# VOLUME 10

# CNP UNITS 1 AND 2
# IMPROVED TECHNICAL
# SPECIFICATIONS CONVERSION

# ITS SECTION 3.5
# EMERGENCY CORE COOLING
# SYSTEMS (ECCS)

## Revision 0

# LIST OF ATTACHMENTS

1. ITS 3.5.1
2. ITS 3.5.2
3. ITS 3.5.3
4. ITS 3.5.4
5. ITS 3.5.5
6. Improved Standard Technical Specifications (ISTS) not adopted in the CNP ITS

# ATTACHMENT 1

## ITS 3.5.1, ACCUMULATORS

# Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

ITS 3.5.1

A.1

ITS

3/4 LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS
3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

ACCUMULATORS

LIMITING CONDITION FOR OPERATION

A.2

Four

LCO 3.5.1 — 3.5.1 Each reactor coolant system accumulator shall be OPERABLE with:

SR 3.5.1.1 — a. The isolation valve open,

SR 3.5.1.2 — b. A contained borated water volume of between 921 and 971 cubic feet,

SR 3.5.1.4 — c. A boron concentration between 2400 ppm and 2600 ppm, and

SR 3.5.1.3 — d. A nitrogen cover-pressure of between 585 and 658 psig.

APPLICABILITY: MODES 1, 2 and 3.*

ACTION:

ACTION A — a. With one accumulator inoperable, due to boron concentration not within limits, restore boron concentration to within limits within 72 hours

ACTION C — or be in at least Mode 3 within the next 6 hours and reduce reactor coolant system pressure to less than or equal to 1000 psig within the following 6 hours.

24 hours — L.1

ACTION B — b. With one accumulator inoperable for reasons other than boron concentration not within limits, restore the accumulator to OPERABLE status within 1 hour,

ACTION C — or be in at least Mode 3 within the next 6 hours and reduce reactor coolant system pressure to less than or equal to 1000 psig within the following 6 hours.

Add proposed ACTION D — A.3

SURVEILLANCE REQUIREMENTS

4.5.1 Each accumulator shall be demonstrated OPERABLE:

a. At least once per 12 hours by:

SR 3.5.1.2
SR 3.5.1.3 — 1. Verifying the contained borated water volume and nitrogen cover-pressure in the tanks, and

SR 3.5.1.1 — 2. Verifying that each accumulator isolation valve is open.

Applicability — *Reactor Coolant System Pressure above 1000 psig.

jen 1-21-00





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ITS 3.5.1

A.1

ITS

3/4 LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS
3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

SURVEILLANCE REQUIREMENTS (Continued)

SR 3.5.1.4 b. At least once per 31 days and, for the affected accumulator(s), 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 refueling water storage tank) by verifying the boron concentration of the accumulator solution. 13 $ft^3$ A.4

SR 3.5.1.5 c. At least once per 31 days when the RCS pressure is above 2000 psig, by verifying that power is removed from each accumulator isolation valve operator.



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ITS 3.5.1

A.1

ITS

3/4 LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS
3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

ACCUMULATORS

LIMITING CONDITION FOR OPERATION

A.2

LCO 3.5.1 3.5.1 ~~Each~~ Four reactor coolant system accumulator shall be OPERABLE with:

SR 3.5.1.1 a. The isolation valve open,

SR 3.5.1.2 b. A contained borated water volume of between 921 and 971 cubic feet,

SR 3.5.1.4 c. A boron concentration between 2400 ppm and 2600 ppm, and

SR 3.5.1.3 d. A nitrogen cover-pressure of between 585 and 658 psig.

APPLICABILITY: MODES 1, 2 and 3.*

ACTION:

ACTION A
ACTION C

a. With one accumulator inoperable due to boron concentration not within limits, restore boron concentration to within limits within 72 hours or be in at least Mode 3 within the next 6 hours and reduce reactor coolant system pressure to less than or equal to 1000 psig within the following 6 hours.

24 hours — L.1

ACTION B
ACTION C

b. With one accumulator inoperable for reasons other than boron concentration not within limits, restore the accumulator to OPERABLE status within 1 hour, or be in at least Mode 3 within the next 6 hours and reduce reactor coolant system pressure to less than or equal to 1000 psig within the following 6 hours.

Add proposed ACTION D — A.3

SURVEILLANCE REQUIREMENTS

4.5.1 Each accumulator shall be demonstrated OPERABLE:

a. At least once per 12 hours by:

SR 3.5.1.2
SR 3.5.1.3
1. Verifying the contained borated water volume and nitrogen cover-pressure in the tanks, and

SR 3.5.1.1 2. Verifying that each accumulator isolation valve is open.

Applicability *Reactor Coolant System Pressure above 1000 psig.



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ITS 3.5.1

A.1

ITS

3/4 LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS
3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

SURVEILLANCE REQUIREMENTS (Continued)

SR 3.5.1.4 b. At least once per 31 days and, for the affected accumulator(s), within 6 hours after each solution volume increase greater than or equal to 1% of tank volume (that is not the result of addition from the refueling water storage tank) by verifying the boron concentration of the accumulator solution. 13 $ft^3$ A.4

SR 3.5.1.5 c. At least once per 31 days when the RCS pressure is above 2000 psig by verifying that power is removed from each accumulator isolation valve operator.



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**DISCUSSION OF CHANGES**
**ITS 3.5.1, ACCUMULATORS**

ADMINISTRATIVE CHANGES

A.1 In the conversion of the CNP 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-1431, Rev. 2, "Standard Technical Specifications-Westinghouse Plants" (ISTS).

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

A.2 CTS 3.5.1 requires "each" reactor coolant system accumulator to be OPERABLE. ITS LCO 3.5.1 requires "four" ECCS accumulators to be OPERABLE. This changes the CTS by specifying the exact number of ECCS accumulators required to be OPERABLE.

This change is acceptable because the total number of ECCS accumulators installed in each unit at CNP is four. This change is designated as administrative because it does not result in any technical changes to the CTS.

A.3 CTS 3.5.1 does not contain a specific ACTION for two or more accumulators inoperable. With two or more accumulators 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 accumulators 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 actions taken when two or more accumulators are inoperable are 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 any technical changes to the CTS.

A.4 CTS 4.5.1.b requires each affected accumulator be demonstrated OPERABLE within 6 hours after each solution volume increase that is not the result of addition from the refueling water storage tank (RWST) of $\geq$ 1% of tank volume by verifying the boron concentration of the accumulator solution. ITS SR 3.5.1.4 requires verifying boron concentration once within 6 hours after each solution volume increase that is not the result of addition from the RWST of $\geq$ 13 $ft^3$. This changes CTS by changing the parameter value of solution volume increase of $\geq$ 1% of tank volume to solution volume increase of $\geq$ 13 $ft^3$.

This change is acceptable because a solution volume increase of $\geq$ 1% of tank volume correlates to a solution volume increase of $\geq$ 13 $ft^3$. This change is designated as administrative because it does not result in any technical changes to the CTS.

**DISCUSSION OF CHANGES**
**ITS 3.5.1, ACCUMULATORS**

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

L.1 *(Category 3 – Relaxation of Completion Time)* CTS 3.5.1 Action b requires an accumulator inoperable for reasons other than boron concentration not within limits be restored to OPERABLE status within 1 hour. ITS 3.5.1 ACTION B specifies a Completion Time of 24 hours under the same condition. This changes the CTS by relaxing the Completion Time from 1 hour to 24 hours.

The purpose of CTS 3.5.1 Action b is to provide the appropriate compensatory actions for one accumulator inoperable for reasons other than boron concentration not within limits. The current Completion Time of 1 hour is an insufficient amount of time to correct accumulator mechanical problems or restore parameters to within limits. This change is acceptable because an evaluation was performed to assess the risk of the proposed accumulator Completion Time extension. The risk evaluation was performed in accordance with RG 1.174 and RG 1.177 and approved by the staff and documented in WCAP-15049-A, Rev. 1, April 1999. I&M has reviewed WCAP-15049, Rev. 1 and the CNP PRA, and has determined that the WCAP-15049 analysis is applicable to CNP and is consistent and bounding with respect to the CNP PRA model. In addition, the extended allowed outage time has no impact on the safety analyses. This change is designated as less restrictive because additional time is allowed to restore parameters to within the LCO limits in the ITS than was allowed in the CTS.



