. states “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." Unit 2 CTS 3.5.2 Action b. states "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." ITS 3.5.2 does not contain this CTS 90-day Special Report requirement in the event the ECCS is actuated and injects water into the RCS. ITS 3.5.2 retains the ACTIONS for inoperable ECCS trains. This changes the CTS by deleting this 90-day Special Report.

The removal of these details for making reports 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 LCO for two ECCS trains to be OPERABLE and ACTIONS when one or more ECCS trains are inoperable. Deletion of the ECCS reporting requirement is acceptable since 10 CFR 50.72(b)(2)(iv) requires a 4 hour notification in the event of an unplanned ECCS actuation and injection into the RCS. Additionally, 10 CFR 50.73(2)(iv)(A) also requires submission of a licensee event report for any unplanned event or condition that resulted in manual or automatic actuation of ECCS. PSL Unit 1 and Unit 2 operating licenses require compliance with 10 CFR 50.72 and 50.73. Therefore, the CTS requirement is unnecessary. Requirements continue to be provided in ITS to mitigate a DBA while in MODES 1, 2 and 3 with pressurizer pressure ≥ 1750 psia. This change is designated as less restrictive because reports that would be submitted under the CTS will not be required under the ITS.

L03 *(Category 10 – Deletion of Surveillance Requirement Shutdown Performance Requirements)* Unit 1 CTS 4.5.2.e and Unit 2 CTS 4.5.2.f contain the requirement to perform the test "during shutdown." ITS SR 3.5.2.6, SR 3.5.2.7, and SR 3.5.2.8 do not specify conduct of the test to occur during shutdown. This changes the CTS by deleting the requirement to perform these Surveillances during shutdown.

The purpose of Unit 1 CTS 4.5.2.e and Unit 2 CTS 4.5.2.f is to demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SIAS and on an RAS, that each ECCS pump starts on receipt of an actual or simulated SIAS, and that the LPSI pumps stop and each automatic containment sump, RWT outlet, and SI recirc valve actuates to the required position on receipt of an actual or simulated RAS.

The proposed Surveillance does not include the restriction that it be performed during shutdown. The control of unit conditions appropriate to perform the test is an issue for procedures and scheduling and has been determined by the NRC Staff to be unnecessary as a Technical Specification restriction. As indicated in Generic Letter 91-04, removal of this specific restriction is consistent with the vast majority of other Technical Specification Surveillances that do not dictate unit conditions for the Surveillance. This change is designated as less restrictive because the Surveillance may be performed during plant conditions other than shutdown.

L04 *(Category 5 – Deletion of Surveillance Requirement)* Unit 1 CTS 4.5.2.e.1 and Unit 2 CTS 4.5.2.f.1 require verification that each automatic ECCS valve in the flow path actuates to its correct position. ITS SR 3.5.2.6 requires verification that each automatic ECCS valve in the flow path "that is not locked, sealed, or otherwise secured in position" actuates to the correct position. This changes the CTS by deleting the Surveillance Requirement for those valves that are locked, sealed, or otherwise secured in position.

The purpose of Unit 1 CTS 4.5.2.e.1 and Unit 2 CTS 4.5.2.f.1 is to provide assurance that if an event occurred requiring ECCS valves to be in their correct position, then those requiring automatic actuation would actuate to their correct position. This change is acceptable because the deleted Surveillance 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 provide confidence that the equipment can perform its assumed safety function. Those automatic valves that are locked, sealed, or otherwise secured in position are not required to actuate on a safety injection actuation signal or a recirculation actuation signal in order to perform their safety function because they are already in the required position. Testing such valves would not provide any additional assurance of OPERABILITY. Valves that are required to actuate will continue to be tested. This change is designated as less restrictive because less stringent Surveillance Requirements are being applied in the ITS than were applied in the CTS.

L05 *(Category 6 – Relaxation Of Surveillance Requirement Acceptance Criteria)* Unit 1 CTS 4.5.2.e.1 and e.2 and Unit 2 4.5.2.f.1 and f.2 state, in part, that automatic valve actuations (e.1, f.1) and automatic pump actuations (e.2, f.2) occur upon receipt of a Safety Injection Actuation Signal. ITS SR 3.5.2.6 and SR 3.5.2.7 allow the use of a simulated or actual signal when performing these tests. This changes the CTS by allowing the use of unplanned actuations to perform the Surveillance based on the collection of sufficient information to satisfy the surveillance test requirements.

The purpose of CTS is to demonstrate that each automatic ECCS valve actuates to the required position on an SIAS and on an RAS, that each ECCS pump starts on receipt of an SIAS, and that the LPSI pumps stop on receipt of an RAS. This change is acceptable because the channel itself cannot discriminate between an "actual" or "simulated" signal. Therefore, the results of the testing are unaffected by the type of signal used to initiate the test. This change is designated as less restrictive because it allows an actual signal to be credited for Surveillance where only a simulated signal was previously allowed in the CTS.

L06 **Unit 2 Only:** *(Category 7 - Relaxation of Surveillance Frequency)* CTS 4.5.2.h.1 states, in part, that verification of the correct position of each electrical and/or mechanical position stop for ECCS throttle valves is required "during valve stroking operation or following maintenance on the valve and prior to declaring the valve OPERABLE when the ECCS subsystems are required to be OPERABLE." ISTS SR 3.5.2.1 states "Verify, for each ECCS throttle valve listed below, each position stop is in the correct position." The ITS Surveillance does not require the valve position stop verification during valve stroking operation or following maintenance on the valve. This changes the CTS by deleting the

Surveillance frequency requirement “during valve stroking operation or following maintenance on the valve and prior to declaring the valve OPERABLE when the ECCS subsystems are required to be OPERABLE.”

The purpose of CTS 4.5.h.1 is verification of the correct position of each electrical and/or mechanical position stop for ECCS throttle valves. 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. This change is designated as less restrictive because Surveillances which are required in the CTS will not be required in the ITS.

L07 **Unit 2 Only:** *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.5.2.a states in part, that each ECCS subsystem shall be demonstrated OPERABLE 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. These valves include Safety Injection Tank (SIT) Vent Valves V3733, V3734, V3735, V3736, V3737, V3738, V3739, V3740. CTS 3.5.2 (ITS LCO 3.5.2) requires two ECCS subsystems to be OPERABLE with each subsystem comprised of one high-pressure safety injection (HPSI) pump, one low-pressure safety injection pump, flow path taking suction from the refueling water tank, and one charging pump. CTS 3.5.2 does not include the SITs as components of an ECCS subsystem. The SIT ECCS function is addressed in CTS 3.5.1 (ITS LCO 3.5.1). Neither ITS 3.5.1 nor 3.5.2 contains a Surveillance to verify the SIT vent valves are locked closed with power to the valve operators removed. This changes the CTS by deleting the Surveillance of verifying SIT vent valves are locked closed with power to the valve operators removed.

The purpose of CTS 4.5.2.a is to verify SIT vent valves are locked in the correct position with power to the valve operators removed to ensure a valve mispositioning event cannot occur, rendering the ECCS inoperable. The basis for this Surveillance, as described in the Bases of ISTS SR 3.5.2.1, is to ensure an inadvertent valve misalignment or active failure, similar to those described in IE Information Notice No. 87-01, does not result in disabling the function of both ECCS trains (subsystems) and invalidate the accident analysis. The SIT vent valves are not required to meet the LCO of CTS 3.5.2 and do not support the OPERABILITY of the ECCS subsystems. The SIT vent valves support OPERABILITY of the SITs by maintaining the integrity of the SIT pressure boundary. This change is acceptable because during a plant startup, the SIT vent valves must be closed to pressurize the SITs and meet the nitrogen cover pressure requirements of CTS 3.5.1.d and 4.5.1.1.a.1. This ensures the SITs are pressurized and available to inject its contents in the event of a LOCA. 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. Additionally, the SIT vent valves are designed to fail close on loss of power and a vent valve misposition will only affect one SIT. Therefore, an inadvertent valve misalignment or active failure, similar to those described in IE Information Notice No. 87-01, will not result in disabling the SIT ECCS function. Any SIT vent valve misposition will also result in a decrease of nitrogen cover pressure below the CTS 3.5.1.d (ITS SR 3.5.1.3) requirement requiring the associated SIT to be declared inoperable and appropriate actions performed. Therefore, the deleted Surveillance Requirement is not necessary to support OPERABILITY of the ECCS subsystems and is not necessary to ensure that the SITs can perform their required ECCS function~~s~~.

This change is designated as less restrictive because a Surveillance~~s~~ which is required in the CTS will not be required in the ITS.

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

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS - Operating

3.5.2 LCO 3.5.2 Two ECCS trains shall be OPERABLE.

3.5.2 Applicability APPLICABILITY: MODES 1 and 2,
MODE 3 with pressurizer pressure ≥ [1700] 1750 psia. 2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
-----REVIEWER'S NOTE----- The adoption of this Condition is contingent upon implementation of a program to perform a contemporaneous assessment of the overall impact on safety of proposed plant configurations prior to performing and during performance of maintenance activities that remove equipment from service. -----------------------------------		3
ACTION 3.5.2.a.1 A. One LPSI subsystem inoperable.	A.1 Restore subsystem to OPERABLE status.	7 days [OR In accordance with the Risk Informed Completion Time Program] 2

ACTIONS (continued)

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
ACTION 3.5.2.a.2 DOC L01	B. One or more trains inoperable for reasons other than Condition A.	B.1	Restore train(s) to OPERABLE status.	72 hours [OR In accordance with the Risk Informed Completion Time Program]	2
ACTION 3.5.2.a.1, a.2	C. Required Action and associated Completion Time not met.	C.1	Be in MODE 3.	6 hours	
		AND			
		C.2	Reduce pressurizer pressure to < [1700] psia. (1750)	12 hours	2
DOC L01	D. Less than 100% of the ECCS flow equivalent to a single OPERABLE train available.	D.1	Enter LCO 3.0.3.	Immediately	

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.5.2.a	SR 3.5.2.1	[Verify the following valves are in the listed position with power to the valve operator removed [and key locked in position]. Valve Number / Position / Function [ ] / [ ] / [ ] [ ] / [ ] / [ ] [ ] / [ ] / [ ] V3659 / Open / Mini-Flow Isolation V3660 / Open / Mini-Flow Isolation	[12 hours OR In accordance with the Surveillance Frequency Control Program]]	2

SURVEILLANCE REQUIREMENTS (continued)

		SURVEILLANCE	FREQUENCY	
4.5.2.b.1 Note 4.5.2.b.1	SR 3.5.2.2	-------------------------------NOTE-------------------------- Not required to be met for system vent flow paths opened under administrative control. --- Verify each ECCS manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	~~[31 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2
4.5.2.b.2	SR 3.5.2.3	Verify ECCS locations susceptible to gas accumulation are sufficiently filled with water.	~~[31 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2
4.5.2.f	SR 3.5.2.4	Verify each ECCS pump's developed head at the test flow point is greater than or equal to the required developed head.	In accordance with the INSERVICE TESTING PROGRAM	
DOC M01	SR 3.5.2.5	~~[~~ Verify each charging pump develops a flow of ≥ ~~[36]~~ 40 gpm ~~at a discharge pressure of ≥ [2200] psig~~.	In accordance with the INSERVICE TESTING PROGRAM ~~]~~	2

SURVEILLANCE REQUIREMENTS (continued)

		SURVEILLANCE	FREQUENCY	
4.5.2.e.1	SR 3.5.2.6	Verify each ECCS automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	[[18] months OR In accordance with the Surveillance Frequency Control Program]	2
4.5.2.e.2	SR 3.5.2.7	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	[[18] months OR In accordance with the Surveillance Frequency Control Program]	2
4.5.2.e.3	SR 3.5.2.8	Verify each LPSI pump stops on an actual or simulated actuate on signal.	[[18] months OR In accordance with the Surveillance Frequency Control Program]	2
4.5.2.d.2	SR 3.5.2.9	[Verify, for each ECCS throttle valve listed below, each position stop is in the correct position. Valve Number Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion.	[[18] months OR In accordance with the Surveillance Frequency Control Program]]	4, 4
M02	SR 3.5.2.10	Verify each boric acid makeup tank water volume is ≥ 4000 gallons.	In accordance with the Surveillance Frequency Control Program	5
M02	SR 3.5.2.11	Verify each boric acid makeup tank boron concentration is ≥ 1900 ppm.	In accordance with the Surveillance Frequency Control Program	5

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS - Operating

3.5.2 LCO 3.5.2 Two ECCS trains shall be OPERABLE.

3.5.2 Applicability APPLICABILITY: MODES 1 and 2,
MODE 3 with pressurizer pressure ≥ [1700] 1750 psia. 2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
-----REVIEWER'S NOTE----- The adoption of this Condition is contingent upon implementation of a program to perform a contemporaneous assessment of the overall impact on safety of proposed plant configurations prior to performing and during performance of maintenance activities that remove equipment from service. ----------------------------------		
ACTION 3.5.2.a.1 A. One LPSI subsystem inoperable.	A.1 Restore subsystem to OPERABLE status.	7 days [OR In accordance with the Risk Informed Completion Time Program]

3

2

1

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
ACTION 3.5.2.a.2 DOC L01	B. One or more trains inoperable for reasons other than Condition A.	B.1 Restore train(s) to OPERABLE status.	72 hours [OR In accordance with the Risk Informed Completion Time Program]	2
ACTION 3.5.2.a.1, a.2	C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Reduce pressurizer pressure to < [1700] 1750 psia.	6 hours 12 hours	2
DOC L01	D. Less than 100% of the ECCS flow equivalent to a single OPERABLE train available.	D.1 Enter LCO 3.0.3.	Immediately	

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.5.2.d.2	SR 3.5.2.1 [Verify the following valves are in the listed position with power to the valve operator removed [and key locked in position]. Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion. Valve Number / Position / Function [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]	[12 hours OR In accordance with the Surveillance Frequency Control Program]]	4

SURVEILLANCE REQUIREMENTS (continued)

CTS	SURVEILLANCE		FREQUENCY	
4.5.2.b Note 4.5.2.b	SR 3.5.2.2	-------------------------------NOTE-------------------------- Not required to be met for system vent flow paths opened under administrative control. --- Verify each ECCS manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	[31 days OR In accordance with the Surveillance Frequency Control Program]	2
4.5.2.c	SR 3.5.2.3	Verify ECCS locations susceptible to gas accumulation are sufficiently filled with water.	[31 days OR In accordance with the Surveillance Frequency Control Program]	2
4.5.2.g	SR 3.5.2.4	Verify each ECCS pump's developed head at the test flow point is greater than or equal to the required developed head.	In accordance with the INSERVICE TESTING PROGRAM	
DOC M01	SR 3.5.2.5	[Verify each charging pump develops a flow of ≥ [36] 40 gpm at a discharge pressure of ≥ [2200] psig.	In accordance with the INSERVICE TESTING PROGRAM]	2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.5.2.f.1	SR 3.5.2.6	Verify each ECCS automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	[[18] months OR In accordance with the Surveillance Frequency Control Program]	2
4.5.2.f.2	SR 3.5.2.7	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	[[18] months OR In accordance with the Surveillance Frequency Control Program]	2
4.5.2.f.3	SR 3.5.2.8	Verify each LPSI pump stops on an actual or simulated actuation signal.	[[18] months OR In accordance with the Surveillance Frequency Control Program]	2
4.5.2.h DOC L06	SR 3.5.2.9	[Verify, for each ECCS throttle valve listed below, each position stop is in the correct position. Valve Number [ ] [ ] HPSI System Valve Number: HCV 3616/3617, HCV 3626/3627, HCV 3636/3637, HCV 3646/3647, V3523/V3540 LPSI System Valve Number: HCV 3615, HCV 3625, HCV 3635, HCV 3645	[[18] months OR In accordance with the Surveillance Frequency Control Program]]	2, 2
M02	SR 3.5.2.10	Verify each boric acid makeup tank water volume is ≥ 4000 gallons.	In accordance with the Surveillance Frequency Control Program	5
M02	SR 3.5.2.11	Verify each boric acid makeup tank boron concentration is ≥ 1900 ppm.	In accordance with the Surveillance Frequency Control Program	5

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.2, ECCS - OPERATING

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. 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. The adoption of this Condition is contingent upon implementation of a program to perform a contemporaneous assessment of the overall impact on safety of proposed plant configurations prior to performing and during performance of maintenance activities that remove equipment from service. St. Lucie Plant Unit 1 and Unit 2 Current Technical Specifications (CTS) were revised in Amendments 247 and 199, for Unit 1 and Unit 2 respectively, are revised to adopt a Risk Informed Completion Time (RICT) Program on July 2, 2019 (ADAMS Accession No. ML19113A099).