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

CTS

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

LCO 3.5.1 — LCO 3.5.1 [Four] ECCS accumulators shall be OPERABLE. (1)

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > [1000] psig. (1)

ACTIONS

| CTS | CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|---|
| Action a | A. One accumulator inoperable due to boron concentration not within limits. | A.1 | Restore boron concentration to within limits. | 72 hours |
| Action b | B. One accumulator inoperable for reasons other than Condition A. | B.1 | Restore accumulator to OPERABLE status. | ~~1~~ 24 hour(s) (TSTF-370) |
| Action a, Action b | C. Required Action and associated Completion Time of Condition A or B not met. | C.1 | Be in MODE 3. | 6 hours |
| | | AND | | |
| | | C.2 | Reduce RCS pressure to ≤ [1000] psig. (1) | 12 hours |
| DOC A.3 | D. Two or more accumulators inoperable. | D.1 | Enter LCO 3.0.3. | Immediately |

SURVEILLANCE REQUIREMENTS

| CTS | SURVEILLANCE | | FREQUENCY |
|---|---|---|---|
| LCO 3.5.1.a, 4.5.1.a.2 | SR 3.5.1.1 | Verify each accumulator isolation valve is fully open. | 12 hours |

CTS

SURVEILLANCE REQUIREMENTS (continued)

| CTS | SURVEILLANCE | | FREQUENCY | |
|---|---|---|---|---|
| LCO 3.5.1.b, 4.5.1.a.1 | SR 3.5.1.2 | Verify borated water volume in each accumulator is ≥ [7853 gallons ( )% and ≤ 8171 gallons ( )%] 921 ft³ and ≤ 971 ft³. | 12 hours | 1 |
| LCO 3.5.1.d, 4.5.1.a.1 | SR 3.5.1.3 | Verify nitrogen cover pressure in each accumulator is ≥ [385] 585 psig and ≤ [481] 658 psig. | 12 hours | 1 |
| LCO 3.5.1.c, 4.5.1.b | SR 3.5.1.4 | Verify boron concentration in each accumulator is ≥ [1900] 2400 ppm and ≤ [2100] 2600 ppm. | 31 days<br><br>AND<br><br>- NOTE -<br>Only required to be performed for affected accumulators<br><br>Once within 6 hours after each solution volume increase of ≥ [[ ] % of indicated level ([ ] gallons)] 13 ft³ that is not the result of addition from the refueling water storage tank | 1<br><br>1 |
| 4.5.1.c | SR 3.5.1.5 | Verify power is removed from each accumulator isolation valve operator when RCS pressure is ≥ [2000] psig. | 31 days | 1 |

## JUSTIFICATION FOR DEVIATIONS
## ITS 3.5.1, ACCUMULATORS

1. The brackets are removed and the proper plant specific information/value is provided.

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

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.1 Accumulators

BASES

BACKGROUND

The functions of the ECCS accumulators 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.

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.

In the refill phase of a LOCA, which immediately follows the blowdown phase, 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 accumulator inventory is then available to help fill voids in the lower plenum and reactor vessel downcomer so as 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 accumulators are pressure vessels partially filled with borated water and pressurized with nitrogen gas. The accumulators are passive components, since no operator or control actions are required in order for them to perform their function. Internal accumulator tank pressure is sufficient to discharge the accumulator contents to the RCS, if RCS pressure decreases below the accumulator pressure.

Each accumulator is piped into an RCS cold leg via an accumulator line and is isolated from the RCS by a motor operated isolation valve and two check valves in series.

The accumulator size, water volume, and nitrogen cover pressure are selected so that three of the four accumulators are sufficient to partially cover the core before significant clad melting or zirconium water reaction can occur following a LOCA. The need to ensure that three accumulators are adequate for this function is consistent with the LOCA assumption that the entire contents of one accumulator will be lost via the RCS pipe break during the blowdown phase of the LOCA.

1 **INSERT 1**

Reactor Coolant System (RCS), contributing to the filling of the

1 **INSERT 1A**

through the beginning of the reflood phase during a large break



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BASES

APPLICABLE SAFETY ANALYSES

The accumulators are assumed OPERABLE 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 accumulators. Reference to the analyses for these DBAs is used to assess changes in the accumulators as they relate to the acceptance limits.

In performing the LOCA calculations, conservative assumptions are made concerning the availability of ECCS flow. In the early stages of a LOCA, with or without a loss of offsite power, the accumulators provide the sole source of makeup water to the RCS. The assumption of loss of offsite power is required by regulations and conservatively imposes a delay wherein the ECCS pumps cannot deliver flow until the emergency diesel generators start, come to rated speed, and go through their timed loading sequence. In cold leg break scenarios, the entire contents of one accumulator are assumed to be lost through the break.

The limiting large break LOCA is a double ended guillotine break at the discharge of the reactor coolant pump. During this event, the accumulators discharge to the RCS as soon as RCS pressure decreases to below accumulator pressure.

As a conservative estimate, no credit is taken for ECCS pump flow until an effective delay has elapsed. This delay accounts for the diesels starting and the pumps being loaded and delivering full flow. The delay time is conservatively set with an additional 2 seconds to account for SI signal generation. During this time, the accumulators are analyzed as providing the sole source of emergency core cooling. No operator action is assumed during the blowdown stage of a large break LOCA.

The worst case small break LOCA analyses also assume 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 accumulators, with pumped flow then providing continued cooling. As break size decreases, the accumulators and centrifugal charging pumps both play a part in terminating the rise in clad temperature. As break size continues to decrease, the role of the accumulators continues to decrease until they are not required and the centrifugal charging pumps become solely responsible for terminating the temperature increase.

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

(1) **INSERT 1B**

, safety injection pumps,

(1) **INSERT 2**

safety injection and

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. Core is maintained in a coolable geometry.

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

For both the large and small break LOCA analyses, a nominal contained accumulator water volume is used. The contained water volume is the same as the deliverable volume for the accumulators, since the accumulators are emptied, once discharged. For small breaks, an increase in water volume is a peak clad temperature penalty. For large breaks, an increase in water volume can be either a peak clad temperature penalty or benefit, depending on downcomer filling and subsequent spill through the break during the core reflooding portion of the transient. The analysis makes a conservative assumption with respect to ignoring or taking credit for line water volume from the accumulator to the check valve. The safety analysis assumes values of [6468] gallons and [6879] gallons. To allow for instrument inaccuracy, values of [6520] gallons and [6820] gallons are specified.

The minimum boron concentration setpoint is used in the post LOCA boron concentration calculation. The calculation is performed to assure reactor subcriticality in a post LOCA environment. Of particular interest is the large break LOCA, since no credit is taken for control rod assembly insertion. A reduction in the accumulator minimum boron concentration would produce a subsequent reduction in the available containment sump concentration for post LOCA shutdown and an increase in the maximum sump pH. The maximum boron concentration is used in determining the cold leg to hot leg recirculation injection switchover time and minimum sump pH.

The large and small break LOCA analyses are performed at the minimum nitrogen cover pressure, since sensitivity analyses have demonstrated

(1) **INSERT 2A**

a nominal value of 946 $ft^3$. The nominal value is used since competing effects related to ECCS bypass, the impact of gas volume changes on the injection rate, and spilled ECCS water modeled as spray (which reduces the containment pressure) result in the nominal value being the most limiting.

(1) **INSERT 3**

(or a more conservative value)

(1) **INSERT 4**

(except during hot leg switchover for large cold leg breaks)

(1) **INSERT 5**

peak clad temperature

(1) **INSERT 5A**

it has been determined

BASES

APPLICABLE SAFETY ANALYSES (continued)

that higher nitrogen cover pressure results in a computed peak clad temperature benefit. The maximum nitrogen cover pressure limit prevents accumulator relief valve actuation, and ultimately preserves accumulator integrity.

The effects on containment mass and energy releases from the accumulators are accounted for in the appropriate analyses (Refs. 1 and 3). (1)

The accumulators satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii). (1)

LCO

The LCO establishes the minimum conditions required to ensure that the accumulators are available to accomplish their core cooling safety function following a LOCA. Four accumulators are required to ensure that 100% of the contents of three of the accumulators will reach the core during a LOCA. This is consistent with the assumption that the contents of one accumulator spill through the break. If less than three accumulators are injected during the blowdown phase of a LOCA, the ECCS acceptance criteria of 10 CFR 50.46 (Ref. 2) could be violated. (1) large break

For an accumulator to be considered OPERABLE, the isolation valve must be fully open, power removed above [2000] psig, and the limits established in the SRs for contained volume, boron concentration, and nitrogen cover pressure must be met. (2)

APPLICABILITY

In MODES 1 and 2, and in MODE 3 with RCS pressure > 1000 psig, the accumulator OPERABILITY requirements are based on full power operation. Although cooling requirements decrease as power decreases, the accumulators are still required to provide core cooling as long as elevated RCS pressures and temperatures exist.

This LCO is only applicable at pressures > 1000 psig. At pressures ≤ 1000 psig, 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.

In MODE 3, with RCS pressure ≤ 1000 psig, and in MODES 4, 5, and 6, the accumulator motor operated isolation valves are closed to isolate the accumulators from the RCS. This allows RCS cooldown and depressurization without discharging the accumulators into the RCS or requiring depressurization of the accumulators.

BASES

ACTIONS

A.1

If the boron concentration of one accumulator 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. The boron in the accumulators contributes to the assumption that the combined ECCS water in the partially recovered core during the early reflooding phase of a large break LOCA is sufficient to keep that portion of the core subcritical. One accumulator below the minimum boron concentration limit, however, will have no effect on available ECCS water and an insignificant effect on core subcriticality during reflood. Boiling of ECCS water in the core during reflood concentrates boron in the saturated liquid that remains in the core. In addition, current analysis techniques demonstrate that the accumulators do not discharge following a large main steam line break for the majority of plants. Even if they do discharge, their impact is minor and not a design limiting event. Thus, 72 hours is allowed to return the boron concentration to within limits.

B.1

If one accumulator is inoperable for a reason other than boron concentration, the accumulator must be returned to OPERABLE status within 1 hour. In this Condition, the required contents of three accumulators cannot be assumed to reach the core during a LOCA. Due to the severity of the consequences should a LOCA occur in these conditions, the 1 hour Completion Time to open the valve, remove power to the valve, or restore the proper water volume or nitrogen cover pressure ensures that prompt action will be taken to return the inoperable accumulator to OPERABLE status. The Completion Time minimizes the potential for exposure of the plant to a LOCA under these conditions.

C.1 and C.2

If the accumulator cannot be returned 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 MODE 3 within 6 hours and RCS pressure reduced to ≤ 1000 psig 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.

4 **INSERT 6**

time the unit is exposed

TSTF-370 **INSERT 7**

The 24 hours allowed to restore an inoperable accumulator to OPERABLE status is justified in WCAP-15049-A, Rev. 1 (Ref. 5). 1

3

5 **INSERT 8**

or other specified condition



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BASES

ACTIONS (continued)

D.1

If more than one accumulator is inoperable, the plant (unit) is in a condition outside the accident analyses; therefore, LCO 3.0.3 must be entered immediately. (1)

SURVEILLANCE REQUIREMENTS

SR 3.5.1.1

Each accumulator (isolation) valve should be verified to be fully open every 12 hours. This verification ensures that the accumulators are available for injection and ensures timely discovery if a valve should be less than fully open. If an isolation valve is not fully open, the rate of injection to the RCS would be reduced. Although a motor operated valve position should not change with power removed, a closed valve could result in not meeting accident analyses assumptions. This Frequency is considered reasonable in view of other administrative controls that ensure a mispositioned isolation valve is unlikely. (5)

SR 3.5.1.2 and SR 3.5.1.3

Every 12 hours, borated water volume and nitrogen cover pressure are verified for each accumulator. This Frequency is sufficient to ensure adequate injection during a LOCA. Because of the static design of the accumulator, a 12 hour Frequency usually allows the operator to identify changes before limits are reached. Operating experience has shown this Frequency to be appropriate for early detection and correction of off normal trends.

SR 3.5.1.4

The boron concentration should be verified to be within required limits for each accumulator every 31 days since the static design of the accumulators 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. Sampling the affected accumulator within 6 hours after a 1% volume (i.e., 13 ft³) 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 inventory is from the refueling water storage tank (RWST), because the water contained in the RWST is within the accumulator boron concentration requirements. This is consistent with the recommendation of NUREG-1366 (Ref. 4). (1)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.1.5

Verification every 31 days that power is removed from each accumulator isolation valve operator when the RCS pressure is ≥ [2000] psig ensures that an active failure could not result in the undetected closure of an accumulator motor operated isolation valve. If this were to occur, only two accumulators would be available for injection given a single failure coincident with a LOCA. Since power is removed under administrative control, the 31 day Frequency will provide adequate assurance that power is removed. (2) (6)

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

REFERENCES

1. (U) FSAR, Chapter [6]. Section 14.3 (1) (2)

2. 10 CFR 50.46.

3. FSAR, Chapter [15]. (1)

4. NUREG-1366, February 1990. (1)

INSERT 9

TSTF-370

TSTF-370

**INSERT 9**

3. WCAP-15049-A, Rev. 1, April 1999.

"Risk-Informed Evaluation of an Extension to Accumulator Completion Times,"

1

**JUSTIFICATION FOR DEVIATIONS**
**ITS 3.5.1 BASES, ACCUMULATORS**

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

2. The brackets have been removed and the proper plant specific information/value has been provided.

3. Typographical/grammatical error corrected.

4. The ISTS ACTION B.1 Bases state that the Completion Time minimizes the potential for exposure of the plant to a LOCA under these conditions. In actuality, the Completion Time minimizes the time the unit is exposed to a LOCA under these conditions, not the potential for exposure. Therefore, the ISTS is revised to more accurately reflect the role of the Completion Time.

5. Changes are made to be consistent with the Specification.

6. ISTS SR 3.5.1.5 Bases state that verifying that power is removed from each accumulator isolation valve operator ensures that an active failure could not result in the "undetected" closure of an accumulator motor operated isolation valve. The word “undetected” was not included in the ITS because verification that power is removed only ensures that the valve does not have power. The requirements of ITS SR 3.5.1.1 and other administrative controls help to ensure that a valve closure does not remain undetected.

7. These punctuation corrections have been made consistent with the Writer's Guide for the Improved Standard Technical Specifications, NEI-03, Section 5.1.3.



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# Specific No Significant Hazards Considerations (NSHCs)

## DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
## ITS 3.5.1, ACCUMULATORS

There are no specific NSHC discussions for this Specification.

# ATTACHMENT 2

# ITS 3.5.2, ECCS - OPERATING

# Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

ITS 3.5.2

A.1

ITS

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - $T_{avg} \geq 350°F$

LIMITING CONDITION FOR OPERATION

LCO 3.5.2

3.5.2 Two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of:

a. One OPERABLE centrifugal charging pump,

b. One OPERABLE safety injection pump,

c. One OPERABLE residual heat removal heat exchanger,

d. One OPERABLE residual heat removal pump, and

e. An OPERABLE flow path capable of taking suction from the refueling water storage tank on a safety injection signal and transferring suction to the containment sump during the recirculation phase of operation.

LA.1

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

or more — L.1

ACTION A

ACTION B

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

Add proposed Required Action B.1 — M.1

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.

L.2

Add proposed ACTION C — L.1

D.C.COOK-UNIT 1 3/4 5-3 Amendment No. 80

A.1

ITS

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS

SR 3.5.2.1

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

a. At least once per 12 hours by verifying that the following valves are in the indicated positions with the control power locked out.

| Valve Number | Valve Function | Valve Position |
|---|---|---|
| a. IMO-390 | a. RWST to RHR | a. Open |
| b. IMO-315 | b. Low head SI to Hot Leg | b. Closed |
| c. IMO-325 | c. Low head SI to Hot Leg | c. Closed |
| d. IMO-262* | d. Mini flow line | d. Open |
| e. IMO-263* | e. Mini flow line | e. Open |
| f. IMO-261* | f. SI Suction | f. Open |
| g. ICM-305* | g. Sump line | g. Closed |
| h. ICM-306* | h. Sump line | h. Closed |

LA.2

SR 3.5.2.2

b. At least once per 31 days 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. 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. Of the areas affected within containment at the completion of each containment entry when CONTAINMENT INTEGRITY is established.

LA.3

*These valves must change position during the switchover from injection to recirculation flow following LOCA.

LA.2

ITS 3.5.2

A.1

ITS

3/4 LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS
3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

SURVEILLANCE REQUIREMENTS (Continued)

d. At least once per 18 months by: [24] L.3

1. Verifying the automatic interlock action to prevent opening of the suction of the RHR system from the Reactor Coolant System when the Reactor Coolant System pressure is above 600 psig. (See ITS 3.4.14)

SR 3.5.2.7 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 abnormal corrosion.

e. At least once per 18 months by: [24] L.3

SR 3.5.2.4 1. Verifying that each automatic valve in the flow path [that is not locked, sealed, or otherwise secured in position] L.4 actuates to its correct position on a [actual or] L.6 Safety Injection [actuation] LA.4 test signal.

SR 3.5.2.5 2. Verifying that each of the following [ECCS] LA.1 pumps start automatically upon receipt of a [actual or test] L.6 Safety Injection [actuation] LA.4 signal:

a) Centrifugal charging pump

b) Safety injection pump

c) Residual heat removal pump

LA.1

SR 3.5.2.3 f. By verifying that each of the following [ECCS] LA.1 pumps' developed head at the test flow point is greater than or equal to the required developed head when tested pursuant to specification 4.0.5.