4. ISTS does not provide a Surveillance Requirement for visual inspection of the ECCS containment sump suction inlets for debris and the suction inlet trash racks and screens for evidence of structural distress or abnormal corrosion. Unit 1 CTS 4.5.2.d.2 and Unit 2 CTS 4.5.2.e.2 Surveillances requiring a containment sump visual inspection of ECCS pump suction inlets, are similar to the visual inspection required by ISTS SR 3.6.13.1. However, FPL is not adopting the ISTS 3.6.13 requirements but rather is retaining the current Surveillance. The ISTS is changed by adding ITS SR 3.2.5.9 for Unit 1 and SR 3.5.2.1 for Unit 2. ISTS SR 3.5.2.9 does not apply to PSL Unit 1 since mechanical stops are not required in the Unit 1 licensing basis. The Unit 1 ECCS design includes flow limiting orifices. Therefore, the ISTS SR 3.5.2.9 text is replaced with the proposed Surveillance Requirement in Unit 1 ITS. ISTS SR 3.5.2.1 does not apply for PSL Unit 2 since there is no single valve that could be mispositioned that would result in a loss of both ECCS trains as described in the ISTS Bases of SR 3.5.2.1. Therefore, the ISTS SR 3.5.2.1 text is replaced with the proposed Surveillance Requirement in the Unit 2 ITS.

5. ISTS 3.5.2 does not contain surveillances for the boric acid makeup tank (BAMT) volume and boron concentration for the charging pump ECCS function. The ISTS 3.5.2 assumes the refueling water tank (RWT) as the ECCS water source for low pressure safety injection, high pressure safety injection, and charging ECCS subsystems. The PSL design connects the ECCS charging subsystem to the BAMTs. Though the charging subsystem can be aligned to the RWT, and the charging pump suction automatically aligns to the RWT on Volume Control Tank low level, the RWT to charging pump suction valve gets a close signal on a safety injection actuation signal. This change adds SR 3.5.2.10 to verify that each BAMT volume is greater than or equal to the specified minimum required volume in accordance with the Surveillance Frequency Control Program and adds SR 3.5.2.11 to verify that each BAMT minimum concentration is greater than or equal to the specified minimum required boron concentration in accordance with the Surveillance Frequency Control Program. These new Surveillances are necessary to periodically verify that a sufficient usable BAMT water volume and boron concentration are available to the charging pump for injection during a small break LOCA. DOC M02

provides additional discussion of change for adding SR 3.5.2.10 and its Frequency and adding SR 3.5.2.11 and its Frequency.

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

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.2 ECCS - Operating

BASES

BACKGROUND

The function of the ECCS is to provide core cooling and negative reactivity to ensure that the reactor core is protected after any of the following accidents:

a. Loss of coolant accident (LOCA),

b. Control Element Assembly (CEA) ejection accident,

c. Loss of secondary coolant accident, including uncontrolled steam release or loss of feedwater, and

d. Steam generator tube rupture (SGTR).

The addition of negative reactivity is designed primarily for the loss of secondary coolant accident where primary cooldown could add enough positive reactivity to achieve criticality and return to significant power.

There are two phases of ECCS operation: injection and recirculation. In the injection phase, all injection is initially added to the Reactor Coolant System (RCS) via the cold legs. ~~After the blowdown stage of the LOCA stabilizes, injection flow is split equally between the hot and cold legs.~~ After the refueling water tank (RWT) has been depleted, the ECCS recirculation phase is entered as the ECCS suction is automatically transferred to the containment sump. 1

Two redundant, 100% capacity trains are provided. In MODES 1, 2, and 3, with pressurizer pressure ≥ ~~1700~~ 1750 psia, each train consists of high pressure safety injection (HPSI), low pressure safety injection (LPSI), and charging subsystems. In MODES 1, 2, and 3, with pressurizer pressure ≥ ~~1700~~ 1750 psia, both trains must be OPERABLE. This ensures that 100% of the core cooling requirements can be provided in the event of a single active failure. 1 1

A suction header supplies water from the RWT or the containment sump to the ECCS pumps. Separate piping supplies each train. The discharge headers from each HPSI pump divide into four supply lines. Both HPSI trains feed into each of the four injection lines. The discharge header from each LPSI pump ~~divides into two supply lines~~ combine to a common header, then divide into four injection lines, each feeding ~~the injection line to two~~ one RCS cold leg~~s~~. Control valves or orifices are set to balance the flow to the RCS. This flow balance directs sufficient flow to the core to meet the analysis assumptions following a LOCA in one of the RCS cold legs. 1

BASES

BACKGROUND (continued)

For LOCAs that are too small to initially depressurize the RCS below the shutoff head of the HPSI pumps, the charging pumps supply water to maintain inventory until the RCS pressure decreases below the HPSI pump shutoff head. During this period, the steam generators (SGs) must provide the core cooling function. The charging pumps take suction from the [boric acid makeup tanks (BAMTs) via gravity feed valves or boric acid makeup pump discharge valves] ~~RWT~~ on a safety injection actuation signal (SIAS) and discharge directly to the RCS through a common header. ~~The normal supply source for the charging pumps is isolated on an SIAS to prevent noncondensible gas (e.g., air, nitrogen, or hydrogen) from being entrained in the charging pumps.~~ 1 4

During low temperature conditions in the RCS, limitations are placed on the maximum number of HPSI pumps that may be OPERABLE. Refer to the Bases for LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," for the basis of these requirements.

During a large break LOCA, RCS pressure will decrease to < 200 psia in < 20 seconds. The safety injection (SI) systems are actuated upon receipt of an SIAS. The actuation of safeguard loads is accomplished in a programmed time sequence. If offsite power is available, the safeguard loads start immediately in the programmed sequence. If offsite power is not available, the Engineered Safety Feature (ESF) buses shed normal operating loads and are connected to the [emergency] diesel generators ([E]DGs). Safeguard loads are then actuated in the programmed time sequence. The time delay associated with diesel starting, sequenced loading, and pump starting determines the time required before pumped flow is available to the core following a LOCA. 1 1

The active ECCS components, along with the passive safety injection tanks (SITs)~~,~~ [and] the RWT~~, and the containment sump, are~~ covered in LCO 3.5.1, "Safety Injection Tanks (SITs)," [and] LCO 3.5.4, "Refueling Water Tank (RWT)," ~~and LCO 3.8.13, "Containment Sump,"~~ provide the cooling water necessary to meet GDC 35 (Ref. 1). 1 3

APPLICABLE SAFETY ANALYSES

The LCO helps to ensure that the following acceptance criteria, established by 10 CFR 50.46 (Ref. 2) for ECCSs, will be met following a LOCA:

a. Maximum fuel element cladding temperature is ≤ 2200°F,

b. Maximum cladding oxidation is ≤ 0.17 times the total cladding thickness before oxidation,

BASES

APPLICABLE SAFETY ANALYSES (continued)

c. Maximum hydrogen generation from a zirconium water reaction is ≤ 0.01 times the hypothetical amount generated if all of the metal in the cladding cylinders surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react,

d. Core is maintained in a coolable geometry, and

e. Adequate long term core cooling capability is maintained.

The LCO also limits the potential for a post trip return to power following a steam line break (SLB) and ensures that containment temperature limits are met.

Both HPSI and LPSI subsystems are assumed to be OPERABLE in the large break LOCA analysis at full power (Ref. 3). This analysis establishes a minimum required runout flow for the HPSI and LPSI pumps, as well as the maximum required response time for their actuation. The HPSI pumps and charging pumps are credited in the small break LOCA analysis. This analysis establishes the flow and discharge head requirements at the design point for the HPSI pump. The SGTR and SLB analyses also credit the HPSI pumps, but are not limiting in their design.

The large break LOCA event with a loss of offsite power and a single failure (disabling one ECCS train) establishes the OPERABILITY requirements for the ECCS. During the blowdown stage of a LOCA, the RCS depressurizes as primary coolant is ejected through the break into the containment. The nuclear reaction is terminated either by moderator voiding during large breaks or control element assembly (CEA) insertion during small breaks. Following depressurization, emergency cooling water is injected into the cold legs, flows into the downcomer, fills the lower plenum, and refloods the core.

On smaller breaks, RCS pressure will stabilize at a value dependent upon break size, heat load, and injection flow. The smaller the break, the higher this equilibrium pressure. In ~~all~~ LOCA analyses, injection flow is not credited until RCS pressure drops below the shutoff head of the HPSI pumps. 1

BASES

APPLICABLE SAFETY ANALYSES (continued)

The LCO ensures that an ECCS train will deliver sufficient water to match decay heat boiloff rates soon enough to minimize core uncovery for a large LOCA. It also ensures that the HPSI pump will deliver sufficient water during a small break LOCA and provide sufficient boron to maintain the core subcritical following an SLB. For smaller LOCAs, the charging pumps deliver sufficient fluid to maintain RCS inventory until the RCS can be depressurized below the HPSI pumps' shutoff head. During this period of a small break LOCA, the SGs continue to serve as the heat sink providing core cooling.

ECCS - Operating satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

In MODES 1, 2, and 3, with pressurizer pressure ≥ 1750 ~~1700~~ psia, two independent (and redundant) ECCS trains are required to ensure that sufficient ECCS flow is available, assuming there is a single failure affecting either train. Additionally, individual components within the ECCS trains may be called upon to mitigate the consequences of other transients and accidents. 1

In MODES 1 and 2, and in MODE 3 with pressurizer pressure ≥ 1750 ~~1700~~ psia, an ECCS train consists of an HPSI subsystem, an LPSI subsystem, and a charging pump. 1

Each HPSI and LPSI subsystem ~~train~~ includes the piping, instruments, and controls to ensure the availability of an OPERABLE flow path capable of taking suction from the RWT on an SIAS and automatically transferring suction to the containment sump upon a recirculation actuation signal (RAS). Management of gas voids is important to ECCS OPERABILITY. 1

During an event requiring ECCS actuation, a flow path is provided to ensure an abundant supply of water from the RWT to the RCS, via the HPSI and LPSI pumps and their respective supply headers, to each of the four cold leg injection nozzles. In the long term, this flow path may be switched to take its supply from the containment sump and to supply part of its flow to the RCS hot legs via the shutdown cooling (SDC) suction nozzles. ~~The~~ charging pump flow paths take~~s~~ suction from the BAMT(s) ~~RWT~~ and supplies the RCS via the normal charging lines. 1

One charging pump flow path taking suction from either a single BAMT via the associated boric acid makeup pump, or both BAMTs via both boric acid makeup pumps. A second charging pump flow path taking suction from either a single BAMT via gravity feed valves, or both BAMTs via gravity feed valves. 4

The flow path for each train must maintain its designed independence to ensure that no single failure can disable both ECCS trains.

BASES

APPLICABILITY

In MODES 1 and 2, and in MODE 3 with RCS pressure ≥ ~~1700~~ 1750 psia, the ECCS OPERABILITY requirements for the limiting Design Basis Accident (DBA) large break LOCA are based on full power operation. Although reduced power would not require the same level of performance, the accident analysis does not provide for reduced cooling requirements in the lower MODES. The HPSI pump performance is based on the small break LOCA, which establishes the pump performance curve and has less dependence on power. The charging pump performance requirements are based on a small break LOCA. The requirements of MODES 2 and 3, with RCS pressure ≥ ~~1700~~ 1750 psia, are bounded by the MODE 1 analysis. 1 1

The ECCS functional requirements of MODE 3, with RCS pressure < ~~1700~~ 1750 psia, and MODE 4 are described in LCO 3.5.3, "ECCS - Shutdown." 1

In MODES 5 and 6, unit conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation - High Water Level," and LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level."

ACTIONS

A.1

With one LPSI subsystem inoperable, action must be taken to restore OPERABLE status within 7 days ~~[~~or in accordance with the Risk Informed Completion Time Program~~]~~. In this condition, the remaining OPERABLE ECCS train is adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure to the remaining LPSI subsystem could result in loss of ECCS function. The 7 day Completion Time is reasonable to perform corrective maintenance on the inoperable LPSI subsystem. The 7 day Completion Time is based on the findings of the deterministic and probabilistic analysis in Reference 6. Reference 6 concluded that extending the Completion Time to 7 days for an inoperable LPSI train provides plant operational flexibility while simultaneously reducing overall plant risk. This is because the risks incurred by having the LPSI train unavailable for a longer time at power will be substantially offset by the benefits associated with avoiding unnecessary plant transitions and by reducing risk during plant shutdown operations. 2

BASES

ACTIONS (continued)

B.1

If one or more trains are inoperable except for reasons other than Condition A (one LPSI subsystem inoperable) and at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is available, the inoperable components must be returned to OPERABLE status within 72 hours [or in accordance with the Risk Informed Completion Time Program]. The 72 hour Completion Time is based on an NRC study (Ref. 4) using a reliability evaluation and is a reasonable amount of time to effect many repairs. 2

An ECCS train is inoperable if it is not capable of delivering the design flow to the RCS. The individual components are inoperable if they are not capable of performing their design function, or if supporting systems are not available.

The LCO requires the OPERABILITY of a number of independent subsystems. Due to the redundancy of trains and the diversity of subsystems, the inoperability of one component in a train does not render the ECCS incapable of performing its function. Neither does the inoperability of two different components, each in a different train, necessarily result in a loss of function for the ECCS. This allows increased flexibility in plant operations when components in opposite trains are inoperable.

An event accompanied by a loss of offsite power and the failure of an emergency DG can disable one ECCS train until power is restored. A reliability analysis (Ref. 4) has shown that the impact with one full ECCS train inoperable is sufficiently small to justify continued operation for 72 hours.

Reference 5 describes situations in which one component, such as a shutdown cooling total flow control valve, can disable both ECCS trains. With one or more components inoperable, such that 100% of the equivalent flow to a single OPERABLE ECCS train is not available, the facility is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be immediately entered.

BASES

ACTIONS (continued)

C.1 and C.2

If the inoperable train cannot be restored to OPERABLE status 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 3 within 6 hours and pressurizer pressure reduced to < 1700 1750 psia within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power in an orderly manner and without challenging unit systems. 1

D.1

Condition B is applicable with one or more trains inoperable. D is applicable with less than 100% of the ECCS flow equivalent to a single OPERABLE train available. The allowed Completion Time of Condition B is based on the assumption that at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is available. With less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available, the facility is in a condition outside of the accident analyses. Therefore, LCO 3.0.3 must be entered immediately. 5

SURVEILLANCE REQUIREMENTS

SR 3.5.2.1

Verification of proper valve position ensures that the flow path from the ECCS pumps to the RCS is maintained. The two series minimum flow isolation valves are common to the HPSI, LPSI, and containment spray pumps. Therefore, it is critical that these valves must be maintained open during the initial phase of a LOCA to prevent ECCS pump damage as a result of the pumps operating at shutoff head. Misalignment of these valves could render both ECCS trains inoperable. Securing these valves in position by removing power or by key locking the control in the correct position ensures that the valves cannot be inadvertently misaligned or change position as the result of an active failure. These valves are of the type described in Reference 5, which can disable the function of both ECCS trains and invalidate the accident analysis. [A 12 hour Frequency is considered reasonable in view of other administrative controls ensuring that a mispositioned valve is an unlikely possibility. 1 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)

SR 3.5.2.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an actuation signal is allowed to be in a nonaccident position provided the valve automatically repositions within the proper stroke time. This Surveillance does not require any testing or valve manipulation. Rather, it involves verification that those valves capable of being mispositioned are in the correct position.

~~[The 31 day Frequency is appropriate because the valves are operated under procedural control and an improper valve position would only affect a single train. This Frequency has been shown to be acceptable through 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
~~---]~~

The Surveillance is modified by a Note which exempts system vent flow paths opened under administrative control. The administrative control should be proceduralized and include stationing a dedicated individual at the system vent flow path who is in continuous communication with the operators in the control room. This individual will have a method to rapidly close the system vent flow path if directed.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.3

ECCS 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 ECCS and may also prevent water hammer, pump cavitation, and pumping of noncondensible gas into the reactor vessel.

Selection of ECCS 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 ECCS 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 acceptable 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 ECCS 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.

ECCS 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

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 ECCS piping and the adequacy of the procedural controls governing system operation.~~
~~OR~~ 2

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

SR 3.5.2.4

Periodic surveillance testing of ECCS pumps to detect gross degradation caused by impeller structural damage or other hydraulic component problems is required by the ASME Code. This type of testing may be accomplished by measuring the pump developed head at only one point of the pump characteristic curve. This verifies both that the measured performance is within an acceptable tolerance of the original pump baseline performance and that the performance at the test flow is greater than or equal to the performance assumed in the unit safety analysis. SRs are specified in the INSERVICE TESTING PROGRAM of the ASME Code. The ASME Code provides the activities and Frequencies necessary to satisfy the requirements.

SR 3.5.2.5

~~Discharge head at~~ design flow is a normal test of charging pump performance required by the ASME Code and the INSERVICE TESTING PROGRAM. A quarterly Frequency for such tests is a Code requirement. Such inservice ~~inspections~~ tests detect component degradation and incipient failures. 1

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.6, SR 3.5.2.7, and SR 3.5.2.8

and each automatic containment sump, RWT outlet, and SI recirc valve to the RWT actuates to the required position

These SRs demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SIAS and on an RAS, that each ECCS pump starts on receipt of an actual or simulated SIAS, and that the LPSI pumps stop on receipt of an actual or simulated RAS. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. [The 18 month Frequency is based on the need to perform these Surveillances under the conditions that apply during a plant outage and the potential for unplanned transients if the Surveillances were performed with the reactor at power. The 18 month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment. 6 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
---]

The actuation logic is tested as part of the Engineered Safety Feature Actuation System (ESFAS) testing, and equipment performance is monitored as part of the INSERVICE TESTING PROGRAM.