1. Centrifugal charging pumps

2. Safety injection pumps

3. Residual heat removal pumps

LA.1

SR 3.5.2.6 g. By verifying the correct position of each mechanical stop for the following Emergency Core Cooling System throttle valves:

1. Within 4 hours following completion of each valve stroking operation or maintenance on the valve when the ECCS subsystems are required to be OPERABLE. L.5

ITS 3.5.2

A.1

ITS

3/4 LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS
3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

SURVEILLANCE REQUIREMENTS (Continued)

L.3

SR 3.5.2.6 2. At least once per 18 24 months.

LA.5

| Boron Injection Throttle Valves | Safety Injection Throttle Valves |
|---|---|
| Valve Number | Valve Number |
| 1. 1-SI-141 L1 | 1. 1-SI-121 N |
| 2. 1-SI-141 L2 | 2. 1-SI-121 S |
| 3. 1-SI-141 L3 | |
| 4. 1-SI-141 L4 | |

L.5

h. By performing a flow balance test during shutdown following completion of modifications to the ECCS subsystem that alter the subsystem flow characteristics and verifying the following flow rates:

| Boron Injection System Single Pump* | Safety Injection System Single Pump** |
|---|---|
| Loop 1 Boron Injection Flow 117.5 gpm | Loop 1 and 4 Cold Leg Flow ≥ 300 gpm |
| Loop 2 Boron Injection Flow 117.5 gpm | Loop 2 and 3 Cold Leg Flow ≥ 300 gpm |
| Loop 3 Boron Injection Flow 117.5 gpm | **Combined Loop 1, 2, 3 and 4 Cold Leg Flow (single pump) less than or equal to 640 gpm. Total SIS (single pump) flow, including miniflow, shall not exceed 675 gpm unless the pump is specifically qualified to a higher flow up to a maximum of 700 gpm. |
| Loop 4 Boron Injection Flow 117.5 gpm | |

*The flow rate in each Boron Injection (BI) line should be adjusted to provide 117.5 gpm (nominal) flow in each loop. Under these conditions there is zero miniflow and 80 gpm plus or minus 5 gpm simulated RCP seal injection line flow.

The actual flow in each BI line may deviate from the nominal so long as:

a) the difference between the highest and lowest flow is 25 gpm or less.

b) the total flow to the four branch lines does not exceed 470 gpm.

c) the minimum flow (total flow) through the three most conservative (lowest flow) branch lines must not be less than 300 gpm.

d) the charging pump discharge resistance (2.31 x $Pd/Qd^2$) must not be less than 4.73E-3 ft/gpm$^2$ and must not be greater than 9.27E-3 ft/gpm$^2$, (Pd is the pump discharge pressure at runout; Qd is the total pump flow rate.)



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ITS 3.5.2

A.1

ITS

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - $T_{avg}$ ≥ 350°F

LIMITING CONDITION FOR OPERATION

LCO 3.5.2 — 3.5.2 Two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of:

a. One OPERABLE centrifugal charging pump,

b. One OPERABLE safety injection pump,

c. One OPERABLE residual heat removal heat exchanger,

d. One OPERABLE residual heat removal pump,

e. An OPERABLE flow path capable of taking suction from the refueling water storage tank on a safety injection signal and transferring suction to the containment sump during the recirculation phase of operation.

f. All safety injection cross-tie valves open.

LA.1

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

L.1 — or more

M.1

ACTION A, ACTION B — a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours. Add proposed Required Action B.1

A.2

ACTION D — b. With a safety injection cross-tie valve closed, restore the cross-tie valve to the open position or reduce the core power level to less than or equal to 3304 MW within one hour. Specification 3.0.4 does not apply.

A.3

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.

L.2

Add proposed ACTION C

L.1

ITS 3.5.2

A.1

ITS

3/4 LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS
3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

SURVEILLANCE REQUIREMENTS

SR 3.5.2.1 4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

a. At least once per 12 hours by verifying that the following valves are in the indicated positions with power to the valve operators removed:

| Valve Number | Valve Function | Valve Position |
|---|---|---|
| a. IMO-390 | a. RWST to RHR | a. Open |
| b. IMO-315 | b. Low head SI to Hot Leg | b. Closed |
| c. IMO-325 | c. Low head SI to Hot Leg | c. Closed |
| d. IMO-262* | d. Mini flow line | d. Open |
| e. IMO-263* | e. Mini flow line | e. Open |
| f. IMO-261* | f. SI Suction | f. Open |
| g. ICM-305* | g. Sump Line | g. Closed |
| h. ICM-306* | h. Sump Line | h. Closed |

LA.2

SR 3.5.2.2 b. At least once per 31 days 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. 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. Of the areas affected within containment at the completion of each containment entry when CONTAINMENT INTEGRITY is established.

LA.3

* These valves must change position during the switchover from injection to recirculation flow following LOCA.

LA.2

ITS 3.5.2

A.1

ITS

3/4 LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS
3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

d. At least once per ~~18~~ 24 months by: L.3

1. ~~Verifying the automatic interlock action to prevent opening of the suction of the RHR system from the Reactor Coolant System when the Reactor Coolant System pressure is above 600 psig.~~ See ITS 3.4.14

SR 3.5.2.7 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. L.3

e. At least once per ~~18~~ 24 months by:

SR 3.5.2.4 1. Verifying that each automatic valve in the flow path that is not locked, sealed, or otherwise secured in position actuates to its correct position on a actual or ~~Safety Injection~~ actuation test signal. L.4 L.6 LA.4

SR 3.5.2.5 2. Verifying that each of the ~~following~~ ECCS pumps start automatically upon receipt of a actual or test ~~Safety Injection~~ actuation signal: L.6 LA.1 LA.4

~~a) Centrifugal charging pump~~

~~b) Safety injection pump~~

~~c) Residual heat removal pump~~ LA.1

SR 3.5.2.3 f. By verifying that each of the ~~following~~ ECCS pumps' developed head at the test flow point is greater than or equal to the required developed head when tested pursuant to Specification 4.0.5. LA.1

~~1. Centrifugal charging pumps~~

~~2. Safety Injection pumps~~

~~3. Residual heat removal pumps~~ LA.1

SR 3.5.2.6 g. By verifying the correct position of each mechanical stop for the following Emergency Core Cooling System throttle valves:

~~1. Within 4 hours following completion of each valve stroking operation or maintenance on the valve when the ECCS subsystems are required to be OPERABLE.~~ L.5

ITS 3.5.2

A.1

ITS

3/4 LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS
3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

SURVEILLANCE REQUIREMENTS (Continued)

L.3

SR 3.5.2.6 2. At least once per ~~18~~ 24 months.

LA.5

| Boron Injection Throttle Valves | Safety Injection Throttle Valves |
|---|---|
| Valve Number | Valve Number |
| 1. 2-SI-141 L1 | 1. 2-SI-121 N |
| 2. 2-SI-141 L2 | 2. 2-SI-121 S |
| 3. 2-SI-141 L3 | |
| 4. 2-SI-141 L4 | |

L.5

h. By performing a flow balance test during shutdown following completion of modifications to the ECCS subsystem that alter the subsystem flow characteristics and verifying the following flow rates:

| Boron Injection System Single Pump* | Safety Injection System Single Pump** |
|---|---|
| Loop 1 Boron Injection Flow 117.5 gpm | Loop 1 and 4 Cold Leg Flow greater than or equal to 300 gpm |
| Loop 2 Boron Injection Flow 117.5 gpm | Loop 2 and 3 Cold Leg Flow greater than or equal to 300 gpm |
| Loop 3 Boron Injection Flow 117.5 gpm | **Combined Loop 1,2,3 and 4 Cold Leg Flow (single pump) less than or equal to 640 gpm. Total SIS (single pump) flow, including miniflow, shall not exceed 675 gpm unless the pump is specifically qualified to a higher flow up to a maximum of 700 gpm. |
| Loop 4 Boron Injection Flow 117.5 gpm | |

* The flow rate in each boron injection (BI) line should be adjusted to provide 117.5 gpm (nominal) flow into each loop. Under these conditions there is zero mini-flow and 80 gpm plus or minus 5 gpm simulated RCP seal injection line flow. The actual flow in each BI line may deviate from the nominal so long as:

a) the difference between the highest and lowest flow is 25 gpm or less.

b) the total flow to the four branch lines does not exceed 470 gpm.

c) the minimum flow through the three most conservative (lowest flow) branch lines must not be less than 300 gpm,

d) the charging pump discharge resistance (2.31*Pd/Qd^2) must not be less than 4.73E-3 ft/gpm^2 and must not be greater than 9.27E-3 ft/gpm^2, (Pd is the pump discharge pressure at runout; Qd is the total pump flow rate).

**DISCUSSION OF CHANGES**
**ITS 3.5.2, ECCS - OPERATING**

ADMINISTRATIVE CHANGES

A.1 In the conversion of the CNP 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-1431, Rev. 2, "Standard Technical Specifications-Westinghouse Plants" (ISTS).

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

A.2 (Unit 2 only) CTS 3.5.2 Action b requires, with a safety injection cross tie valve closed, either restoring the cross tie valve to the open position or reducing core power to ≤ 3304 MWt within 1 hour. Unit 2 ITS 3.5.2 ACTION D does not state the requirement to restore a closed safety injection cross tie valve to the open position, but includes the other compensatory Required Action to reduce power within 1 hour. This changes the Unit 2 CTS by not explicitly stating the requirement to restore a closed safety injection cross tie valve to the open position.

This change is acceptable because the technical requirements have not changed. Restoration of compliance with the LCO is always an available Required Action, and it is the convention in the ITS to not state such "restore" options explicitly unless it is the only action or is required for clarity. This change is designated as administrative because it does not result in technical changes to the CTS.

A.3 (Unit 2 only) CTS 3.5.2 Action b states "Specification 3.0.4 does not apply." CTS 3.0.4 states "Entry into an OPERATIONAL MODE or other specified applicability condition shall not be made unless the conditions of the Limiting Condition for Operation are met without reliance on provisions contained in the ACTION statements unless otherwise excepted." Unit 2 ITS 3.5.2 ACTION D does not contain the exception to ITS LCO 3.0.4, since ITS LCO 3.0.4 states that when an LCO is not met, entry into a MODE or other specified condition in the Applicability may be made when the associated ACTIONS to be entered permit continued operation in the MODE or other specified condition in the Applicability for an unlimited period of time. This changes the Unit 2 CTS by deleting an allowance since it is incorporated into ITS LCO 3.0.4.

This change is considered acceptable because ITS LCO 3.0.4 has been changed such that the CTS allowance is not required in order to retain the same CTS requirement. Unit 2 ITS 3.5.2 ACTION D allows continued operation for an unlimited period of time, which together with ITS LCO 3.0.4 results in the same technical requirements as the CTS. This change is designated as administrative because it does not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M.1 CTS 3.5.2 Action a requires that when one inoperable ECCS subsystem is not restored to OPERABLE status within 72 hours, the unit must be in HOT

**DISCUSSION OF CHANGES**
**ITS 3.5.2, ECCS - OPERATING**

SHUTDOWN within the next 12 hours. In addition to requiring the unit to be in MODE 4 within 12 hours (ITS 3.5.2 Required Action B.2) if the ECCS is not restored within the allowed Completion Time, ITS 3.5.2 Required Action B.1 also requires the unit to be in MODE 3 within 6 hours. This changes the CTS by requiring entry into MODE 3 within 6 hours when a shutdown is required.

This change is acceptable because the requirement to place the unit in MODE 3 in 6 hours is based on operating experience and the need to reach the required conditions from full power in an orderly manner and without challenging unit systems. This change is designated as more restrictive because it imposes a time requirement on when the unit must be in MODE 3.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA.1 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS LCO 3.5.2 states that two independent ECCS subsystems shall be OPERABLE and contains a description of what constitutes an OPERABLE subsystem. CTS 4.5.2.e.2 and 4.5.2.f also list the pumps that are included in an OPERABLE subsystem and are required to be tested. ITS 3.5.2 requires two ECCS trains to be OPERABLE, but the details of what constitutes an OPERABLE train are moved to the Bases. ITS SR 3.5.2.3 and SR 3.5.2.5 also do not list the pumps that comprise an ECCS train since this information has been moved to the Bases, but require only that each ECCS pump be tested. This changes the CTS by moving the details of what constitutes an OPERABLE subsystem 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, to verify each ECCS pump starts on an actual or simulated actuation signal, and to verify each ECCS pump develops acceptable head. 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 of the ITS. 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.

LA.2 *(Type 2 – Removing Descriptions of System Operation)* CTS 4.5.2.a, which requires verification of the position of certain ECCS valves, includes a footnote (footnote *) that states that positions of certain ECCS valves must be changed during the switchover from injection to recirculation flow following a LOCA. ITS SR 3.5.2.1, which requires the same valve position verification, does not include



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**DISCUSSION OF CHANGES**
**ITS 3.5.2, ECCS - OPERATING**

this extra information. This changes the CTS by removing the description that certain valves must change position to the UFSAR.

The removal of these details, which are related to system operation, 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 to verify the valves are secured in the listed position. Also, this change is acceptable because the removed information will be adequately controlled in the UFSAR. Changes to the UFSAR are controlled by 10 CFR 50.59 or 10 CFR 50.71(e), which ensures that any changes to the UFSAR are properly evaluated. This change is designated as a less restrictive removal of detail change because information relating to system operation is being removed from the Technical Specifications.

LA.3 *(Type 3 – Removing Procedural Details for Meeting TS Requirements and Related Reporting Problems)* CTS 4.5.2.c requires a visual inspection for loose debris in containment prior to establishing containment integrity and within affected areas of the containment at the completion of each containment entry when containment integrity is established. The ITS does not include this requirement. This changes the CTS by moving this requirement to the Technical Requirements Manual (TRM).

The removal of these details for performing a Surveillance Requirement 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 3.5.2.7 still retains the requirement for an inspection of the containment sump for debris every 24 months. The purpose of CTS 4.5.2.c is to ensure that following a containment entry for maintenance or inspection, any debris is removed that could clog the containment sump following a LOCA. This is a good housekeeping practice that should be part of any containment entry and is a detail not necessary to be included in the ITS to provide adequate protection of the public health and safety. Also, this change is acceptable because the removed information will be adequately controlled in the Technical Requirements Manual (TRM). Any changes to the TRM are made under 10 CFR 50.59, which ensures changes to the TRM are properly evaluated. This change is designated as a less restrictive removal of detail change because information relating to meeting a TS requirement is being removed from the Technical Specifications.

LA.4 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 4.5.2.e.1 and 4.5.2.e.2 require verification of the automatic actuation of ECCS components on a "Safety Injection" signal. ITS SR 3.5.2.4 and SR 3.5.2.5 do not state the specific type of signal, but only specify an "actuation" signal. This changes CTS by moving the actual actuation signal 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 to verify that appropriate equipment actuates upon receipt of an actuation signal. 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 of the ITS. 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.

LA.5 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 4.5.2.g.2, which requires verification of the position of certain ECCS throttle valves, includes information concerning the flow path they throttle (i.e., boron injection or safety injection). ITS SR 3.5.2.6, which requires the same valve position verification, does not include this extra information. This changes the CTS by moving the flow path description to the UFSAR.

The removal of these details, which are related to system design and system description, from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the requirement to verify the valves are secured in the listed position, and the specific valve number is still listed in the ITS. Also, this change is acceptable because the removed information will be adequately controlled in the UFSAR. Changes to the UFSAR are controlled by 10 CFR 50.59 or 10 CFR 50.71(e), which ensure that any changes to the UFSAR are properly evaluated. This change is designated as a less restrictive removal of detail change because information relating to system design and system description is being removed from the Technical Specifications.

<u>LESS RESTRICTIVE CHANGES</u>

L.1 *(Category 4 – Relaxation of Required Action)* CTS 3.5.2 Action a states that when one ECCS train is inoperable, it must be returned to OPERABLE status within 72 hours. ITS 3.5.2 ACTION A states that when one or more trains are inoperable (for reasons other than Condition D - Unit 2 only), restore the trains to OPERABLE status within 72 hours. ITS 3.5.2 ACTION C states that with less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available (for reasons other than Condition D - Unit 2 only), enter LCO 3.0.3 immediately. This changes the CTS by allowing combinations of equipment from both trains to be credited as 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 safety injection pump in one train and an inoperable charging pump in the other train would require a CTS 3.0.3 entry. Under the ITS, the same condition would allow 72 hours before requiring a shutdown because the remaining OPERABLE safety injection pump and charging pump are capable of producing the flow equivalent to a single OPERABLE train.