SR 3.5.2.9 7

Realignment of valves in the flow path on an SIAS is necessary for proper ECCS performance. The safety injection valves have stops to position them properly so that flow is restricted to a ruptured cold leg, ensuring that the other cold legs receive at least the required minimum flow. This SR is not required for units with flow limiting orifices. [The 18 month Frequency is based on the same factors as those stated above for SR 3.5.2.6, SR 3.5.2.7, and SR 3.5.2.8. 7

Periodic inspections of ECCS train containment sump suction inlets ensure they are unrestricted and stay in proper operating condition. 7

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.
--]

2

REFERENCES

1. 10 CFR 50, Appendix A, GDC 35.
2. 10 CFR 50.46.
3. U FSAR, Chapter [6].
4. NRC Memorandum to V. Stello, Jr., from R. L. Baer, "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.
5. IE Information Notice No. 87-01, January 6, 1987.
6. CE NPSD-995, "Low Pressure Safety Injection System AOT Extension," May 1995.

2

SR 3.5.2.10

This Surveillance verifies that the water volume in the BAMT is above the minimum usable volume plus additional margin to ensure that a sufficient water supply is available to the charging pump for injection during a small break LOCA. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

8

SR 3.5.2.11

This Surveillance verifies that the boron concentration in the BAMT is above the minimum BAMT boron concentration to ensure that a sufficient borated water supply is available to the charging pump for injection during a small break LOCA. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

8

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.2 ECCS - Operating

BASES

BACKGROUND

The function of the ECCS is to provide core cooling and negative reactivity to ensure that the reactor core is protected after any of the following accidents:

a. Loss of coolant accident (LOCA),

b. Control Element Assembly (CEA) ejection accident,

c. Loss of secondary coolant accident, including uncontrolled steam release or loss of feedwater, and

d. Steam generator tube rupture (SGTR).

The addition of negative reactivity is designed primarily for the loss of secondary coolant accident where primary cooldown could add enough positive reactivity to achieve criticality and return to significant power.

There are two phases of ECCS operation: injection and recirculation. In the injection phase, all injection is initially added to the Reactor Coolant System (RCS) via the cold legs. ~~After the blowdown stage of the LOCA stabilizes, injection flow is split equally between the hot and cold legs.~~ After the refueling water tank (RWT) has been depleted, the ECCS recirculation phase is entered as the ECCS suction is automatically transferred to the containment sump. 1

Two redundant, 100% capacity trains are provided. In MODES 1, 2, and 3, with pressurizer pressure ≥ ~~1700~~ 1750 psia, each train consists of high pressure safety injection (HPSI), low pressure safety injection (LPSI), and charging subsystems. In MODES 1, 2, and 3, with pressurizer pressure ≥ ~~1700~~ 1750 psia, both trains must be OPERABLE. This ensures that 100% of the core cooling requirements can be provided in the event of a single active failure. 1 1

A suction header supplies water from the RWT or the containment sump to the ECCS pumps. Separate piping supplies each train. The discharge headers from each HPSI pump divide into four supply lines. Both HPSI trains feed into each of the four injection lines. The discharge header from each LPSI pump divides into two supply lines, each feeding the injection line to two RCS cold legs. Control valves or orifices are set to balance the flow to the RCS. This flow balance directs sufficient flow to the core to meet the analysis assumptions following a LOCA in one of the RCS cold legs.

BASES

BACKGROUND (continued)

For LOCAs that are too small to initially depressurize the RCS below the shutoff head of the HPSI pumps, the charging pumps supply water to maintain inventory until the RCS pressure decreases below the HPSI pump shutoff head. During this period, the steam generators (SGs) must provide the core cooling function. The charging pumps take suction from the ~~RWT~~ boric acid makeup tanks (BAMTs) via gravity feed valves or boric acid makeup pump discharge valves on a safety injection actuation signal (SIAS) and discharge directly to the RCS through a common header. ~~The normal supply source for the charging pumps is isolated on an SIAS to prevent noncondensible gas (e.g., air, nitrogen, or hydrogen) from being entrained in the charging pumps.~~ 1 4

During low temperature conditions in the RCS, limitations are placed on the maximum number of HPSI pumps that may be OPERABLE. Refer to the Bases for LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," for the basis of these requirements.

During a large break LOCA, RCS pressure will decrease to < 200 psia in < 20 seconds. The safety injection (SI) systems are actuated upon receipt of an SIAS. The actuation of safeguard loads is accomplished in a programmed time sequence. If offsite power is available, the safeguard loads start immediately in the programmed sequence. If offsite power is not available, the Engineered Safety Feature (ESF) buses shed normal operating loads and are connected to the emergency diesel generators (EDGs). 1
Safeguard loads are then actuated in the programmed time sequence. The time delay associated with diesel starting, sequenced loading, and pump starting determines the time required before pumped flow is available to the core following a LOCA. 1

The active ECCS components, along with the passive safety injection tanks (SITs) and the RWT~~, and the containment sump, are~~ covered in LCO 3.5.1, "Safety Injection Tanks (SITs)," and LCO 3.5.4, "Refueling Water Tank (RWT)," ~~and LCO 3.8.13, "Containment Sump,"~~ provide the cooling water necessary to meet GDC 35 (Ref. 1). 1 3

APPLICABLE SAFETY ANALYSES

The LCO helps to ensure that the following acceptance criteria, established by 10 CFR 50.46 (Ref. 2) for ECCSs, will be met following a LOCA:

a. Maximum fuel element cladding temperature is ≤ 2200°F,

b. Maximum cladding oxidation is ≤ 0.17 times the total cladding thickness before oxidation,

BASES

APPLICABLE SAFETY ANALYSES (continued)

c. Maximum hydrogen generation from a zirconium water reaction is ≤ 0.01 times the hypothetical amount generated if all of the metal in the cladding cylinders surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react,

d. Core is maintained in a coolable geometry, and

e. Adequate long term core cooling capability is maintained.

The LCO also limits the potential for a post trip return to power following a steam line break (SLB) and ensures that containment temperature limits are met.

Both HPSI and LPSI subsystems are assumed to be OPERABLE in the large break LOCA analysis at full power (Ref. 3). This analysis establishes a minimum required runout flow for the HPSI and LPSI pumps, as well as the maximum required response time for their actuation. The HPSI pumps and charging pumps are credited in the small break LOCA analysis. This analysis establishes the flow and discharge head requirements at the design point for the HPSI pump. The SGTR and SLB analyses also credit the HPSI pumps, but are not limiting in their design.

The large break LOCA event with a loss of offsite power and a single failure (disabling one ECCS train) establishes the OPERABILITY requirements for the ECCS. During the blowdown stage of a LOCA, the RCS depressurizes as primary coolant is ejected through the break into the containment. The nuclear reaction is terminated either by moderator voiding during large breaks or control element assembly (CEA) insertion during small breaks. Following depressurization, emergency cooling water is injected into the cold legs, flows into the downcomer, fills the lower plenum, and refloods the core.

On smaller breaks, RCS pressure will stabilize at a value dependent upon break size, heat load, and injection flow. The smaller the break, the higher this equilibrium pressure. In ~~all~~ LOCA analyses, injection flow is not credited until RCS pressure drops below the shutoff head of the HPSI pumps. 1

BASES

APPLICABLE SAFETY ANALYSES (continued)

The LCO ensures that an ECCS train will deliver sufficient water to match decay heat boiloff rates soon enough to minimize core uncovery for a large LOCA. It also ensures that the HPSI pump will deliver sufficient water during a small break LOCA and provide sufficient boron to maintain the core subcritical following an SLB. For smaller LOCAs, the charging pumps deliver sufficient fluid to maintain RCS inventory until the RCS can be depressurized below the HPSI pumps' shutoff head. During this period of a small break LOCA, the SGs continue to serve as the heat sink providing core cooling.

ECCS - Operating satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

In MODES 1, 2, and 3, with pressurizer pressure ≥ ~~1700~~ 1750 psia, two independent (and redundant) ECCS trains are required to ensure that sufficient ECCS flow is available, assuming there is a single failure affecting either train. Additionally, individual components within the ECCS trains may be called upon to mitigate the consequences of other transients and accidents. 1

In MODES 1 and 2, and in MODE 3 with pressurizer pressure ≥ ~~1700~~ 1750 psia, an ECCS train consists of an HPSI subsystem, an LPSI subsystem, and a charging pump. 1

Each ~~train~~ HPSI and LPSI subsystem includes the piping, instruments, and controls to ensure the availability of an OPERABLE flow path capable of taking suction from the RWT on an SIAS and automatically transferring suction to the containment sump upon a recirculation actuation signal (RAS). Management of gas voids is important to ECCS OPERABILITY. 1

During an event requiring ECCS actuation, a flow path is provided to ensure an abundant supply of water from the RWT to the RCS, via the HPSI and LPSI pumps and their respective supply headers, to each of the four cold leg injection nozzles. In the long term, this flow path may be switched to take its supply from the containment sump and to supply part of its flow to the RCS hot legs via the shutdown cooling (SDC) suction nozzles. ~~The~~ charging pump flow path~~s~~ take~~s~~ suction from the ~~RWT~~ BAMT(s) and supplies the RCS via the normal charging lines. 1

One charging pump flow path taking suction from either a single BAMT via the associated boric acid makeup pump, or both BAMTs via both boric acid makeup pumps. A second charging pump flow path taking suction from either a single BAMT via gravity feed valves, or both BAMTs via gravity feed valves. 4

The flow path for each train must maintain its designed independence to ensure that no single failure can disable both ECCS trains.

BASES

APPLICABILITY

In MODES 1 and 2, and in MODE 3 with RCS pressure ≥ ~~1700~~ 1750 psia, the ECCS OPERABILITY requirements for the limiting Design Basis Accident (DBA) large break LOCA are based on full power operation. Although reduced power would not require the same level of performance, the accident analysis does not provide for reduced cooling requirements in the lower MODES. The HPSI pump performance is based on the small break LOCA, which establishes the pump performance curve and has less dependence on power. The charging pump performance requirements are based on a small break LOCA. The requirements of MODES 2 and 3, with RCS pressure ≥ ~~1700~~ 1750 psia, are bounded by the MODE 1 analysis. 1 1

The ECCS functional requirements of MODE 3, with RCS pressure < ~~1700~~ 1750 psia, and MODE 4 are described in LCO 3.5.3, "ECCS - Shutdown." 1

In MODES 5 and 6, unit conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation - High Water Level," and LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level."

ACTIONS

A.1

With one LPSI subsystem inoperable, action must be taken to restore OPERABLE status within 7 days ~~[~~or in accordance with the Risk Informed Completion Time Program~~]~~. In this condition, the remaining OPERABLE ECCS train is adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure to the remaining LPSI subsystem could result in loss of ECCS function. The 7 day Completion Time is reasonable to perform corrective maintenance on the inoperable LPSI subsystem. The 7 day Completion Time is based on the findings of the deterministic and probabilistic analysis in Reference 6. Reference 6 concluded that extending the Completion Time to 7 days for an inoperable LPSI train provides plant operational flexibility while simultaneously reducing overall plant risk. This is because the risks incurred by having the LPSI train unavailable for a longer time at power will be substantially offset by the benefits associated with avoiding unnecessary plant transitions and by reducing risk during plant shutdown operations. 2

BASES

ACTIONS (continued)

B.1

If one or more trains are inoperable except for reasons other than Condition A (one LPSI subsystem inoperable) and at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is available, the inoperable components must be returned to OPERABLE status within 72 hours [or in accordance with the Risk Informed Completion Time Program]. The 72 hour Completion Time is based on an NRC study (Ref. 4) using a reliability evaluation and is a reasonable amount of time to effect many repairs. 2

An ECCS train is inoperable if it is not capable of delivering the design flow to the RCS. The individual components are inoperable if they are not capable of performing their design function, or if supporting systems are not available.

The LCO requires the OPERABILITY of a number of independent subsystems. Due to the redundancy of trains and the diversity of subsystems, the inoperability of one component in a train does not render the ECCS incapable of performing its function. Neither does the inoperability of two different components, each in a different train, necessarily result in a loss of function for the ECCS. This allows increased flexibility in plant operations when components in opposite trains are inoperable.

An event accompanied by a loss of offsite power and the failure of an emergency DG can disable one ECCS train until power is restored. A reliability analysis (Ref. 4) has shown that the impact with one full ECCS train inoperable is sufficiently small to justify continued operation for 72 hours.

Reference 5 describes situations in which one component, such as a shutdown cooling total flow control valve, can disable both ECCS trains. With one or more components inoperable, such that 100% of the equivalent flow to a single OPERABLE ECCS train is not available, the facility is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be immediately entered.

BASES

ACTIONS (continued)

C.1 and C.2

If the inoperable train cannot be restored to OPERABLE status 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 3 within 6 hours and pressurizer pressure reduced to < ~~1700~~ 1750 psia within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power in an orderly manner and without challenging unit systems. 1

D.1

Condition ~~B is applicable with one or more trains inoperable~~ D is applicable with less than 100% of the ECCS flow equivalent to a single OPERABLE train available. The allowed Completion Time of Condition B is based on the assumption that at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is available. With less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available, the facility is in a condition outside of the accident analyses. Therefore, LCO 3.0.3 must be entered immediately. 5

SURVEILLANCE REQUIREMENTS

SR 3.5.2.1

~~Verification of proper valve position ensures that the flow path from the ECCS pumps to the RCS is maintained. Misalignment of these valves could render both ECCS trains inoperable. Securing these valves in position by removing power or by key locking the control in the correct position ensures that the valves cannot be inadvertently misaligned or change position as the result of an active failure. These valves are of the type described in Reference 5, which can disable the function of both ECCS trains and invalidate the accident analysis. [A 12 hour Frequency is considered reasonable in view of other administrative controls ensuring that a mispositioned valve is an unlikely possibility.~~ 7

~~OR~~

Periodic inspections of ECCS train containment sump suction inlets ensure they are unrestricted and stay in proper operating condition.

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.~~
~~---]~~

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an actuation signal is allowed to be in a nonaccident position provided the valve automatically repositions within the proper stroke time. This Surveillance does not require any testing or valve manipulation. Rather, it involves verification that those valves capable of being mispositioned are in the correct position.

~~[The 31 day Frequency is appropriate because the valves are operated under procedural control and an improper valve position would only affect a single train. This Frequency has been shown to be acceptable through 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
~~--]~~

The Surveillance is modified by a Note which exempts system vent flow paths opened under administrative control. The administrative control should be proceduralized and include stationing a dedicated individual at the system vent flow path who is in continuous communication with the operators in the control room. This individual will have a method to rapidly close the system vent flow path if directed.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.3

ECCS 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 ECCS and may also prevent water hammer, pump cavitation, and pumping of noncondensible gas into the reactor vessel.

Selection of ECCS 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 ECCS 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 acceptable 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 ECCS 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.

ECCS 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

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 ECCS piping and the adequacy of the procedural controls governing system operation.
OR 2

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
-----]

SR 3.5.2.4

Periodic surveillance testing of ECCS pumps to detect gross degradation caused by impeller structural damage or other hydraulic component problems is required by the ASME Code. This type of testing may be accomplished by measuring the pump developed head at only one point of the pump characteristic curve. This verifies both that the measured performance is within an acceptable tolerance of the original pump baseline performance and that the performance at the test flow is greater than or equal to the performance assumed in the unit safety analysis. SRs are specified in the INSERVICE TESTING PROGRAM of the ASME Code. The ASME Code provides the activities and Frequencies necessary to satisfy the requirements.

SR 3.5.2.5

Discharge head at design flow is a normal test of charging pump performance required by the ASME Code and the INSERVICE TESTING PROGRAM. A quarterly Frequency for such tests is a Code requirement. Such inservice inspections tests detect component degradation and incipient failures. 1

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.6, SR 3.5.2.7, and SR 3.5.2.8

These SRs demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SIAS and on an RAS, that each ECCS pump starts on receipt of an actual or simulated SIAS, and that the LPSI pumps stop on receipt of an actual or simulated RAS. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. 6

and each automatic containment sump, RWT outlet, and SI recirc valve to the RWT actuates to the required position

~~[The 18 month Frequency is based on the need to perform these Surveillances under the conditions that apply during a plant outage and the potential for unplanned transients if the Surveillances were performed with the reactor at power. The 18 month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment.~~ 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
~~---]~~

The actuation logic is tested as part of the Engineered Safety Feature Actuation System (ESFAS) testing, and equipment performance is monitored as part of the INSERVICE TESTING PROGRAM.

SR 3.5.2.9

Realignment of valves in the flow path on an SIAS is necessary for proper ECCS performance. The safety injection valves have stops to position them properly so that flow is restricted to a ruptured cold leg, ensuring that the other cold legs receive at least the required minimum flow. ~~This SR is not required for units with flow limiting orifices. [The 18 month Frequency is based on the same factors as those stated above for SR 3.5.2.6, SR 3.5.2.7, and SR 3.5.2.8.~~ 1 2

The HPSI header injection valves are throttled to prevent HPSI pump runout.

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.~~
~~-----]~~ 2

REFERENCES

1. 10 CFR 50, Appendix A, GDC 35.
2. 10 CFR 50.46.
3. U FSAR, Chapter [6]. 2
4. NRC Memorandum to V. Stello, Jr., from R. L. Baer, "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.
5. IE Information Notice No. 87-01, January 6, 1987.
6. CE NPSD-995, "Low Pressure Safety Injection System AOT Extension," May 1995.

SR 3.5.2.10

This Surveillance verifies that the water volume in the BAMT is above the minimum usable volume plus additional margin to ensure that a sufficient water supply is available to the charging pump for injection during a small break LOCA. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. 8

SR 3.5.2.11

This Surveillance verifies that the boron concentration in the BAMT is above the minimum BAMT boron concentration to ensure that a sufficient borated water supply is available to the charging pump for injection during a small break LOCA. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. 8

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.2, BASES, ECCS - OPERATING

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 3.6.13, “Containment Sump” is not being adopted and St. Lucie Plant (PSL) Unit 1 and Unit 2 Current Technical Specifications (CTS) does not have a separate containment sump Specification. The Containment Sump function ensures debris is not transported to the ECCS and containment spray pump suction inlets during a LOCA, which could inhibit operation of these mitigation systems. Requirements associated with this function are provided in ITS 3.5.2, “ECCS – Operating”, and ITS 3.5.3, “ECCS – Shutdown” for PSL Unit 1 and Unit 2. Therefore, ISTS 3.6.13 is not included in the PSL Unit 1 and Unit 2 ITS. The reference to a containment sump Specification is deleted.

4. ISTS Background and LCO descriptions include charging pump details. These details are enhanced to include charging pump flow paths that maintain the required independence of ECCS trains. These details for the charging pump flow paths are relocated from the CTS and are added to the ITS Bases.

5. Editorial change made to the Bases of Condition D to reflect the wording of Condition D in ISTS 3.5.2 (ITS 3.5.2) and further clarify the distinction between Conditions B and D.

6. ISTS SR 3.5.5.6, SR 3.5.2.7, and SR 3.5.2.8 description contains that each automatic ECCS valve actuates and each ECCS pump starts on an actual or simulated SIAS and on an RAS, and that the LPSI pump stops on receipt of an actual or simulated RAS. Unit 1 CTS 4.5.2.e.3 and Unit 2 4.5.2.f.3 each provide details that upon receipt of an actual or simulated RAS, that in addition to each LPSI pump stops, each containment sump isolation valve opens, each refueling water tank outlet valve closes, and each safety injection system recirculation valve to the refueling water tank closes. These details for automatic valves design actuation in response to an RAS are relocated from the CTS and are added to the ISTS Bases to recognize these design features.

7. The CTS Surveillance requiring a containment sump visual inspection of ECCS pump suction inlets is added to ITS SR 3.2.5.9 for Unit 1 and SR 3.5.2.1 for Unit 2. The ISTS Bases are revised to reflect the change to the ISTS SRs. The Bases discussion added is similar to the discussion provided for the Bases of ISTS SR 3.5.2.10 in Revision 4 of NUREG-1432.

8. ISTS 3.5.2 does not contain surveillances for the boric acid makeup tank (BAMT) volume and boron concentration for the charging pump ECCS function. This ISTS Bases change reflects the change to the Specification, which adds SR 3.5.2.10 to verify that each BAMT volume is greater than or equal to the specified minimum volume in accordance with the Surveillance Frequency Control Program and SR 3.5.2.11 to verify that each BAMT minimum boron concentration is greater than or

equal to the specified minimum required boron concentration in accordance with the Surveillance Frequency Control Program. The added Bases discussion is similar to the Bases discussion provided for the refueling water tank (RWT) volume verification of ISTS SR 3.5.4.2 and the RWT boron concentration verification of ISTS SR 3.5.4.3.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.5.2, ECCS - OPERATING

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

ATTACHMENT 3

3.5.3 ECCS - Shutdown

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

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - SHUTDOWN

LIMITING CONDITION FOR OPERATION

In MODE 4, only the safety injection actuation and recirculation actuation manual channels and associated actuation logic are required. L01

high pressure safety injection (HPSI) train

LCO 3.5.3 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. LA01

b. Prior to decreasing the reactor coolant system temperature below 270°F a maximum of only one high pressure safety injection pump shall be OPERABLE with its associated header stop valve open. See ITS 3.4.12

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. with RCS cold leg temperature > 250°F A03
MODES 5 and 6 when the Pressurizer manway cover is in place and the reactor vessel head is on. See ITS 3.4.12

ACTION:

Required HPSI train inoperable · required HPSI train · within 1 hour L02

ACTION A 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 24 hours. L03

ACTION B MODE 4 with RCS cold leg temperature ≤ 250°F A03

b. With RCS temperature below 270°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. See ITS 3.4.12

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. L04

ACTIONS Note d. LCO 3.0.4.b is not applicable to ECCS High Pressure Safety Injection subsystem when entering MODE 4.

SURVEILLANCE REQUIREMENTS

For required, HPSI train, applicable portions of the following SRs are applicable: SR 3.5.2.1 SR 3.5.2.2 SR 3.5.2.4 SR 3.5.2.7 SR 3.5.2.3 SR 3.5.2.6 SR 3.5.2.9 A02

SR 3.5.3.1 4.5.3.1 The ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2.

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. See ITS 3.4.12

Applicability * With pressurizer pressure < 1750 psia.

Applicability # REACTOR COOLANT SYSTEM cold leg temperature above 250°F.

EMERGENCY CORE COOLING SYSTEMS

3/4.5.3 ECCS SUBSYSTEMS - SHUTDOWN

LIMITING CONDITION FOR OPERATION

In MODE 4, only the safety injection actuation and recirculation actuation manual channels and associated actuation logic are required. L01

LCO 3.5.3 ~~3.5.3~~ ~~As a minimum,~~ one ~~ECCS subsystem comprised of the following~~ [high pressure safety injection (HPSI) train] 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.~~ LA01

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. See ITS 3.4.12

ACTION:

ACTION A / ACTION B

a. ~~With no ECCS subsystems OPERABLE,~~ [Required HPSI train inoperable] restore ~~at least one ECCS subsystem~~ [required HPSI train] to OPERABLE status within 1 hour or be in ~~COLD SHUTDOWN~~ [Mode 5] within ~~the next~~ ~~20~~ [24] hours. L03

~~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.~~ L04

ACTIONS Note ~~c.~~ LCO 3.0.4.b is not applicable to ECCS High Pressure Safety Injection subsystem when entering MODE 4.

SURVEILLANCE REQUIREMENTS

SR 3.5.3.1 ~~4.5.3 The ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2.~~

For required, HPSI train, applicable portions of the following SRs are applicable:
SR 3.5.2.1 SR 3.5.2.4 SR 3.5.2.7
SR 3.5.2.2 SR 3.5.2.6 SR 3.5.2.9
SR 3.5.2.3
A02

* With pressurizer pressure less than 1750 psia.

\# One HPSI shall be rendered inoperable prior to entering MODE 5. See ITS 3.4.12

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 4.5.3.1, and Unit 2 CTS 4.5.3, state that the ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2, but do not specify the applicable Surveillance Requirements. Similarly, ITS SR 3.5.3.1 specifies the applicable ITS 3.5.2 Surveillance Requirements.

The purpose of this SR is to ensure the required HPSI train is OPERABLE. Per the definition of OPERABILITY, the required HPSI train is OPERABLE or has OPERABILITY when it is capable of performing its specified safety function and when all necessary attendant equipment required for the HPSI train to perform its specified safety function are also capable of performing their related support function(s). Thus, only the SRs required to verify the HPSI train can perform its intended safety function are required. SR 3.5.2.5 and SR 3.5.2.8 verify charging pump and LPSI pump features, respectively, and are not part of the required HPSI train. Therefore, these SRs are not specified in the ITS.

This change is designated as administrative and is acceptable because it only clarifies the current requirement and does not result in a technical change to the CTS.

A03 **Unit 1 only**: CTS 3.5.3 Applicability requires, in part, at least one ECCS subsystem to be OPERABLE in MODE 4. CTS 3.5.3.a describes an ECCS subsystem in MODE 4 as consisting of one OPERABLE HPSI pump with the proper flowpath. The MODE 4 requirement in CTS 3.5.3.a is modified by # footnote, which states Reactor Coolant System cold leg temperature above 250°F. In MODE 4 with RCS cold leg temperature above 250°F (per # footnote), CTS 3.5.3 Action a requires the plant to be in Cold Shutdown (i.e., MODE 5) within the required completion time if the required ECCS subsystem cannot be restored immediately. ITS 3.5.3 requires one HPSI train to be OPERABLE in MODE 3 with pressurizer pressure < 1750 psia and in MODE 4 with RCS cold leg temperature > 250°F. When the required HPSI train (i.e., required ECCS subsystem) cannot be restored to OPERABLE status within the required Completion Time, ITS 3.5.3 Required Action B.1 requires the unit to be in MODE 4 with RCS cold leg temperature ≤ 250°F. This changes the Applicability from MODE 4 to MODE 4 with RCS cold leg temperature > 250°F and the action end state from MODE 4 to MODE 4 with RCS cold leg temperature ≤ 250°F.

The CTS 3.5.3 Applicability has a dual purpose: to provide applicability for the ECCS shutdown requirements and the low temperature overpressure protection (LTOP) requirements. ITS 3.5.3 provides ECCS shutdown requirements and ITS

3.4.12 provides LTOP requirements. The purpose of the ECCS shutdown requirements is to ensure adequate core cooling systems are available in the event of a loss of RCS inventory when the reactor is shutdown and the RCS is hot and pressurized. The purpose of CTS 3.5.3 Action a is to restore the required ECCS subsystem to OPERABLE status in a timely manner or place the plant in a condition in which the equipment is no longer required. CTS 3.5.3.a and Action a address the requirement for one ECCS subsystem when in MODE 3 with pressurizer pressure < 1750 psia and in MODE 4 with RCS cold leg temperature > 250°F. In MODE 4 below 250°F there is no CTS requirement or action related to ECCS. CTS 3.5.3.b and c and the associated action support the LTOP analysis and are not related to the ECCS function. Specifically, CTS 3.5.3.b limits HPSI to a maximum of only one with its associated header stop valve open when RCS temperature is ≤ 270°F and CTS 3.5.3.c requires all HPSI pumps to be disabled and their header stop valves closed (i.e., incapable of injecting into the RCS) when RCS temperature is ≤ 236°F in MODE 4. As a result, no ECCS is required to be OPERABLE in MODE 4 with RCS cold leg temperature ≤ 250°F. Therefore, the ITS ECCS Shutdown Applicability is modified from MODE 4 to MODE 4 with RCS cold leg temperature ≤ 250°F consistent with the CTS intent and the end state action is modified to require exiting the Applicability consistent with the requirements of CTS 3.0.2 (ITS LCO 3.0.2).

These changes are designated as administrative changes and are acceptable because they maintain the current requirement that one HPSI train be OPERABLE in MODE 4 with RCS cold leg temperature > 250°F and to place the unit in a condition in which the required HPSI train is 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

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* Unit 1 CTS 3.5.3.a and Unit 2 CTS 3.5.3.a and 3.5.3.b, state, in part, that as a minimum, 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. Additionally, Discussion of Change L01 changes the CTS 3.5.3 LCO to only require manual channel actuation in MODE 4. ITS 3.5.3 retains the requirement that one high pressure safety injection (HPSI) train shall be OPERABLE. This changes the CTS by moving the details of what composes an OPERABLE ECCS subsystem, including flowpath and actuation functions, 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 that one high pressure safety injection (HPSI) train shall be OPERABLE. 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 Specifications Bases Control Program in Chapter 5. This program provides for the evaluation of changes to the Bases 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

L01 *(Category 1 – Relaxation of LCO Requirements)* CTS 3.5.3 states, in part, that one 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 is required to be OPERABLE in MODE 3 with pressurizer pressure < 1750 psia and MODE 4. This changes the CTS 3.5.3 LCO to only require manual channel actuation in MODE 4. CTS 3.3.2.1 and Table 3.3-3 only require automatic SIAS and RAS in MODES 1, 2, and 3, and manual channel actuation is required in MODE 4. Furthermore, Discussion of Change LA01 changes the CTS by moving the details of what composes an OPERABLE ECCS subsystem, including flowpath and actuation functions, to the Bases.

The purpose of CTS 3.5.3 is to state the limiting conditions for operation. This change is acceptable because the LCO requirements continue to ensure that the required HPSI train is maintained consistent with the safety analyses and licensing basis. This change is designated as less restrictive because less stringent LCO requirements are being applied in the ITS than were applied in the CTS.

L02 **Unit 1 Only:** *(Category 3 – Relaxation of Completion Time)* CTS 3.5.3 Action a. states, in part, “immediately restore one ECCS subsystem to OPERABLE status or be in COLD SHUTDOWN within 20 hours.” With the required HPSI train inoperable, ITS 3.5.3 Required Action A.1 allows 1 hour to restore the required HPSI train to OPERABLE status. This changes the CTS by relaxing the Completion Time from “immediately” to 1 hour.

The purpose of CTS 3.5.3 Action a. is to take action with no HPSI train OPERABLE. With no HPSI train OPERABLE, the unit is not prepared to respond to a loss of coolant accident. The ITS 1 hour Completion Time to restore at least one HPSI train to OPERABLE status ensures that prompt action is taken to restore the required cooling capacity or to initiate actions to place the unit in a condition where an ECCS train is not required. This change is acceptable because the Completion Time is consistent with the Completion Time in the ISTS and continues to provide safe operation under the specific Condition, considering the low probability of a DBA occurring during the allowed Completion Time.

This change is designated as less restrictive because additional time is allowed to restore the required HPSI train to OPERABLE status than was allowed in the CTS.

L03 *(Category 3 – Relaxation of Completion Time)* Unit 1 CTS 3.5.3 Action a. states, in part, “immediately restore one ECCS subsystem to OPERABLE status or be in COLD SHUTDOWN within 20 hours.” Unit 2 CTS 3.5.3 Action a. states, in part, “restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.” With the Required Action and associated Completion Time not met, that being the required HPSI train is not restored to OPERABLE status within the associated Completion Time, ITS 3.5.3 Required Action B.1 allows 24 hours to be in a condition where an ECCS train is not required. This changes the CTS by relaxing the Completion Time from “within the next 20 hours” to 24 hours.

The purpose of CTS 3.5.3 Action a. is to take action with no HPSI train OPERABLE. With no HPSI train OPERABLE, the unit is not prepared to respond to a loss of coolant accident. The ITS 24 hour Completion Time for ITS 3.5.3 Required Action B.1 is reasonable, based on operating experience, to reach the condition in an orderly manner and without challenging plant systems. This change is acceptable because the Completion Time is consistent with the time in the ISTS to reach the required plant condition to provide safe operation under the specific Condition, considering the low probability of a DBA occurring during the allowed Completion Time.

This change is designated as less restrictive because additional time is allowed to place the unit in a MODE or specified condition where an ECCS train is not required than was allowed in the CTS.

L04 *(Category 9 – Deletion of Reporting Requirements)* Unit 1 CTS 3.5.3 Action c. states “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.” Unit 2 CTS 3.5.3 Action b. states “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.” ITS 3.5.3 does not contain this CTS 90-day Special Report requirement in the event the ECCS is actuated and injects water into the RCS. ITS 3.5.3 retains the ACTIONS for the required HPSI train inoperable. This changes the CTS by deleting this 90-day Special Report.

The removal of these details for making reports 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 LCO for one required HPSI train OPERABLE and the ACTIONS for the required HPSI train inoperable. Deletion of the ECCS reporting requirement is acceptable since 10 CFR 50.72(b)(2)(iv) requires a 4 hour notification in the event of an unplanned ECCS actuation and injection into the RCS. Additionally, 10 CFR 50.73(2)(iv)(A) also requires submission of a licensee event report for any unplanned event or condition that resulted in manual or automatic actuation of ECCS. PSL Unit 1 and Unit 2 operating licenses require compliance with 10 CFR 50.72 and 50.73. Therefore, the CTS requirement is unnecessary. Requirements continue to be provided in ITS to mitigate a DBA while Mode 3 with pressurizer pressure < 1750 psia and in Hot Standby (MODE 4) conditions. This change is designated as less restrictive because reports that would be submitted under the CTS will not be required under the ITS.

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

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.3 ECCS - Shutdown

LCO 3.5.3 LCO 3.5.3 One high pressure safety injection (HPSI) train shall be OPERABLE.

3.5.3 Applicability MODE 3 Footnote* MODE 4 Footnote#

APPLICABILITY: MODE 3 with pressurizer pressure < ~~[1700]~~ 1750 psia, MODE 4 with RCS cold leg temperature > 250°F. 2 4

ACTIONS

ACTION 3.5.3.d

-----NOTE-----
LCO 3.0.4.b is not applicable to ECCS High Pressure Safety Injection subsystem when entering MODE 4.

CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION 3.5.3.a L02 — A. Required HPSI train inoperable.	A.1 Restore required HPSI train to OPERABLE status.	1 hour
ACTION 3.5.3.a L03 — B. Required Action and associated Completion Time not met.	B.1 Be in MODE ~~5~~ 4 with RCS cold leg temperature ≤ 250°F.	24 hours 4

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
4.5.3.1 SR 3.5.3.1	~~The~~ For required HPSI train, applicable portion of the following SRs are applicable: ~~[~~SR 3.5.2.1~~]~~ SR 3.5.2.6 SR 3.5.2.2 SR 3.5.2.7 ~~[~~SR 3.5.2.3~~]~~ ~~[~~SR 3.5.2.9~~]~~ SR 3.5.2.4	In accordance with applicable SRs 3 2

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.3 ECCS - Shutdown

LCO 3.5.3

LCO 3.5.3 One high pressure safety injection (HPSI) train shall be OPERABLE.