The purpose of CTS 3.5.2 Action a is to limit the period of time the plant can operate without redundant ECCS trains. This change is acceptable because the

**DISCUSSION OF CHANGES**
**ITS 3.5.2, ECCS - OPERATING**

Required Actions are used to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering the OPERABILITY status of the redundant systems of required features, the capacity and capability of remaining features, a reasonable time for repairs or replacement of required features, and the low probability of a DBA occurring during the repair period. ITS 3.5.2 ACTIONS A and C continue to require ECCS components equivalent to a complete ECCS train, and limit the time only one equivalent train is OPERABLE to 72 hours. The ECCS can still perform its safety function, assuming no single failure occurs. This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L.2 *(Category 8 – Deletion of Reporting Requirements)* CTS 3.5.2 Action b (Unit 1) and CTS 3.5.2 Action c (Unit 2) require that a Special Report be prepared and submitted to the NRC within 90 days following an ECCS actuation that results in water being injected into the Reactor Coolant System. The report is to include the description of the circumstances of the event and the total accumulated actuation cycles to date. ITS 3.5.2 does not include this requirement.

The purpose of CTS 3.5.2 Action b (Unit 1) and CTS 3.5.2 Action c (Unit 2) is to provide information about the event to the NRC. This change is acceptable because the regulations provide adequate reporting requirements, and the reports do not affect continued plant operation. A Licensee Event Report is required to be submitted by 10 CFR 50.73(a)(2)(iv) describing any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF). Therefore, a report to the NRC is still required. However, 10 CFR 50.73 does not require that the report include the total accumulated actuation cycles to date. ITS 5.5.4, "Component Cyclic or Transient Limits," requires that controls are in place to track the cyclic and transient occurrences to ensure that components are maintained within the design limits. This change is designated as less restrictive because reports that would be submitted under the CTS will not be required under the ITS.

L.3 *(Category 10 – 18 to 24 Month Surveillance Frequency Change, Non-Channel Calibration Type)* CTS 4.5.2.d.2 requires a visual inspection of the containment sump and verifying subsystem suction inlets are not restricted by debris and the sump components show no evidence of structural distress or abnormal corrosion every 18 months. CTS 4.5.2.e.1 requires a verification that each ECCS automatic valve in the flow path actuates to its correct position on a Safety Injection signal every 18 months. CTS 4.5.2.e.2 requires a verification that each ECCS pump starts on a Safety Injection signal every 18 months. CTS 4.5.2.g.2 requires a verification that the mechanical stops for certain boron injection and safety injection throttle valves are in the correct position every 18 months. ITS SR 3.5.2.7, SR 3.5.2.4, SR 3.5.2.5, and SR 3.5.2.6, respectively, require performance of similar tests every 24 months. This changes the CTS by extending the Frequency of the Surveillances from 18 months (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.2 and ITS SR 3.0.2) to 24 months (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.2 and ITS SR 3.0.2).

**DISCUSSION OF CHANGES**
**ITS 3.5.2, ECCS - OPERATING**

The purpose of CTS 4.5.2.d.2 is to ensure the containment sump condition does not prevent the ECCS pumps from performing their required function. The purpose of CTS 4.5.2.e.1 and 4.5.2.e.2 is to ensure that the ECCS automatic valves in the flow path and pumps function properly on receipt of an automatic actuation signal. The purpose of CTS 4.5.2.g.2 is to ensure the throttle valves are in their correct position to ensure proper flow during an accident. These changes were evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of historical surveillance data and maintenance data sufficient to determine failure modes have shown that these tests normally pass their Surveillances at the current Frequency. An evaluation has been performed using this data, and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal.

For CTS 4.5.2.d.2, while several buckets of dirt and debris were removed from the sump locations during the 1995, 1996, and 1997 sump inspections performed to meet the CTS 4.5.2.d.2 requirement, there did not appear to be any substantial loss of capability and these discoveries do not appear to be the result of time elapsed between inspections. Subsequent to these inspections, a new plant procedure was issued to provide containment cleanliness requirements with respect to loose debris. Also, CTS 4.5.2.c, which requires a visual inspection for loose debris in containment prior to establishing containment integrity and within affected areas of the containment at the completion of each containment entry when containment integrity is required, is being maintained in the Technical Requirements Manual. This requirement, as well as ITS SR 3.6.14.1 and SR 3.6.14.2, which require visual inspections for debris of the refueling canal drains, will assist in ensuring the containment sumps remain free of debris that could affect ECCS OPERABILITY.

For CTS 4.5.2.e.1 and 4.5.2.e.2, extending the Surveillance Frequency for the ECCS automatic valves and pump tests is acceptable because the automatic valves are cycled and the pumps operated, during the operating cycle, in accordance with the Inservice Testing (IST) Program, or justifications exist to document less frequent testing. Based on the inherent system and component reliability and the testing performed during the operating cycle, the impact, if any, from this change on system availability is minimal. The review of historical surveillance data also demonstrated that there are no failures that would invalidate this conclusion.

For CTS 4.5.2.g.2, extending the Surveillance Frequency to verify that mechanical stops for certain boron injection and safety injection throttle valves are in the correct position is acceptable because the stops are mechanical devices and simple devices that require direct operator action to move. The stops are only adjusted by procedure after testing to confirm proper operation. There are no time-based events that would result in the change of the mechanical stops. Based on the device simplicity and component reliability, the impact, if any, from this change on system availability is minimal. The review of historical surveillance data also demonstrates that there are no failures that would invalidate this conclusion.



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**DISCUSSION OF CHANGES**
**ITS 3.5.2, ECCS - OPERATING**

For each of these Surveillances, the proposed 24 month Surveillance Frequency, if performed at the maximum interval allowed by ITS SR 3.0.2 (30 months) does not invalidate any assumptions in the plant licensing basis. This change is designated as less restrictive because Surveillances will be performed less frequently under the ITS than under the CTS.

L.4 *(Category 6 – Relaxation Of Surveillance Requirement Acceptance Criteria)* CTS 4.5.2.e.1 requires verification that each ECCS automatic valve actuates to its correct position. ITS SR 3.5.2.4 requires verification that each ECCS automatic 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 excluding those ECCS automatic valves that are locked, sealed, or otherwise secured in position from the verification.

The purpose of CTS 4.5.2.e.1 is to provide assurance that if an event occurred requiring the ECCS valves to be in their correct position, those requiring automatic actuation would actuate to their correct position. This change is acceptable because it has been determined that the relaxed Surveillance Requirement acceptance criteria are not necessary for verification that the equipment used to meet the LCO can perform its required functions. Those automatic valves that are locked, sealed, or otherwise secured in position are not required to actuate on an ECCS 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.

L.5 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.5.2.g.1 and 4.5.2.h describe tests that must be performed following repositioning of valves, maintenance, or modification to the ECCS. The ITS does not include these testing requirements. This changes the CTS by deleting a conditional Surveillance Requirement.

The purpose of 4.5.2.g.1 and 4.5.2.h is to verify OPERABILITY of ECCS subsystems following repositioning or maintenance on a valve and following completion of modifications to the ECCS subsystems that alter subsystem flow characteristics. 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. Any time the OPERABILITY of a system or component has been affected by repair, maintenance, modification, or replacement of a component, post maintenance testing is required to demonstrate the OPERABILITY of the system or component. This is described in the Bases for ITS SR 3.0.1 and required under ITS SR 3.0.1. The OPERABILITY requirements for the ECCS trains are described in the Bases for ITS 3.5.2. In addition, the requirements of 10 CFR 50, Appendix B, Section XI (Test Control) provide adequate controls for test programs to ensure that testing incorporates applicable acceptance criteria. Compliance with 10 CFR 50, Appendix B is required under the unit operating license. As a result, post-maintenance testing will continue to be performed and an explicit requirement in the Technical Specifications is not necessary. This change is designated as less restrictive because Surveillances which are required in the CTS will not be required in the ITS.

L.6 *(Category 6 – Relaxation Of Surveillance Requirement Acceptance Criteria)* CTS 4.5.2.e.1 and 4.5.2.e.2 require verification of the automatic actuation of ECCS components on a "Safety Injection" signal. ITS SR 3.5.2.4 and SR 3.5.2.5 do not state the specific type of signal, but only specify that the signal may be from either an actual or simulated (i.e., test) signal. This changes the CTS by explicitly allowing the use of either an actual or simulated signal for the test.

The purpose of CTS 4.5.2.e.1 and 4.5.2.e.2 is to ensure that the ECCS components operate correctly upon receipt of an actuation signal. This change is acceptable because it has been determined that the relaxed Surveillance Requirement acceptance criteria are not necessary for verification that the equipment used to meet the LCO can perform its required functions. Equipment can not discriminate between an "actual," "simulated," or "test" signal and, therefore, the results of the testing are unaffected by the type of signal used to initiate the test. This change allows taking credit for unplanned actuation if sufficient information is collected to satisfy the Surveillance test requirements. The change also allows a simulated signal to be used, if necessary. This change is designated as less restrictive because less stringent Surveillance Requirements are being applied in the ITS than were applied in the CTS.