3.5.3 Applicability

APPLICABILITY: MODE 3 with pressurizer pressure < ~~[1700]~~ 1750 psia, MODE 4. 2

ACTIONS

ACTION 3.5.3.c

-----NOTE-----
LCO 3.0.4.b is not applicable to ECCS High Pressure Safety Injection subsystem when entering MODE 4.

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION 3.5.3.a	A. Required HPSI train inoperable.	A.1 Restore required HPSI train to OPERABLE status.	1 hour
ACTION 3.5.3.a L03	B. Required Action and associated Completion Time not met.	B.1 Be in MODE 5.	24 hours

SURVEILLANCE REQUIREMENTS

CTS	SURVEILLANCE		FREQUENCY	
4.5.3	SR 3.5.3.1	~~The~~ For required HPSI train, applicable portion of the following SRs are applicable: ~~[~~SR 3.5.2.1~~]~~ SR 3.5.2.6 SR 3.5.2.2 SR 3.5.2.7 ~~[~~SR 3.5.2.3~~]~~ ~~[~~SR 3.5.2.9~~]~~ SR 3.5.2.4	In accordance with applicable SRs	3 2

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.3, ECCS - SHUTDOWN

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. Clarification is added to ISTS SR 3.5.3.1. The change clarifies the intent that only the required HPSI train portions of the listed SRs are applicable. This change is similar to the SR wording of SR 3.5.3.1 of ISTS NUREGs 1430 (Babcock and Wilcox) and 1431 (Westinghouse).

4. **Unit 1 only**: To support the Unit 1 low temperature overpressure protection (LTOP) analysis, all HPSI pumps must be incapable of injecting into the Reactor Coolant System (RCS) when RCS cold leg temperature is ≤ 236°F in MODE 4. Therefore, the change to the Applicability in the ITS to MODE 4 with RCS cold leg temperature > 250°F is made consistent with the # footnote in CTS to ensure both HPSI subsystems are blocked prior to RCS cold leg temperature dropping below 236°F. Core cooling requirements in MODE 4 when RCS cold leg temperature is ≤ 250°F are addressed by LCO 3.4.6, “RCS Loops – MODE 4.” Required Action B.1 is modified in the ITS to require action to exit the Applicability consistent with the change to the Applicability.

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

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.3 ECCS - Shutdown

Thus, only the SI and recirculation actuation manual channels and associated actuation logic to the required HPSI train are required in MODE 3 with pressurizer pressure < 1750 psia and MODE 4 with RCS cold leg temperature > 250°F.

BASES

BACKGROUND

The Background section for Bases B 3.5.2, "ECCS - Operating," , as it describes the design of the ECCS, is applicable to these Bases, with the following modifications. 1

In MODE 3 with pressurizer pressure < ~~1700~~ 1750 psia and in MODE 4 when RCS cold leg temperature is > 250°F, an ECCS train is defined as one high pressure safety injection (HPSI) subsystem. The HPSI ~~flow path~~ train consists of piping, valves, and pumps that enable water from the refueling water tank (RWT) and the containment sump to be injected into the Reactor Coolant System (RCS) following the accidents described in Bases 3.5.2. 3 2

APPLICABLE SAFETY ANALYSES

~~The Applicable Safety Analyses section of Bases 3.5.2 is applicable to these Bases.~~ 1

Plant licensing basis does not require an analysis to determine the effects of a loss of coolant accident (LOCA) or demonstration of ECCS equipment capability to mitigate a LOCA in MODE 3 with pressurizer pressure < 1750 psia or MODE 4 when RCS cold leg temperature is > 250°F. However, one HPSI subsystem is required to be OPERABLE in MODE 3 with pressurizer pressure < 1750 psia and MODE 4 with RCS cold leg temperature > 250°F to ensure sufficient ECCS flow is available to the core and adequate core cooling is maintained following a loss of RCS inventory. 1

Due to the stable conditions associated with operation in MODE 4, and the reduced probability of a Design Basis Accident (DBA), the ECCS operational requirements are reduced. Included in these reductions is that certain automatic safety injection (SI) actuation signals are not available. ~~In this MODE, sufficient time exists for manual actuation of the required ECCS to mitigate the consequences of a DBA.~~ 1

Only one train of ECCS is required for ~~MODE 4~~ MODE 3 with pressurizer pressure < 1750 psia and MODE 4 with RCS cold leg temperature > 250°F. Protection against single failures is not relied on for this MODE of operation. 3

ECCS - Shutdown satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

In MODE 3 with pressurizer pressure < ~~1700~~ 1750 psia and MODE 4 when RCS cold leg temperature is > 250°F, an ECCS subsystem is composed of a single HPSI subsystem. Each HPSI subsystem includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWT and transferring suction to the containment sump. 3

During an event requiring ECCS actuation, a flow path is required to supply water from the RWT to the RCS via the HPSI pumps and their respective supply headers to each of the four cold leg injection nozzles. In the long term, this flow path may be switched to take its supply from the containment sump and to deliver its flow to the RCS hot and cold legs. Management of gas voids is important to ECCS OPERABILITY.

BASES

when RCS cold leg temperature is ≤ 300°F

LCO (continued)

1750

With RCS pressure < ~~1700~~ psia, one HPSI pump is acceptable without single failure consideration, based on the stable reactivity condition of the reactor and the limited core cooling requirements. The low pressure safety injection (LPSI) pumps may therefore be released from the ECCS train for use in shutdown cooling (SDC). In MODE 4 ~~with RCS cold leg temperature less than or equal to the LTOP enable temperature specified in the PTLR~~, a maximum of one HPSI pump is allowed to be OPERABLE in accordance with LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System." 3

In addition, no HPSI pump can be OPERABLE when RCS cold leg temperature is ≤ 236°F in accordance with LCO 3.4.12.

3

3

APPLICABILITY

1750

In MODES 1, 2, and 3 with RCS pressure ≥ ~~1700~~ psia, the OPERABILITY requirements for ECCS are covered by LCO 3.5.2. 3

1750 with RCS cold leg temperature > 250°F

In MODE 3 with RCS pressure < ~~1700~~ psia and in MODE 4, one OPERABLE ECCS train is acceptable without single failure consideration, based on the stable reactivity condition of the reactor and the limited core cooling requirements. 3

MODE 4 when RCS cold leg temperature is ≤ 250°F and in

MODE 4 when RCS cold leg temperature is ≤ 250°F are addressed by LCO 3.4.6, "RCS Loops – MODE 4. Core cooling requirements in

In MODES 5 and 6, unit conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation - High Water Level," and LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level." 1

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to an inoperable ECCS High Pressure Safety Injection subsystem. There is an increased risk associated with entering MODE 4 from MODE 5 with an inoperable ECCS High Pressure Safety Injection subsystem 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

With no HPSI pump OPERABLE, the unit is not prepared to respond to a loss of coolant accident. The 1 hour Completion Time to restore at least one HPSI train to OPERABLE status ensures that prompt action is taken to restore the required cooling capacity or to initiate actions to place the unit in ~~MODE 5,~~ where an ECCS train is not required.

a condition

BASES

ACTIONS (continued)

B.1

MODE 4 with RCS cold leg temperature ≤ 250°F

When the Required Action cannot be completed within the required Completion Time, a controlled shutdown should be initiated. Twenty-four hours is reasonable, based on operating experience, to reach ~~MODE 5~~ in an orderly manner and without challenging plant systems. 3

SURVEILLANCE REQUIREMENTS

SR 3.5.3.1

The applicable Surveillance descriptions from Bases 3.5.2 apply.

REFERENCES ~~The applicable references from Bases 3.5.2 apply~~.

None 1

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.3 ECCS - Shutdown

Thus, only the SI and recirculation actuation manual channels and associated actuation logic to the required HPSI train are required in MODE 3 with pressurizer pressure < 1750 psia and MODE 4.

BASES

BACKGROUND

The Background section for Bases B 3.5.2, "ECCS - Operating," , as it describes the design of the ECCS, is applicable to these Bases, with the following modifications. 1

In MODE 3 with pressurizer pressure < ~~1700~~ 1750 psia and in MODE 4, an ECCS train is defined as one high pressure safety injection (HPSI) subsystem. The HPSI ~~flow path~~ train consists of piping, valves, and pumps that enable water from the refueling water tank (RWT) and the containment sump to be injected into the Reactor Coolant System (RCS) following the accidents described in Bases 3.5.2. 3 2

APPLICABLE SAFETY ANALYSES

~~The Applicable Safety Analyses section of Bases 3.5.2 is applicable to these Bases.~~ 1

Plant licensing basis does not require an analysis to determine the effects of a loss of coolant accident (LOCA) or demonstration of ECCS equipment capability to mitigate a LOCA in MODE 3 with pressurizer pressure < 1750 psia or MODE 4. However, one HPSI subsystem is required to be OPERABLE in MODE 3 with pressurizer pressure < 1750 psia and MODE 4 to ensure sufficient ECCS flow is available to the core and adequate core cooling is maintained following a loss of RCS inventory. 1

Due to the stable conditions associated with operation in MODE 4, and the reduced probability of a Design Basis Accident (DBA), the ECCS operational requirements are reduced. Included in these reductions is that certain automatic safety injection (SI) actuation signals are not available. ~~In this MODE, sufficient time exists for manual actuation of the required ECCS to mitigate the consequences of a DBA.~~ 1

Only one train of ECCS is required for ~~MODE 4~~ MODE 3 with pressurizer pressure < 1750 psia and MODE 4. Protection against single failures is not relied on for this MODE of operation. 3

ECCS - Shutdown satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

In MODE 3 with pressurizer pressure < ~~1700~~ 1750 psia and MODE 4, an ECCS subsystem is composed of a single HPSI subsystem. Each HPSI subsystem includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWT and transferring suction to the containment sump. 3

During an event requiring ECCS actuation, a flow path is required to supply water from the RWT to the RCS via the HPSI pumps and their respective supply headers to each of the four cold leg injection nozzles. In the long term, this flow path may be switched to take its supply from the containment sump and to deliver its flow to the RCS hot and cold legs. Management of gas voids is important to ECCS OPERABILITY.

BASES

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, (3)

LCO (continued)

1750 (3)

With RCS pressure < ~~1700~~ psia, one HPSI pump is acceptable without single failure consideration, based on the stable reactivity condition of the reactor and the limited core cooling requirements. The low pressure safety injection (LPSI) pumps may therefore be released from the ECCS train for use in shutdown cooling (SDC). In MODE 4 ~~with RCS cold leg temperature less than or equal to the LTOP enable temperature specified in the PTLR~~, a maximum of one HPSI pump is allowed to be OPERABLE in accordance with LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System."

APPLICABILITY

1750

In MODES 1, 2, and 3 with RCS pressure ≥ ~~1700~~ psia, the OPERABILITY requirements for ECCS are covered by LCO 3.5.2. (3)

1750

In MODE 3 with RCS pressure < ~~1700~~ psia and in MODE 4, one OPERABLE ECCS train is acceptable without single failure consideration, based on the stable reactivity condition of the reactor and the limited core cooling requirements. (3)

In MODES 5 and 6, unit conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation - High Water Level," and LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level."

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to an inoperable ECCS High Pressure Safety Injection subsystem. There is an increased risk associated with entering MODE 4 from MODE 5 with an inoperable ECCS High Pressure Safety Injection subsystem 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

With no HPSI pump OPERABLE, the unit is not prepared to respond to a loss of coolant accident. The 1 hour Completion Time to restore at least one HPSI train to OPERABLE status ensures that prompt action is taken to restore the required cooling capacity or to initiate actions to place the unit in MODE 5, where an ECCS train is not required.

BASES

ACTIONS (continued)

B.1

When the Required Action cannot be completed within the required Completion Time, a controlled shutdown should be initiated. Twenty-four hours is reasonable, based on operating experience, to reach MODE 5 in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.5.3.1

The applicable Surveillance descriptions from Bases 3.5.2 apply.

REFERENCES

~~The applicable references from Bases 3.5.2 apply~~. None

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.3, BASES, ECCS - SHUTDOWN

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. Editorial change is made to the Background section of the ISTS Bases to clarify what constitutes a HPSI train since LCO 3.5.3 requires one HPSI "train" to be OPERABLE. In addition, the text added to the Applicable Safety Analysis section of the ISTS Bases clarifies that only the manual channel as associated actuation logic to the required HPSI train are required in MODE 4 when the Specification is applicable.

3. 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 3.5.3, ECCS - SHUTDOWN

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

ATTACHMENT 4

ITS 3.5.4, Refueling Water Tank (RWT)

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

EMERGENCY CORE COOLING SYSTEMS

REFUELING WATER TANK

LIMITING CONDITION FOR OPERATION

LCO 3.5.4 — 3.5.4 The refueling water tank shall be OPERABLE ~~with~~:

SR 3.5.4.2 — ~~a.~~ ~~A minimum contained~~ [Verify RWT borated water] volume [is ≥] 477,360 gallons ~~of borated water,~~

SR 3.5.4.3 — ~~b.~~ ~~A minimum~~ [Verify RWT] boron concentration ~~of~~ [is ≥] 1900 ppm ~~,~~ [and ≤ 2200 ppm] — M01

SR 3.5.4.1 — ~~c.~~ ~~A maximum water temperature of~~ 100°F ~~,~~

SR 3.5.4.1 — ~~d.~~ ~~A minimum~~ [Verify RWT borated] water temperature ~~of~~ [is ≥] 55°F [and ≤ 100°F] ~~when in MODES 1 and 2, and~~

SR 3.5.4.1 — ~~e.~~ ~~A minimum water temperature of 40°F when in MODES 3 and 4~~ — M02

Applicability — **APPLICABILITY:** MODES 1, 2, 3 and 4.

ACTION: [Add proposed Action A] [Add proposed Action C] — L01 [Add proposed Action B] — L02

ACTION D / ACTION E — ~~With the~~ [RWT] refueling water tank inoperable [for reasons other than Condition A or C], restore ~~the tank~~ to OPERABLE status within 1 hour or be in ~~at least HOT STANDBY~~ [MODE 3] within 6 hours and in ~~COLD SHUTDOWN~~ [MODE 5] within ~~the following 30~~ [36] hours.

SURVEILLANCE REQUIREMENTS

~~4.5.4~~ ~~The RWT shall be demonstrated OPERABLE:~~

SR 3.5.4.2, SR 3.5.4.3 Frequency — ~~a.~~ In accordance with the Surveillance Frequency Control Program ~~by:~~

SR 3.5.4.2 — ~~1.~~ Verifying ~~ing the~~ water [volume] ~~level~~ in the tank, and

SR 3.5.4.3 — ~~2.~~ Verifying ~~ing the~~ boron concentration of the water.

SR 3.5.4.1 Frequency / SR 3.5.4.1 — ~~b.~~ In accordance with the Surveillance Frequency Control Program ~~by~~ verifying ~~ing the~~ RWT temperature.

SR 3.5.4.1 Note — NOTE Only required to be performed when ambient air temperature is < 55°F or > 100°F. — L03

EMERGENCY CORE COOLING SYSTEMS

~~3/4.5.4~~ REFUELING WATER TANK

LIMITING CONDITION FOR OPERATION

LCO 3.5.4 — 3.5.4 The refueling water tank shall be OPERABLE ~~with~~:

SR 3.5.4.2 — ~~a.~~ ~~A minimum contained~~ [Verify RWT] borated water volume [is ≥] 477,360 gallons~~,~~

SR 3.5.4.3 — ~~b.~~ ~~A~~ [Verify RWT] boron concentration ~~of between~~ [is ≥] 1900 [ppm] and [≤] 2200 ppm ~~of boron, and~~

SR 3.5.4.1 — ~~c.~~ ~~A solution~~ [Verify RWT borated water] temperature ~~of between~~ [is ≥] 55°F and [≤] 100°F.

Applicability — **APPLICABILITY**: MODES 1, 2, 3 and 4.

ACTION:

[Add proposed Action A] (L01)
[Add proposed Action C]
[Add proposed Action B] (L02)

ACTION D
ACTION E

~~With the~~ refueling water tank inoperable [for reasons other than Condition A or C], restore ~~the tank~~ [RWT] to OPERABLE status within 1 hour or be in ~~at least~~ ~~HOT STANDBY~~ [MODE 3] within 6 hours and in ~~COLD SHUTDOWN~~ [MODE 5] within ~~the following~~ ~~30~~ [36] hours.