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

⟨UNIT 1⟩



CTS

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS - Operating

LCO 3.5.2 — LCO 3.5.2 Two ECCS trains shall be OPERABLE.

\- NOTES -

[ 1. In MODE 3, both safety injection (SI) pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve testing per SR 3.4.14.1. ①

2. In MODE 3, ECCS pumps may be made incapable of injecting to support transition into or from the Applicability of LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," for up to 4 hours or until the temperature of all RCS cold legs exceeds [375°F] [Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR plus [25]°F], whichever comes first. ]

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

| CTS | CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|---|
| Action a | A. One or more trains inoperable. | A.1 Restore train(s) to OPERABLE status. | 72 hours |
| Action a | B. Required Action and associated Completion Time not met. | B.1 Be in MODE 3.<br>AND<br>B.2 Be in MODE 4. | 6 hours<br><br>12 hours |
| DOC L.1 | C. Less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available. | C.1 Enter LCO 3.0.3. | Immediately |

⟨UNIT 2⟩



CTS

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS - Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

- NOTES -

[ 1. In MODE 3, both safety injection (SI) pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve testing per SR 3.4.14.1.

2. In MODE 3, ECCS pumps may be made incapable of injecting to support transition into or from the Applicability of LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," for up to 4 hours or until the temperature of all RCS cold legs exceeds [375°F] [Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR plus [25]°F], whichever comes first. ]

(1)

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

| | CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|---|
| Action c | A. One or more trains inoperable. | A.1 | Restore train(s) to OPERABLE status. | 72 hours |
| Action a | B. Required Action and associated Completion Time not met. INSERT 1 | B.1<br>AND<br>B.2 | Be in MODE 3.<br><br>Be in MODE 4. | 6 hours<br><br>12 hours |
| DOC L.1 | C. Less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available. | C.1 | Enter LCO 3.0.3. | Immediately |

(2)

Action b INSERT 2 (2)

UNIT 2

(2) **INSERT 1**

for reasons other than Condition D

(2) **INSERT 2**

| | | |
|---|---|---|
| D. One or more Safety Injection (SI) System cross tie valves closed. | D.1 Reduce THERMAL POWER to ≤ 3304 MWt. | 1 hour |



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CTS



SURVEILLANCE REQUIREMENTS

| CTS | SURVEILLANCE | | FREQUENCY | |
|---|---|---|---|---|
| 4.5.2.a | SR 3.5.2.1 | ① Verify the following valves are in the listed position with power to the valve operator removed.<br><br>Number / Position / Function<br>[ ] [ ] [ ]<br>[ ] [ ] [ ]<br>[ ] [ ] [ ]<br><br>INSERT 3 | 12 hours ① | ③ |
| 4.5.2.b | SR 3.5.2.2 | 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 | |
| | SR 3.5.2.3 | [ Verify ECCS piping is full of water. | 31 days ] | ④ |
| 4.5.2.f | SR 3.5.2.4 ③ | 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 | ④ |
| 4.5.2.e.1 | SR 3.5.2.5 ④ | 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] 24 months | ④ ③ |
| 4.5.2.e.2 | SR 3.5.2.6 ⑤ | Verify each ECCS pump starts automatically on an actual or simulated actuation signal. | [18] 24 months | ④ ③ |
| 4.5.2.g.2 | SR 3.5.2.7 ⑥ | ① Verify, for each ECCS throttle valve listed below, each position stop is in the correct position.<br><br>Valve Number<br>[ ]<br>[ ]<br>[ ]<br><br>INSERT 4 | [18] 24 months ① | ④ ③ |
| 4.5.2.d.2 | SR 3.5.2.8 ⑦ | 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] 24 months | ④ ③ |



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3.5.2

(3) **INSERT 3**

| | | | |
|---|---|---|---|
| 1-IMO-261 (Unit 1) | 2-IMO-261 (Unit 2) | Open | SI suction line |
| 1-IMO-262 (Unit 1) | 2-IMO-262 (Unit 2) | Open | Mini flow line |
| 1-IMO-263 (Unit 1) | 2-IMO-263 (Unit 2) | Open | Mini flow line |
| 1-IMO-315 (Unit 1) | 2-IMO-315 (Unit 2) | Closed | Low head SI to hot leg |
| 1-IMO-325 (Unit 1) | 2-IMO-325 (Unit 2) | Closed | Low head SI to hot leg |
| 1-IMO-390 (Unit 1) | 2-IMO-390 (Unit 2) | Open | RWST to RHR |
| 1-ICM-305 (Unit 1) | 2-ICM-305 (Unit 2) | Closed | Sump line |
| 1-ICM-306 (Unit 1) | 2-ICM-306 (Unit 2) | Closed | Sump line |

(3) **INSERT 4**

| | |
|---|---|
| 1-SI-121 N (Unit 1) | 2-SI-121 N (Unit 2) |
| 1-SI-121 S (Unit 1) | 2-SI-121 S (Unit 2) |
| 1-SI-141 L1 (Unit 1) | 2-SI-141 L1 (Unit 2) |
| 1-SI-141 L2 (Unit 1) | 2-SI-141 L2 (Unit 2) |
| 1-SI-141 L3 (Unit 1) | 2-SI-141 L3 (Unit 2) |
| 1-SI-141 L4 (Unit 1) | 2-SI-141 L4 (Unit 2) |

**JUSTIFICATION FOR DEVIATIONS**
**ITS 3.5.2, ECCS - OPERATING**

1. ISTS SR 3.4.14.1 is not normally performed in MODE 3 at CNP, and it cannot currently be performed in ≤ 2 hours. Therefore, the Note 1 allowance is not needed and has been deleted. The CNP LTOP system enable temperatures are 266°F for Unit 1 and 299°F for Unit 2. These temperatures are outside of the ECCS Applicability of MODES 1 through 3. Note 2 provides an exception for ECCS pumps inoperable pursuant to LTOP controls. Therefore, Note 2 is not needed and has been removed.

2. A new ACTION (ACTION D) has been added, for Unit 2 only, to be consistent with the current licensing basis. The Unit 2 small break LOCA analysis assumes the Safety Injection System cross tie valves are open, and if not, power must be restricted to ≤ 3304 MWt. In addition, Unit 2 Conditions A and C have been modified to reflect the addition of ACTION D.

3. The brackets are removed and the proper plant specific information/value is provided.

4. ISTS SR 3.5.2.3, a bracketed Surveillance Requirement, has not been included in the CNP ITS. This is consistent with current licensing basis. In addition, a review of plant records indicate that water hammers in the ECCS trains are not a concern at CNP. The remaining SRs have been renumbered due to this deletion.



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# 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), coolant leakage greater than the capability of the normal charging system, ①

b. Rod ejection accident, INSERT 1 ②

c. Loss of secondary coolant accident, including uncontrolled steam release or loss of feedwater, and ② ①

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. INSERT 2 ②

There are three phases of ECCS operation: injection, cold leg recirculation, and hot leg recirculation. In the injection phase, water is taken from the refueling water storage tank (RWST) and injected into the Reactor Coolant System (RCS) through the cold legs. When sufficient water is removed from the RWST to ensure that enough boron has been added to maintain the reactor subcritical and the containment sumps have enough water to supply the required net positive suction head to the ECCS pumps, suction is switched to the containment sump for cold leg recirculation. After (Within) approximately 24 (7.5) hours, the ECCS flow is shifted to the hot leg recirculation phase to provide a backflush, which would reduce the boiling in the top of the core and any resulting boron precipitation. INSERT 3 ② ②

The ECCS consists of three separate subsystems: centrifugal charging (high head), safety injection (SI) (intermediate head), and residual heat removal (RHR) (low head). Each subsystem consists of two redundant, 100% capacity trains. The ECCS accumulators and the RWST are also part of the ECCS, but are not considered part of an ECCS flow path as described by this LCO.

The ECCS flow paths consist of piping, valves, heat exchangers, and pumps such that water from the RWST can be injected into the RCS

2 **INSERT 1**

Rupture of a control rod drive mechanism housing (RCCA ejection)

2 **INSERT 2**

rupture of a steam pipe

2 **INSERT 3**

in order to minimize the potential for



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BASES

BACKGROUND (continued)

following the accidents described in this LCO. The major components of each subsystem are the centrifugal charging pumps, the RHR pumps, heat exchangers, and the SI pumps. Each of the three subsystems consists of two 100% capacity trains that are interconnected and redundant such that either train is capable of supplying 100% of the flow required to mitigate the accident consequences. This interconnecting and redundant subsystem design provides the operators with the ability to utilize components from opposite trains to achieve the required 100% flow to the core.