SURVEILLANCE REQUIREMENTS

~~4.5.4~~ ~~The RWT shall be demonstrated OPERABLE:~~

SR 3.5.4.2, SR 3.5.4.3 Frequency — ~~a.~~ In accordance with the Surveillance Frequency Control Program ~~by:~~

SR 3.5.4.2 — ~~1.~~ Verify~~ing the~~ contained borated water volume in the tank, and

SR 3.5.4.3 — ~~2.~~ Verify~~ing the~~ boron concentration of the water. (LA01)

SR 3.5.4.1 and Frequency
SR 3.5.4.1 NOTE

~~b.~~ ~~At least once per 24 hours~~ [In accordance with the Surveillance Frequency Control Program] ~~by~~ verify~~ing the~~ RWT temperature [NOTE Only required to be performed] when ~~the outside~~ [ambient] air temperature is ~~less then~~ [<] 55°F or ~~greater than~~ [>] 100°F. (A01)

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 only:** CTS 3.5.4.b requires a minimum RWT boron concentration of 1900 ppm but does not require a maximum boron concentration. ITS SR 3.5.4.3 requires verification that RWT boron concentration is within a minimum and maximum limit. Similarly, Unit 2 CTS 3.5.4.b requires boron concentration within a minimum 1900 ppm and a maximum 2200 ppm. This changes the Unit 1 CTS by adding a RWT boron concentration maximum limit of 2200 ppm.

The purpose of CTS 3.5.4.b is provide a RWT minimum boron concentration limit to ensure that, following a LOCA with a minimum level in the RWT, the reactor will remain subcritical in the cold condition following mixing of the RWT and RCS water volumes. The RWT maximum boron concentration limit is based on boron precipitation in the core following a LOCA which could result in reduced heat removal capability between the fuel cladding and the reactor coolant. This change is acceptable, because the maximum boron concentration limit provides additional assurance that the RWT is capable of performing its function and not impeding other mitigation systems from performing their safety functions.

This change is designated as more restrictive because it adds a RWT maximum boron concentration limit to the CTS.

M02 **Unit 1 only:** CTS 3.5.4.d requires a minimum RWT water temperature of 55°F when in MODES 1 and 2. CTS 3.5.4.e requires a minimum RWT water temperature of 40°F when in MODES 3 and 4. ITS SR 3.5.4.1 requires verification that RWT boron concentration is within a minimum and maximum limit, with the minimum limit the same for MODES 1, 2, 3, and 4. Similarly, Unit 2 CTS 3.5.4.c requires water temperature of between 55°F and 100°F in MODES 1, 2, 3 and 4. This changes the Unit 1 CTS by changing the RWT minimum water temperature to 55°F in MODES 3 and 4.

The purpose of CTS 3.5.4.e is to provide a RWT minimum water temperature in MODES 3 and 4 to ensure that the RWT is capable of performing its function when required. This change is acceptable because raising the minimum required water temperature from 40°F to 55°F in MODES 3 and 4 provides additional margin to the low temperature design limit and provides assurance that the RWT will be capable of performing its function. In addition, raising the minimum temperature of the RWT will further minimize the reactivity impact as a result of an inadvertent ECCS injection while shutdown. This change is designated as more restrictive because it changes the RWT minimum water temperature in MODES 3 and 4 to a higher temperature than required in CTS.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 **Unit 2 only:** (*Type 6 – Removal of SR Frequency to the Surveillance Frequency Control Program*) CTS 4.5.4.b requires verification that RWT borated water temperature is within limits at least once per 24 hours when the outside (i.e., ambient) air temperature is less than 55°F or greater than 100°F. ITS SR 3.5.4.1 requires a similar Surveillance and specifies a periodic Frequency of, "In accordance with the Surveillance Frequency Control Program." This changes the CTS by moving the specified periodic Frequency to the Surveillance Frequency Control Program.

The removal of periodic Surveillance Requirement Frequencies 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 to periodically verify RWT borated water temperature is within limits. The existing Surveillance Frequency is removed from Technical Specifications and placed under licensee control pursuant to the methodology described in NEI 04-10. The control of changes to periodic Surveillance Frequencies is in accordance with the Surveillance Frequency Control Program requirements specified in CTS 6.8.4 (ITS 5.5.16). This program ensures that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met. This change is designated as a less restrictive removal of detail change because Surveillance Frequencies are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 3 – Relaxation of Completion Time)* CTS 3.5.4 ACTION allows 1 hour to restore an inoperable RWT. ITS 3.5.4 ACTION A allows 8 hours to restore the RWT to OPERABLE status if the inoperability is due to the RWT boron concentration not within limits. ITS 3.5.4 ACTION C allows 8 hours to restore the RWT to OPERABLE status if the inoperability is due to the RWT borated water temperature not within limits. ITS 3.5.4 ACTION D requires the restoration of the RWT to an OPERABLE status within 1 hour for reasons other than Condition A or Condition C (e.g., RWT water volume not within limits). This changes the CTS by expanding the Completion Time for restoration of an inoperable RWT due to boron concentration or borated water temperature not within limits from 1 hour to 8 hours.

The purpose of CTS 3.5.4 Action is to require prompt action to restore the RWT to OPERABLE status. This change is acceptable because the Completion Time is consistent with safe operation under the specified Condition, considering a reasonable time to restore RWT parameters and the low probability of a DBA occurring during the allowed Completion Time. The primary function of the RWT is to contain sufficient borated water volume to support the ECCS during the injection phase following a LOCA. This RWT water volume continues to be available while in the Condition with the RWT boron concentration or the RWT borated water temperature not within limits. As a result, the most important safety function of the RWT can still be provided. The allowed Completion Time of 8 hours to restore the RWT to within limits was developed considering the time required to change the boron concentration or water temperature and that the contents of the tank are still available for injection. Given the remaining abilities of the RWT, requiring a plant shutdown after one hour is not warranted. 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.

L02 *(Category 4 – Relaxation of Required Action)* CTS 3.5.4 ACTION, states, "With the refueling water tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours."

ITS 3.5.4 ACTION A allows 8 hours to restore the RWT to OPERABLE status if the inoperability is due to the RWT boron concentration not within limits. ITS 3.5.4 ACTION C allows 8 hours to restore the RWT to OPERABLE status if the inoperability is due to the RWT borated water temperature not within limits. ITS 3.5.4 ACTION D requires the restoration of the RWT to an OPERABLE status within 1 hour for reasons other than Condition A or Condition C (e.g., RWT water volume not within limits). ITS ACTION E requires that with the Required Action and associated Completion Time of Condition C (borated water temperature) or D (borated water volume) not met, then be in MODE 3 within 6 hours and MODE 5 within 36 hours consistent with CTS. In addition, the end state of ITS 3.5.4 is MODE 5 consistent with CTS.

ITS ACTION B requires that with the Required Action and associated Completion Time of Condition A (boron concentration) not met, then be in MODE 3 within 6 hours and includes a NOTE modifying Required Action B.1 that states, "LCO 3.0.4.a is not applicable when entering MODE 3 or MODE 4." This changes CTS by changing the end state of CTS 3.5.4.b, RWT boron concentration, from MODE 5 (Cold Shutdown) to MODE 3 (Hot Standby).

This change is acceptable because the modification of the end state from MODE 5 to MODE 3, with respect to RWT boron concentration, is consistent with CE NPSD-1186-A, Revision 00, "Technical Justification for the Risk-Informed Modification to Selected Required Action End States for CEOG Member PWRs," dated October 2001 (ADAMS Accession No. ML110410539) and Technical Specifications Task Force (TSTF) traveler TSTF- 422, Revision 2, "Change in Technical Specifications End States, (CE NPSD-1186)," dated December 22, 2009 (ADAMS Accession No. ML103270197) allowances.

Florida Power & Light Company provided the regulatory commitments regarding the implementation of TSTF-422, Revision 2, in License Amendment Request for Adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-422, Revision 2, "Change in Technical Specifications End States, (CE NPSD-1186)," Using the Consolidated Line Item Improvement Process (ADAMS Accession No. ML16118A272). The NRC issued Amendment Nos. 234 and 184 to Renewed Facility Operating License Nos. DPR-67 and NPF-16 for the St. Lucie Plant, Unit Nos. 1 and 2, respectively (ADAMS Accession No. ML16210A374).

This change is designated as less restrictive because instead of requiring the plant to achieve COLD SHUTDOWN (MODE 5) with the RWT boron concentration not restored to within limits, the ITS end state is HOT STANDBY (MODE 3) with the Note that LCO 3.0.4.a not applicable when entering MODE 3 or MODE 4.

L03 **Unit 1 only:** (*Category 7 – Relaxation of Surveillance Frequency)* CTS 4.5.4.b states that the RWT be demonstrated OPERABLE by verifying the RWT water temperature within limits in accordance with the Surveillance Frequency Control Program. ITS SR 3.5.4.1 also states that the RWT be demonstrated OPERABLE by verifying the RWT water temperature within limits in accordance with the Surveillance Frequency Control Program. ITS SR 3.5.4.1 is modified by a Note that eliminates the requirement to perform this Surveillance when ambient air temperatures are within the operating temperature limits of the RWT. This changes the CTS by adopting the ITS SR 3.5.4.1 Note that eliminates the requirement to perform this Surveillance when ambient air temperatures are within the operating temperature limits of the RWT.

The purpose of CTS 4.5.4.b and ITS SR 3.5.4.1 is to verify RWT water temperature within limits. This change is acceptable because with ambient temperatures within the RWT operating temperature limits, the RWT temperature should not exceed the limits since the RWT is exposed to ambient temperature and is not insulated. Because of the RWT design, tank temperature tracks closely with outside ambient temperature. Thus, periodic verification of the RWT temperature is unnecessary while ambient temperature is between 55°F and 100°F. 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)

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.4 Refueling Water Tank (RWT)

LCO 3.5.4

LCO 3.5.4 The RWT shall be OPERABLE.

3.5.4 Applicability

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.5.4 ACTION DOC L01	A. RWT boron concentration not within limits.	A.1 Restore RWT to OPERABLE status.	8 hours
3.5.4 ACTION DOC L02	B. Required Action and associated Completion Time of Condition A not met.	B.1 --------------NOTE-------------- LCO 3.0.4.a is not applicable when entering MODE 3 or MODE 4. ------------------------------------- Be in MODE 3.	6 hours
3.5.4 ACTION DOC L01	C. RWT borated water temperature not within limits.	C.1 Restore RWT to OPERABLE status.	8 hours
3.5.4 ACTION	D. RWT inoperable for reasons other than Condition A or C.	D.1 Restore RWT to OPERABLE status	1 hour
3.5.4 ACTION	E. Required Action and associated Completion Time of Condition C or D not met.	E.1 Be in MODE 3. <u>AND</u> E.2 Be in MODE 5.	6 hours 36 hours

CTS

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
DOC L03 LCO 3.5.4.c,d SR 4.5.4.b DOC M02 SR 3.5.4.1	-------------------------------NOTE----------------------------- [Only required to be performed when ambient air temperature is < [40]°F or > [100]°F.] 55 -- Verify RWT borated water temperature is ≥ [40]°F and ≤ [100]°F. 55	[24 hours OR In accordance with the Surveillance Frequency Control Program] 2 2
LCO 3.5.4.a SR 4.5.4.a.1 SR 3.5.4.2	Verify RWT borated water volume is ≥ [362,800 gallons, (88)%] [above the ECCS suction connection]. 477,360	[7 days OR In accordance with the Surveillance Frequency Control Program] 2
LCO 3.5.4.b SR 4.5.4.a.2 DOC M01 SR 3.5.4.3	Verify RWT boron concentration is ≥ [1720] ppm and ≤ [2500] ppm. 1900 2200	[7 days OR In accordance with the Surveillance Frequency Control Program] 2

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.4 Refueling Water Tank (RWT)

LCO 3.5.4 The RWT shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.5.4 ACTION DOC L01	A. RWT boron concentration not within limits.	A.1 Restore RWT to OPERABLE status.	8 hours
3.5.4 ACTION DOC L02	B. Required Action and associated Completion Time of Condition A not met.	B.1 --------------NOTE-------------- LCO 3.0.4.a is not applicable when entering MODE 3 or MODE 4. ------------------------------------- Be in MODE 3.	6 hours
3.5.4 ACTION DOC L01	C. RWT borated water temperature not within limits.	C.1 Restore RWT to OPERABLE status.	8 hours
3.5.4 ACTION	D. RWT inoperable for reasons other than Condition A or C.	D.1 Restore RWT to OPERABLE status	1 hour
3.5.4 ACTION	E. Required Action and associated Completion Time of Condition C or D not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

CTS	SURVEILLANCE		FREQUENCY	
LCO 3.5.4.c SR 4.5.4.b	SR 3.5.4.1	-------------------------------NOTE------------------------------ [Only required to be performed when ambient air temperature is < [40] 55 °F or > [100]°F.] --		2
LCO 3.5.4.c SR 4.5.4.b		Verify RWT borated water temperature is ≥ [40] 55 °F and ≤ [100]°F.	[24 hours OR In accordance with the Surveillance Frequency Control Program]	2
LCO 3.5.4.a SR 4.5.4.a.1	SR 3.5.4.2	Verify RWT borated water volume is ≥ [362,800 477,360 gallons, (88)%] [above the ECCS suction connection].	[7 days OR In accordance with the Surveillance Frequency Control Program]	2
LCO 3.5.4.b SR 4.5.4.a.2	SR 3.5.4.3	Verify RWT boron concentration is ≥ [1720] 1900 ppm and ≤ [2500] 2200 ppm.	[7 days OR In accordance with the Surveillance Frequency Control Program]	2

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.4, REFUELING WATER TANK (RWT)

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 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.4 Refueling Water Tank (RWT)

BASES

BACKGROUND

The RWT supports the ECCS and the Containment Spray System by providing a source of borated water for Engineered Safety Feature (ESF) pump operation.

The RWT supplies two ECCS trains by separate, redundant supply headers. Each header also supplies one train of the Containment Spray System. A motor operated isolation valve is provided in each header to allow the operator to isolate the usable volume of the RWT from the ECCS after the ESF pump suction has been transferred to the containment sump following depletion of the RWT during a loss of coolant accident (LOCA). A separate header is used to supply the Chemical and Volume Control System (CVCS) from the RWT. Use of a single RWT to supply both trains of the ECCS is acceptable since the RWT is a passive component, and passive failures are not assumed to occur coincidently with the Design Basis Event during the injection phase of an accident. Not all the water stored in the RWT is available for injection following a LOCA; the location of the ECCS suction piping in the RWT will result in some portion of the stored volume being unavailable.

The high pressure safety injection (HPSI), low pressure safety injection (LPSI), and containment spray pumps are provided with recirculation lines that ensure each pump can maintain minimum flow requirements when operating at shutoff head conditions. These lines discharge back to the RWT, which vents to the atmosphere. When the suction for the HPSI and containment spray pumps is transferred to the containment sump, this flow path must be isolated to prevent a release of the containment sump contents to the RWT. If not isolated, this flow path could result in a release of contaminants to the atmosphere and the eventual loss of suction head for the ESF pumps.

This LCO ensures that:

a. The RWT contains sufficient borated water to support the ECCS during the injection phase,

b. Sufficient water volume exists in the containment sump to support continued operation of the ESF pumps at the time of transfer to the recirculation mode of cooling, and

c. The reactor remains subcritical following a LOCA.

BASES

BACKGROUND (continued)

Insufficient water inventory in the RWT could result in insufficient cooling capacity of the ECCS when the transfer to the recirculation mode occurs. Improper boron concentrations could result in a reduction of SDM or excessive boric acid precipitation in the core following a LOCA, as well as excessive caustic stress corrosion of mechanical components and systems inside containment.

APPLICABLE SAFETY ANALYSES

During accident conditions, the RWT provides a source of borated water to the HPSI, LPSI, containment spray, and charging pumps. As such, it provides containment cooling and depressurization, core cooling, and replacement inventory and is a source of negative reactivity for reactor shutdown (Ref. 1). The design basis transients and applicable safety analyses concerning each of these systems are discussed in the Applicable Safety Analyses section of Bases B 3.5.2, "ECCS - Operating," and B 3.6.6, "Containment Spray and Cooling Systems." These analyses are used to assess changes to the RWT in order to evaluate their effects in relation to the acceptance limits.

477,360

The volume limit of ~~[362,800]~~ gallons is based on two factors: 2

a. Sufficient deliverable volume must be available to provide at least 20 minutes ~~(plus a 10% margin)~~ of full flow from all ESF pumps prior to reaching a low level switchover to the containment sump for recirculation and 1

b. The containment sump water volume must be sufficient to support continued ESF pump operation after the switchover to recirculation occurs. This sump volume water inventory is supplied by the RWT borated water inventory.

Twenty minutes is the point at which 75% of the design flow of one HPSI pump is capable of meeting or exceeding the decay heat boiloff rate.

When ESF pump suction is transferred to the sump, there must be sufficient water in the sump to ensure adequate net positive suction head (NPSH) for the HPSI and containment spray pumps. The RWT capacity must be sufficient to supply this amount of water without considering the inventory added from the safety injection tanks or Reactor Coolant System (RCS), but accounting for loss of inventory to containment subcompartments and reservoirs due to containment spray operation and to areas outside containment due to leakage from ECCS injection and recirculation equipment.

BASES

APPLICABLE SAFETY ANALYSES (continued)

1900

The ~~[1720]~~ ppm limit for minimum boron concentration was established to ensure that, following a LOCA with a minimum level in the RWT, the reactor will remain subcritical in the cold condition following mixing of the RWT and RCS water volumes. Small break LOCAs assume that all control rods are inserted, except for the control element assembly (CEA) of highest worth, which is withdrawn from the core. Large break LOCAs assume that all CEAs remain withdrawn from the core. The most limiting case occurs at beginning of core life. 2

2200

The maximum boron limit of ~~[2500]~~ ppm in the RWT is based on boron precipitation in the core following a LOCA. With the reactor vessel at saturated conditions, the core dissipates heat by pool nucleate boiling. Because of this boiling phenomenon in the core, the boric acid concentration will increase in this region. If allowed to proceed in this manner, a point will be reached where boron precipitation will occur in the core. Post LOCA emergency procedures direct the operator to establish simultaneous hot and cold leg injection to prevent this condition by establishing a forced flow path through the core regardless of break location. These procedures are based on the minimum time in which precipitation could occur, assuming that maximum boron concentrations exist in the borated water sources used for injection following a LOCA. Boron concentrations in the RWT in excess of the limit could result in precipitation earlier than assumed in the analysis. 2

55

The upper limit of ~~[~~100~~]~~°F and the lower limit of ~~[40]~~°F on RWT temperature are the limits assumed in the accident analysis. Although RWT temperature affects the outcome of several analyses, the upper and lower limits established by the LCO are not limited by any of these analyses. 2

The RWT satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The RWT ensures that an adequate supply of borated water is available to cool and depressurize the containment in the event of a Design Basis Accident (DBA) and to cool and cover the core in the event of a LOCA, that the reactor remains subcritical following a DBA, and that an adequate level exists in the containment sump to support ESF pump operation in the recirculation mode.

To be considered OPERABLE, the RWT must meet the limits established in the SRs for water volume, boron concentration, and temperature.

BASES

APPLICABILITY

In MODES 1, 2, 3, and 4, the RWT OPERABILITY requirements are dictated by the ECCS and Containment Spray System OPERABILITY requirements. Since ~~both~~ the ECCS ~~and the Containment Spray System~~ must be OPERABLE in MODES 1, 2, 3, and 4, the RWT must be OPERABLE to support ~~their~~ its operation. 1 1

Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation - High Water Level," and LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level."

ACTIONS

A.1

With RWT boron concentration not within limits, it must be returned to within limits within 8 hours. In this condition neither the ECCS nor the Containment Spray System can perform their design functions; therefore, prompt action must be taken to restore the tank to OPERABLE condition. The allowed Completion Time of 8 hours to restore the RWT to within limits was developed considering the time required to change boron concentration and that the contents of the tank are still available for injection.

B.1

~~-----------------------------------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].~~

~~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.~~ 3
~~---~~

If the RWT boron concentration is not restored to within limits within the associated Completion Time, the plant must be brought to MODE 3 within 6 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant

BASES

ACTIONS (continued)

systems. Reference 2 demonstrated that is it acceptable to remain in MODE 3 in this condition because the boron concentration limit is based on MODE 1 events which are unlikely in MODE 3, such as a LOCA, and conditions which do not exist in MODE 3, such as a critical core with all rods out. Since the anticipated deviations from the RWT boron concentration requirements are expected to be small and the ability to correct the deficiency is expected to be readily available, entry into MODE 4 or 5 is not necessary.

Required Action B.1 is modified by a Note that states that LCO 3.0.4.a is not applicable when entering MODE 3 or MODE 4. This Note prohibits the use of LCO 3.0.4.a to enter MODE 3 or 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.

C.1

With RWT water temperature not within limits, it must be returned to within limits within 8 hours. In this condition neither the ECCS nor the Containment Spray System can perform their design functions; therefore, prompt action must be taken to restore the tank to OPERABLE condition. The allowed Completion Time of 8 hours to restore the RWT to within limits was developed considering the time required to change water temperature and that the contents of the tank are still available for injection.

D.1

or RWT inoperable for reasons other than boron concentration, borated water temperature, or borated water volume,

1

With RWT borated water volume not within limits, it must be returned to within limits within 1 hour. In this condition, neither the ECCS nor Containment Spray System can perform their design functions; therefore, prompt action must be taken to restore the tank to OPERABLE status or to place the unit in a MODE in which these systems are not required. The allowed Completion Time of 1 hour to restore the RWT to OPERABLE status is based on this condition simultaneously affecting multiple redundant trains.

BASES

ACTIONS (continued)

E.1 and E.2

If the RWT temperature or water volume cannot be restored to OPERABLE status 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 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.

SURVEILLANCE REQUIREMENTS

SR 3.5.4.1

RWT borated water temperature shall be verified to be within the limits assumed in the accident analysis. ~~[This Frequency of 24 hours has been shown to be sufficient to identify temperature changes that approach either acceptable limit.~~ 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
~~---]~~

The SR is modified by a Note that eliminates the requirement to perform this Surveillance when ambient air temperatures are within the operating temperature limits of the RWT. With ambient temperatures within this range, the RWT temperature should not exceed the limits.

SR 3.5.4.2

Above minimum RWT water volume level shall be verified. This Frequency ensures that a sufficient initial water supply is available for injection and to support continued ESF pump operation on recirculation. ~~[Since the RWT volume is normally stable and is provided with a Low Level Alarm, a 7 day Frequency is appropriate and has been shown to be acceptable through operating experience.~~ 2

~~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.~~
~~-----]~~ 2

SR 3.5.4.3

Boron concentration of the RWT shall be verified to be within the required range. This Frequency ensures that the reactor will remain subcritical following a LOCA. Further, it ensures that the resulting sump pH will be maintained in an acceptable range such that boron precipitation in the core will not occur earlier than predicted and the effect of chloride and caustic stress corrosion on mechanical systems and components will be minimized. ~~[Since the RWT volume is normally stable, a 7 day sampling Frequency is appropriate and has been shown through operating experience to be 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

REFERENCES U

1. FSAR, ~~Chapter [6]~~ Section 6.2 and ~~Chapter [15]~~ Section 15.6. 1 2
2. CE NPSD-1186-A, Technical Justification for the Risk Informed Modification to Selected Required Action End States for CEOG PWRs, October, 2001.

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.4 Refueling Water Tank (RWT)

BASES

BACKGROUND

The RWT supports the ECCS and the Containment Spray System by providing a source of borated water for Engineered Safety Feature (ESF) pump operation.

The RWT supplies two ECCS trains by separate, redundant supply headers. Each header also supplies one train of the Containment Spray System. A motor operated isolation valve is provided in each header to allow the operator to isolate the usable volume of the RWT from the ECCS after the ESF pump suction has been transferred to the containment sump following depletion of the RWT during a loss of coolant accident (LOCA). A separate header is used to supply the Chemical and Volume Control System (CVCS) from the RWT. Use of a single RWT to supply both trains of the ECCS is acceptable since the RWT is a passive component, and passive failures are not assumed to occur coincidently with the Design Basis Event during the injection phase of an accident. Not all the water stored in the RWT is available for injection following a LOCA; the location of the ECCS suction piping in the RWT will result in some portion of the stored volume being unavailable.

The high pressure safety injection (HPSI), low pressure safety injection (LPSI), and containment spray pumps are provided with recirculation lines that ensure each pump can maintain minimum flow requirements when operating at shutoff head conditions. These lines discharge back to the RWT, which vents to the atmosphere. When the suction for the HPSI and containment spray pumps is transferred to the containment sump, this flow path must be isolated to prevent a release of the containment sump contents to the RWT. If not isolated, this flow path could result in a release of contaminants to the atmosphere and the eventual loss of suction head for the ESF pumps.

This LCO ensures that:

a. The RWT contains sufficient borated water to support the ECCS during the injection phase,

b. Sufficient water volume exists in the containment sump to support continued operation of the ESF pumps at the time of transfer to the recirculation mode of cooling, and

c. The reactor remains subcritical following a LOCA.

BASES

BACKGROUND (continued)

Insufficient water inventory in the RWT could result in insufficient cooling capacity of the ECCS when the transfer to the recirculation mode occurs. Improper boron concentrations could result in a reduction of SDM or excessive boric acid precipitation in the core following a LOCA, as well as excessive caustic stress corrosion of mechanical components and systems inside containment.

APPLICABLE SAFETY ANALYSES

During accident conditions, the RWT provides a source of borated water to the HPSI, LPSI, containment spray, and charging pumps. As such, it provides containment cooling and depressurization, core cooling, and replacement inventory and is a source of negative reactivity for reactor shutdown (Ref. 1). The design basis transients and applicable safety analyses concerning each of these systems are discussed in the Applicable Safety Analyses section of Bases B 3.5.2, "ECCS - Operating," and B 3.6.6, "Containment Spray and Cooling Systems." These analyses are used to assess changes to the RWT in order to evaluate their effects in relation to the acceptance limits.

477,360

The volume limit of ~~[362,800]~~ gallons is based on two factors: 2

a. Sufficient deliverable volume must be available to provide at least 20 minutes ~~(plus a 10% margin)~~ of full flow from all ESF pumps prior to reaching a low level switchover to the containment sump for recirculation and 1

b. The containment sump water volume must be sufficient to support continued ESF pump operation after the switchover to recirculation occurs. This sump volume water inventory is supplied by the RWT borated water inventory.

Twenty minutes is the point at which 75% of the design flow of one HPSI pump is capable of meeting or exceeding the decay heat boiloff rate.

When ESF pump suction is transferred to the sump, there must be sufficient water in the sump to ensure adequate net positive suction head (NPSH) for the HPSI and containment spray pumps. The RWT capacity must be sufficient to supply this amount of water without considering the inventory added from the safety injection tanks or Reactor Coolant System (RCS), but accounting for loss of inventory to containment subcompartments and reservoirs due to containment spray operation and to areas outside containment due to leakage from ECCS injection and recirculation equipment.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The ~~[1720]~~ 1900 ppm limit for minimum boron concentration was established to ensure that, following a LOCA with a minimum level in the RWT, the reactor will remain subcritical in the cold condition following mixing of the RWT and RCS water volumes. Small break LOCAs assume that all control rods are inserted, except for the control element assembly (CEA) of highest worth, which is withdrawn from the core. Large break LOCAs assume that all CEAs remain withdrawn from the core. The most limiting case occurs at beginning of core life. 2

The maximum boron limit of ~~[2500]~~ 2200 ppm in the RWT is based on boron precipitation in the core following a LOCA. With the reactor vessel at saturated conditions, the core dissipates heat by pool nucleate boiling. Because of this boiling phenomenon in the core, the boric acid concentration will increase in this region. If allowed to proceed in this manner, a point will be reached where boron precipitation will occur in the core. Post LOCA emergency procedures direct the operator to establish simultaneous hot and cold leg injection to prevent this condition by establishing a forced flow path through the core regardless of break location. These procedures are based on the minimum time in which precipitation could occur, assuming that maximum boron concentrations exist in the borated water sources used for injection following a LOCA. Boron concentrations in the RWT in excess of the limit could result in precipitation earlier than assumed in the analysis. 2

The upper limit of ~~[~~100~~]~~°F and the lower limit of ~~[40]~~ 55°F on RWT temperature are the limits assumed in the accident analysis. Although RWT temperature affects the outcome of several analyses, the upper and lower limits established by the LCO are not limited by any of these analyses. 2

The RWT satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The RWT ensures that an adequate supply of borated water is available to cool and depressurize the containment in the event of a Design Basis Accident (DBA) and to cool and cover the core in the event of a LOCA, that the reactor remains subcritical following a DBA, and that an adequate level exists in the containment sump to support ESF pump operation in the recirculation mode.

To be considered OPERABLE, the RWT must meet the limits established in the SRs for water volume, boron concentration, and temperature.

BASES

APPLICABILITY

In MODES 1, 2, 3, and 4, the RWT OPERABILITY requirements are dictated by the ECCS and Containment Spray System OPERABILITY requirements. Since ~~both~~ the ECCS ~~and the Containment Spray System~~ must be OPERABLE in MODES 1, 2, 3, and 4, the RWT must be OPERABLE to support ~~their~~ its operation. 1 1

Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation - High Water Level," and LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level."

ACTIONS

A.1

With RWT boron concentration not within limits, it must be returned to within limits within 8 hours. In this condition neither the ECCS nor the Containment Spray System can perform their design functions; therefore, prompt action must be taken to restore the tank to OPERABLE condition. The allowed Completion Time of 8 hours to restore the RWT to within limits was developed considering the time required to change boron concentration and that the contents of the tank are still available for injection.

B.1

~~-----------------------------------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].~~

~~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.~~ 3
~~--~~

If the RWT boron concentration is not restored to within limits within the associated Completion Time, the plant must be brought to MODE 3 within 6 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant

BASES

ACTIONS (continued)

systems. Reference 2 demonstrated that is it acceptable to remain in MODE 3 in this condition because the boron concentration limit is based on MODE 1 events which are unlikely in MODE 3, such as a LOCA, and conditions which do not exist in MODE 3, such as a critical core with all rods out. Since the anticipated deviations from the RWT boron concentration requirements are expected to be small and the ability to correct the deficiency is expected to be readily available, entry into MODE 4 or 5 is not necessary.

Required Action B.1 is modified by a Note that states that LCO 3.0.4.a is not applicable when entering MODE 3 or MODE 4. This Note prohibits the use of LCO 3.0.4.a to enter MODE 3 or 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.

C.1

With RWT water temperature not within limits, it must be returned to within limits within 8 hours. In this condition neither the ECCS nor the Containment Spray System can perform their design functions; therefore, prompt action must be taken to restore the tank to OPERABLE condition. The allowed Completion Time of 8 hours to restore the RWT to within limits was developed considering the time required to change water temperature and that the contents of the tank are still available for injection.

D.1

[Inserted: or RWT inoperable for reasons other than boron concentration, borated water temperature, or borated water volume,] (1)

With RWT borated water volume not within limits, it must be returned to within limits within 1 hour. In this condition, neither the ECCS nor Containment Spray System can perform their design functions; therefore, prompt action must be taken to restore the tank to OPERABLE status or to place the unit in a MODE in which these systems are not required. The allowed Completion Time of 1 hour to restore the RWT to OPERABLE status is based on this condition simultaneously affecting multiple redundant trains.

BASES

ACTIONS (continued)

E.1 and E.2

If the RWT temperature or water volume cannot be restored to OPERABLE status 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 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.

SURVEILLANCE REQUIREMENTS

SR 3.5.4.1

RWT borated water temperature shall be verified to be within the limits assumed in the accident analysis. [This Frequency of 24 hours has been shown to be sufficient to identify temperature changes that approach either acceptable limit. 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
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The SR is modified by a Note that eliminates the requirement to perform this Surveillance when ambient air temperatures are within the operating temperature limits of the RWT. With ambient temperatures within this range, the RWT temperature should not exceed the limits.

SR 3.5.4.2

Above minimum RWT water volume level shall be verified. This Frequency ensures that a sufficient initial water supply is available for injection and to support continued ESF pump operation on recirculation. [Since the RWT volume is normally stable and is provided with a Low Level Alarm, a 7 day Frequency is appropriate and has been shown to be acceptable through operating experience. 2

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.
--]

2

SR 3.5.4.3

Boron concentration of the RWT shall be verified to be within the required range. This Frequency ensures that the reactor will remain subcritical following a LOCA. Further, it ensures that the resulting sump pH will be maintained in an acceptable range such that boron precipitation in the core will not occur earlier than predicted and the effect of chloride and caustic stress corrosion on mechanical systems and components will be minimized. [Since the RWT volume is normally stable, a 7 day sampling Frequency is appropriate and has been shown through operating experience to be 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

REFERENCES

U

1. FSAR, Chapter [6] Section 6.2 and Chapter [15] Section 15.6.
2. CE NPSD-1186-A, Technical Justification for the Risk Informed Modification to Selected Required Action End States for CEOG PWRs, October, 2001.

1 2

1

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.4, BASES, REFUELING WATER TANK (RWT)

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. The Reviewer's Note has been deleted. The Reviewer's Note provides the NRC Reviewer information needed to meet the requirements. This Note is not meant to be retained in the final version of the plant specific submittal.

   CTS 3.5.4 ACTION, states, "With the refueling water tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours." ITS 3.5.4 ACTION A allows 8 hours to restore the RWT to OPERABLE status if the inoperability is due to the RWT boron concentration not within limits. ITS ACTION B requires that with the Required Action and associated Completion Time of Condition A (boron concentration) not met, then be in MODE 3 within 6 hours. The end state of ITS 3.5.4 is MODE 5. In addition, ITS ACTION B includes a NOTE modifying Required Action B.1 that states, "LCO 3.0.4.a is not applicable when entering MODE 3 or MODE 4." This changes CTS by modifying the end state of CTS 3.5.4.b, RWT boron concentration. The modification of the end state from MODE 5 to MODE 3, with respect to RWT boron concentration, is consistent with CE NPSD-1186-A, Revision 00, "Technical Justification for the Risk-Informed Modification to Selected Required Action End States for CEOG Member PWRs," dated October 2001 (ADAMS Accession No. ML110410539) and Technical Specifications Task Force (TSTF) traveler TSTF- 422, Revision 2, "Change in Technical Specifications End States, (CE NPSD-1186)," dated December 22, 2009 (ADAMS Accession No. ML103270197) allowances.

   FPL (PSL Unit 1 and Unit 2) provided the regulatory commitments regarding the implementation of TSTF-422, Revision 2, in License Amendment Request for Adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-422, Revision 2, "Change in Technical Specifications End States, (CE NPSD-1186)," Using the Consolidated Line Item Improvement Process (ADAMS Accession No. ML16118A272). The NRC issued Amendment Nos. 234 and 184 to Renewed Facility Operating License Nos. DPR-67 and NPF-16 for the St. Lucie Plant, Unit Nos. 1 and 2, respectively (ADAMS Accession No. ML16210A374).

4. **Unit 2 Only:** The Reviewer's Note has been deleted. The Reviewer's Note provides the NRC Reviewer information needed to meet the requirements. This Note is not meant to be retained in the final version of the plant specific submittal. CTS 4.5.4.b requires verification that RWT borated water temperature is within limits at least once per 24 hours when the outside (i.e., ambient) air temperature is less than 55°F or greater than 100°F. The Surveillance Frequency Control Program was incorporated into the CTS by License Amendment 173, dated June 22, 2015 (ADAMS Accession No. 15127A066). The 24 hour Frequency specified in CTS 4.5.4.b is proposed to be relocated to the Surveillance Frequency Control Program (See Discussion of Change LA01).

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.5.4, REFUELING WATER TANK (RWT)

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

ATTACHMENT 5

ITS 3.5.5, Trisodium Phosphate (TSP) - Unit 2 only

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

EMERGENCY CORE COOLING SYSTEMS

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:

See ITS 3.5.2

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

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.

SR 3.5.5.1
SR 3.5.5.2
Frequency

~~e.~~ In accordance with the Surveillance Frequency Control Program ~~by:~~ A01

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.

* Not required to be met for system vent flow paths opened under administrative control.

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (continued)

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

Add LCO 3.5.5 A02

LCO 3.5.5
SR 3.5.5.1

The TSP baskets shall contain ≥ 173 ft^3 of active TSP

Add ACTION A, B L01

3. Verifying that a minimum total of 173 cubic feet of solid granular trisodium phosphate dodecahydrate (TSP) is contained within the TSP storage baskets. contain active

SR 3.5.5.2

4. Verifying that when a representative sample of 70.5 ± 0.5 grams of TSP from a TSP storage basket is submerged, without agitation, in 10.0 ± 0.1 gallons of 120 ± 10°F borated water representative of the RWT, the pH of the mixed solution is raised to greater than or equal to 7 within 4 hours. the water provides adequate adjustment LA01

f. In accordance with the Surveillance Frequency Control Program, during shutdown, by:

1. Verifying that each automatic valve in the flow paths actuates to its correct position on SIAS and/or RAS test signals.

2. Verifying that each of the following pumps start automatically upon receipt of a Safety Injection Actuation Test Signal:

a. High-Pressure Safety Injection pumps.

b. Low-Pressure Safety Injection pumps.

c. Charging Pumps

3. Verifying that upon receipt of an actual or simulated Recirculation Actuation Signal: each low-pressure safety injection pump stops, each containment sump isolation valve opens, each refueling water tank outlet valve closes, and each safety injection system recirculation valve to the refueling water tank closes.

g. By verifying that each of the following pumps develops the specified total developed head when tested pursuant to the INSERVICE TESTING PROGRAM:

1. High-Pressure Safety Injection pumps.

2. Low-Pressure Safety Injection pumps.

h. By verifying the correct position of each electrical and/or mechanical position stop for the following ECCS throttle valves:

1. During valve stroking operation or following maintenance on the valve and prior to declaring the valve OPERABLE when the ECCS subsystems are required to be OPERABLE.

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) 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 3.5.2 requires two ECCS subsystems to be OPERABLE with each subsystem comprised of specific components and flowpaths and is applicable in MODES 1, 2, and 3 with pressurizer pressure ≥ 1750 psia. CTS 4.5.2.e.3 and e.4 provide requirements for trisodium phosphate dodecahydrate (TSP). ITS LCO 3.5.5, "Trisodium Phosphate (TSP)," states that the TSP baskets shall contain ≥ 173 ft^3 of active TSP. The Applicability for this requirement is MODES 1 and 2, and MODE 3 with pressurizer pressure ≥ 1750 psia, consistent with the CTS Applicability. ITS ACTIONS are provided to restore TSP to within limits within 72 hours or place the plant in MODE 3 within 6 hours and reduce pressurizer pressure to < 1750 psia within 12 hours (See Discussion of Change L01 for change to CTS actions). This changes the CTS by providing a separate Specification for TSP requirements.

The purpose of CTS 4.5.2.e.3 and e.4 (TSP Surveillances) is to verify an adequate amount of active TSP is available to maintain pH in the containment sump during a LOCA to promote iodine retention in the sump during the recirculation phase of ECCS and containment spray, thereby limiting radiological consequences. This function is not related to the OPERABILITY of the ECCS trains and is more appropriately addressed by a separate Specification. This change is designated as administrative because providing a separate Specification for TSP requirements does not result in a technical change to the CTS.

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 SR 4.5.2.e.4 states that when a representative sample of 70.5 + 0.5 grams of TSP from a TSP storage basket is submerged, without agitation, in 10.0 ± 0.1 gallons of 120 ± 10°F borated water representative of the

RWT, the pH of the mixed solution is raised to greater than or equal to 7 within 4 hours. ITS SR 3.5.5.2 requires verification that a sample from the TSP baskets provides adequate pH adjustment of RWT water, and does not retain this detail. This changes the CTS by relocating the details for verification of the TSP sample for pH adjustment.

The removal of these details, that 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 SR 3.5.5.2 retains the requirement to periodically verify a TSP sample for pH adjustment. The removed details that state "a representative sample of 70.5 + 0.5 grams of TSP from a TSP storage basket is submerged, without agitation, in 10.0 ± 0.1 gallons of 120 ± 10°F borated water representative of the RWT, the pH of the mixed solution is raised to greater than or equal to 7 within 4 hours," are moved to the ITS Bases. 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.

LESS RESTRICTIVE CHANGES

L01 *(Category 4 – Relaxation of Required Action)* CTS 3.5.2 does not contain ACTIONS to follow if the TSP Surveillances are not met. Therefore, if the TSP Surveillances are not met, CTS 3.0.3 would be required. CTS 3.0.3 requires action to be initiated within 1 hour and place the unit, as applicable, in hot standby (MODE 3) within the next 6 hours, hot shutdown (MODE 4) within the following 6 hours, and cold shutdown (MODE 5) within the subsequent 24 hours. Since the TSP Surveillances are applicable in MODES 1, 2, and 3 with pressurizer pressure ≥ 1750 psia, upon entry into CTS 3.0.3, the unit would have be placed in MODE 3 within 7 hours from entry and pressurizer pressure reduced below 1750 psia before MODE 4 is required to be reached within 13 hours from entry. ITS 3.5.5 contains ACTIONS to follow if the TSP LCO is not met. If the LCO is not met, 72 hours are provided to restore TSP to within limits. If this action is not completed within the 72 hours, the plant must be placed in MODE 3 within 6 hours and reduce pressurizer pressure to < 1750 psia within 12 hours. This changes the CTS by providing time to restore TSP to within limits before a plant shutdown is required.

The purpose of CTS 4.5.2.e.3 and e.4 (TSP Surveillances) is to verify an adequate amount of active TSP is available to maintain pH in the containment sump during a LOCA. During plant operation the containment sump is not accessible and corrections may not be possible. However, if possible, this change provides time to restore TSP within limits rather than requiring a plant shutdown. If active TSP is not within the required limit, TSP must be restored within the required limit in 72 hours. The pH control of the ECCS recirculation and containment spray solution for corrosion protection and iodine removal is reduced in this condition. This change is acceptable because the 72 hour Completion Time takes into account that the condition, which caused the TSP not within limits, would most likely allow the ECCS and Containment Spray System to continue to provide some capability for pH adjustment and iodine removal. The 72-hour Completion Time also considers that the Containment Spray System would continue to be available to remove some iodine from the containment atmosphere in the event of a DBA and the low probability of the worst case DBA occurring during this period. Therefore, allowing time to evaluate the TSP degradation and make any adjustments is acceptable. If TSP cannot be restored to within limits in 72 hours, the unit must be placed in a condition where the LCO no longer applies; MODE 3 with pressurizer pressure < 1750 psia. 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)

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.5 Trisodium Phosphate (TSP)

4.5.2.e.3 LCO 3.5.5 The TSP baskets shall contain ≥ [291] 173 ft^3 of active TSP. 2

3.5.2 Applicability APPLICABILITY: MODES 1, 2, and 3. MODE 1 and 2, MODE 3 with pressurizer pressure ≥ 1750 psia. 1

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC L01 A. TSP not within limits.	A.1 Restore TSP to within limits.	72 hours
DOC L01 B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4. Reduce pressurizer pressure < 1750 psia.	6 hours [12] hours 1

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
4.5.2.e.3 SR 3.5.5.1	Verify the TSP baskets contain ≥ [291] 173 ft^3 of trisodium phosphate.	[[18] months OR In accordance with the Surveillance Frequency Control Program] 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
SR 3.5.2.e.4	SR 3.5.5.2	Verify that a sample from the TSP baskets provides adequate pH adjustment of RWT water.	~~[[18] months~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program	2

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.5, TRISODIUM PHOSPHATE (TSP) – UNIT 2 ONLY

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 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.5 Trisodium Phosphate (TSP)

BASES

BACKGROUND

Trisodium phosphate (TSP) is placed on the floor or in the sump of the containment building to ensure that iodine, which may be dissolved in the recirculated reactor cooling water following a loss of coolant accident (LOCA), remains in solution. TSP also helps inhibit stress corrosion cracking (SCC) of austenitic stainless steel components in containment during the recirculation phase following an accident.

Fuel that is damaged during a LOCA will release iodine in several chemical forms to the reactor coolant and to the containment atmosphere. A portion of the iodine in the containment atmosphere is washed to the sump by containment sprays. The emergency core cooling water is borated for reactivity control. This borated water causes the sump solution to be acidic. In a low pH (acidic) solution, dissolved iodine will be converted to a volatile form. The volatile iodine will evolve out of solution into the containment atmosphere, significantly increasing the levels of airborne iodine. The increased levels of airborne iodine in containment contribute to the radiological releases and increase the consequences from the accident due to containment atmosphere leakage.

After a LOCA, the components of the core cooling and containment spray systems will be exposed to high temperature borated water. Prolonged exposure to the core cooling water combined with stresses imposed on the components can cause SCC. The SCC is a function of stress, oxygen and chloride concentrations, pH, temperature, and alloy composition of the components. High temperatures and low pH, which would be present after a LOCA, tend to promote SCC. This can lead to the failure of necessary safety systems or components.

Adjusting the pH of the recirculation solution to levels above 7.0 prevents a significant fraction of the dissolved iodine from converting to a volatile form. The higher pH thus decreases the level of airborne iodine in containment and reduces the radiological consequences from containment atmosphere leakage following a LOCA. Maintaining the solution pH above 7.0 also reduces the occurrence of SCC of austenitic stainless steel components in containment. Reducing SCC reduces the probability of failure of components.

BASES

BACKGROUND (continued)

TSP is employed as a passive form of pH control for post LOCA containment spray and core cooling water. Baskets of TSP are placed on the floor or in the sump of the containment building to dissolve from released reactor coolant water and containment sprays after a LOCA. Recirculation of the water for core cooling and containment sprays then provides mixing to achieve a uniform solution pH. The hydrated form (45-57% moisture) of TSP is used because of the high humidity in the containment building during normal operation. Since the TSP is hydrated, it is less likely to absorb large amounts of water from the humid atmosphere and will undergo less physical and chemical change than the anhydrous form of TSP.

APPLICABLE SAFETY ANALYSES

The LOCA radiological consequences analysis takes credit for iodine retention in the sump solution based on the recirculation water pH being ≥ 7.0. The radionuclide releases from the containment atmosphere and the consequences of a LOCA would be increased if the pH of the recirculation water were not adjusted to 7.0 or above.

TSP satisfies Criterion 3 of the 10 CFR 50.36(c)(2)(ii).

LCO

The TSP is required to adjust the pH of the recirculation water to > 7.0 after a LOCA. A pH > 7.0 is necessary to prevent significant amounts of iodine released from fuel failures and dissolved in the recirculation water from converting to a volatile form and evolving into the containment atmosphere. Higher levels of airborne iodine in containment may increase the release of radionuclides and the consequences of the accident. A pH > 7.0 is also necessary to prevent SCC of austenitic stainless steel components in containment. SCC increases the probability of failure of components.

The required amount of TSP is based upon the extreme cases of water volume and pH possible in the containment sump after a large break LOCA. The minimum required volume is the volume of TSP that will achieve a sump solution pH of ≥ 7.0 when taking into consideration the maximum possible sump water volume and the minimum possible pH. The amount of TSP needed in the containment building is based on the mass of TSP required to achieve the desired pH. However, a required volume is specified, rather than mass, since it is not feasible to weigh the entire amount of TSP in containment. The minimum required volume is based on the manufactured density of TSP. Since TSP can have a tendency to agglomerate from high humidity in the containment building, the density may increase and the volume decrease during normal plant operation. Due to possible agglomeration and increase in density, estimating the minimum volume of TSP in containment is conservative with respect to achieving a minimum required pH.

BASES

with pressurizer pressure ≥ 1750 psia

APPLICABILITY

In MODES 1, 2, and 3, the RCS is at elevated temperature and pressure, providing an energy potential for a LOCA. The potential for a LOCA results in a need for the ability to control the pH of the recirculated coolant. 1

3 with pressurizer pressure < 1750 psia,

In MODES 4, 5, and 6, the potential for a LOCA is reduced or nonexistent, and TSP is not required. 1

ACTIONS

A.1

If it is discovered that the TSP in the containment building sump is not within limits, action must be taken to restore the TSP to within limits. During plant operation the containment sump is not accessible and corrections may not be possible.

The Completion Time of 72 hours is allowed for restoring the TSP within limits, where possible~~, because 72 hours is the same time allowed for restoration of other ECCS components~~. 1

and takes into account that the condition which caused the TSP not within limits would most likely allow the ECCS and Containment Spray System to continue to provide some capability for pH adjustment and iodine removal. The 72 hour Completion Time also considers that the Containment Spray System would continue to be available to remove some iodine from the containment atmosphere in the event of a DBA and the low probability of the worst case DBA occurring during

B.1 and B.2

If the TSP cannot be restored within limits within the Completion Time of Required Action A.1, the plant must be brought to a MODE in which the LCO does not apply. The specified Completion Times for reaching MODE~~S~~ 3 and ~~4 are~~ those used throughout the Technical Specifications; they were chosen to allow reaching the specified conditions from full power in an orderly manner and without challenging plant systems. 3

and reducing pressurizer pressure below 1750 psia correspond to

SURVEILLANCE REQUIREMENTS

SR 3.5.5.1

Periodic determination of the volume of TSP in containment must be performed due to the possibility of leaking valves and components in the containment building that could cause dissolution of the TSP during normal operation. A verification is required to determine visually that a minimum of ~~[291]~~ 173 cubic feet is contained in the TSP baskets. This requirement ensures that there is an adequate volume of TSP to adjust the pH of the post LOCA sump solution to a value ≥ 7.0. 2

~~[The periodic verification is required every 18 months, since access to the TSP baskets is only feasible during outages, and normal fuel cycles are scheduled for 18 months. Operating experience has shown this Surveillance Frequency acceptable due to the margin in the volume of TSP placed in the containment building.~~ 2

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.~~
~~---]~~ 2

SR 3.5.5.2

Testing must be performed to ensure the solubility and buffering ability of the TSP after exposure to the containment environment. A representative sample of ~~[ ]~~ 70.5 ± 0.5 grams of TSP from one of the baskets in containment is submerged in ~~1.0 gal ± 0.05~~ 10.0 ± 0.1 gal of water at a boron concentration ~~of [ ]~~ between 1900 and 2200 ppm and at the standard temperature of ~~25°C ± 5°C~~ 120 ± 10°F. Without agitation, the solution pH should be raised to ≥ 7 within 4 hours. ~~The representative sample weight is based on the minimum required TSP weight of [ ] kilograms, which at manufactured density corresponds to the minimum volume of [ ] cubic ft, and maximum possible post LOCA sump volume of [ ] gallons, normalized to buffer a 1.0 gal sample.~~ The boron concentration of the test water is representative of the ~~maximum possible~~ boron concentration corresponding to the ~~maximum possible~~ post LOCA sump volume. Agitation of the test solution is prohibited, since an adequate standard for the agitation intensity cannot be specified. The test time ~~of 4 hours~~ is necessary to allow time for the dissolved TSP to naturally diffuse through the sample solution. In the post LOCA containment sump, rapid mixing would occur, significantly decreasing the actual amount of time before the required pH is achieved. This would ensure compliance with the Standard Review Plan requirement of a pH ≥ 7.0 by the onset of recirculation after a LOCA.

2
1
1
1

~~[The periodic verification is required every 18 months, since access to the TSP baskets is only feasible during outages, and normal fuel cycles are scheduled for 18 months. Operating experience has shown this Surveillance Frequency acceptable due to the margin in the volume of TSP placed in the containment building.~~ 2

~~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.
---]

2

REFERENCES None.

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.5, BASES, TRISODIUM PHOSPHATE (TSP) – UNIT 2 ONLY

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 end state is changed from MODE 4 to MODE 3 with pressurizer pressure < 1750 psia consistent with the CTS Applicability. The ISTS Bases is changed consistent with the change to the ISTS

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.5.5, TRISODIUM PHOSPHATE (TSP) – UNIT 2 ONLY

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