During the injection phase of LOCA recovery, a suction header supplies water from the RWST to the ECCS pumps. Separate piping supplies each subsystem and each train within the subsystem. The discharge from the centrifugal charging pumps combines prior to entering the boron injection tank (BIT) (if the plant utilizes a BIT) and then divides again into four supply lines, each of which feeds the injection line to one RCS cold leg. The discharge from the SI and RHR pumps divides and feeds an injection line to each of the RCS cold legs. Control valves are set to balance the flow to the RCS. This balance ensures sufficient flow to the core to meet the analysis assumptions following a LOCA in one of the RCS cold legs.

For LOCAs that are too small to depressurize the RCS below the shutoff head of the SI pumps, the centrifugal charging pumps supply water until the RCS pressure decreases below the SI pump shutoff head. During this period, the steam generators are used to provide part of the core cooling function.

During the recirculation phase of LOCA recovery, RHR pump suction is transferred to the containment sump. The RHR pumps then supply the other ECCS pumps. Initially, recirculation is through the same paths as the injection phase. Subsequently, recirculation alternates injection between the hot and cold legs.

The centrifugal charging subsystem of the ECCS also functions to supply borated water to the reactor core following increased heat removal events, such as a main steam line break (MSLB). The limiting design conditions occur when the negative moderator temperature coefficient is highly negative, such as at the end of each cycle.

During low temperature conditions in the RCS, limitations are placed on the maximum number of ECCS pumps that may be OPERABLE. Refer

(2) **INSERT 3A**

The ECCS pumps are provided with recirculation lines that ensure each pump can maintain minimum flow requirements when operating at or near shutoff head conditions.

(2) **INSERT 4**

combines via two normally open cross tie valves

(2) **INSERT 5**

The discharges from the RHR pumps are not normally crosstied and each RHR pump feeds an injection line (common to the SI injection line) to two of the four RCS cold legs (one RHR pump feeds two cold legs, the other RHR pump feeds the other two cold legs).

(2) **INSERT 6**

and precludes pump runout

(2) **INSERT 6A**

for SI and RHR pumps,



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BASES

BACKGROUND (continued)

to the Bases for LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," for the basis of these requirements. (3)

The ECCS subsystems are actuated upon receipt of an SI signal. 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). 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. (2)

The active ECCS components, along with the passive accumulators and the RWST covered in LCO 3.5.1, "Accumulators," and LCO 3.5.4, "Refueling Water Storage Tank (RWST)," provide the cooling water necessary to meet GDC 35 (Ref. 1). INSERT 7 (4)

APPLICABLE SAFETY ANALYSES

The LCO helps to ensure that the following acceptance criteria for the ECCS, established by 10 CFR 50.46 (Ref. 2), 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,

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 magnitude of the post trip return to power following an MSLB event and ensures that containment temperature limits are met. (2)

Each ECCS subsystem is taken credit for in a large break LOCA event at full power (Refs. 3 and 4). This event establishes the requirement for runout flow for the ECCS pumps, as well as the maximum response time (2)

4 **INSERT 7**

Plant Specific Design Criteria 37, 41, and 44



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BASES

APPLICABLE SAFETY ANALYSES (continued)

for their actuation. The centrifugal charging pumps and SI pumps are credited in a small break LOCA event. This event establishes the flow and discharge head at the design point for the centrifugal charging pumps. The SGTR and MSLB events also credit the centrifugal charging pumps. The OPERABILITY requirements for the ECCS are based on the following LOCA analysis assumptions:

a. A large break LOCA event, with loss of offsite power and a single failure disabling one RHR pump (both EDG trains are assumed to operate due to requirements for modeling full active containment heat removal system operation) and

b. A small break LOCA event, with a loss of offsite power and a single failure disabling one ECCS train.

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 rod insertion for 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.

The effects on containment mass and energy releases are accounted for in appropriate analyses (Refs. 3 and 4). The LCO ensures that an ECCS train will deliver sufficient water to match boiloff rates soon enough to minimize the consequences of the core being uncovered following a large LOCA. It also ensures that the centrifugal charging and SI pumps will deliver sufficient water and boron during a small LOCA to maintain core subcriticality. For smaller LOCAs, the centrifugal charging pump delivers sufficient fluid to maintain RCS inventory. For a small break LOCA, the steam generators continue to serve as the heat sink, providing part of the required core cooling.

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

LCO

In MODES 1, 2, and 3, two independent (and redundant) ECCS trains are required to ensure that sufficient ECCS flow is available, assuming 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.

In MODES 1, 2, and 3, an ECCS train consists of a centrifugal charging subsystem, an SI subsystem, and an RHR subsystem. Each train

BASES

LCO (continued)

includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWST upon an SI signal and Manually ~~automatically~~ transferring suction to the containment sump. (2)

During an event requiring ECCS actuation, a flow path is required to provide an abundant supply of water from the RWST to the RCS via the ECCS 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 its flow to the RCS hot and cold legs. (5)

The flow path for each ECCS train must maintain its designed independence to ensure that no single failure can disable both ECCS trains. INSERT B (Unit 2 only) (3)

~~As indicated in Note 1, the SI flow paths may be isolated for 2 hours in MODE 3, under controlled conditions, to perform pressure isolation valve testing per SR 3.4.14.1. The flow path is readily restorable from the control room.~~

~~As indicated in Note 2, operation in MODE 3 with ECCS trains made incapable of injecting in order to facilitate entry into or exit from the Applicability of LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," is necessary for plants with an LTOP arming temperature at or near the MODE 3 boundary temperature of 350°F. LCO 3.4.12 requires that certain pumps be rendered incapable of injecting at and below the LTOP arming temperature. When this temperature is at or near the MODE 3 boundary temperature, time is needed to make pumps incapable of injecting prior to entering the LTOP Applicability, and provide time to restore the inoperable pumps to OPERABLE status on exiting the LTOP Applicability.~~ (3)

APPLICABILITY

In MODES 1, 2, and 3, the ECCS OPERABILITY requirements for the limiting Design Basis Accident, a 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 centrifugal charging pump performance is based on a small break LOCA, which establishes the pump performance curve and has less dependence on power. The SI pump performance requirements are based on a small break LOCA.~~ (6) MODE 2 and MODE 3 requirements are bounded by the MODE 1 analysis.

(UNIT 2 only)

3 **INSERT 8**

However, for the SI System flow path, the two SI pumps are required to have their discharges cross-connected when THERMAL POWER exceeds 3304 MWt. This ensures the peak clad temperature limit is not exceeded during a small break LOCA.

BASES

APPLICABILITY (continued)

This LCO is only applicable in MODE 3 and above. Below MODE 3, the SI signal setpoint is manually bypassed by operator control, and system functional requirements are relaxed as described in LCO 3.5.3, "ECCS - Shutdown."

In MODES 5 and 6, plant 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 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation - High Water Level," and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level."

ACTIONS

A.1

With one or more trains inoperable and at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available, the inoperable components must be returned to OPERABLE status within 72 hours. The 72 hour Completion Time is based on an NRC reliability evaluation (Ref. 5) and is a reasonable time for repair of many ECCS components.

An ECCS train is inoperable if it is not capable of delivering design flow to the RCS. Individual components are inoperable if they are not capable of performing their design function or 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 under circumstances when components in opposite trains are inoperable.

An event accompanied by a loss of offsite power and the failure of an EDG can disable one ECCS train until power is restored. A reliability analysis (Ref. 5) has shown that the impact of having one full ECCS train inoperable is sufficiently small to justify continued operation for 72 hours.

Reference 6 describes situations in which one component, such as an RHR crossover valve, can disable both ECCS trains. With one or more component(s) inoperable such that 100% of the flow equivalent to a

(Unit 2 only)

3 **INSERT 9**

for reasons other than Condition D



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BASES

ACTIONS (continued)

single OPERABLE ECCS train is not available, the facility is in a condition outside the accident analysis. Therefore, LCO 3.0.3 must be immediately entered.

B.1 and B.2

If the inoperable train cannot be returned 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 MODE 3 within 6 hours and MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

C.1

Condition A is applicable with one or more trains inoperable. The allowed Completion Time 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.

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 removal of power or by key locking the control in the correct position ensures that they cannot change position as a result of an active failure or be inadvertently misaligned. These valves are of the type, described in Reference 6, that can disable the function of both ECCS trains and invalidate the accident analyses. A 12 hour Frequency is considered reasonable in view of other administrative controls that will ensure a mispositioned valve is unlikely.

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 were verified to be in the correct position prior to locking, sealing,

(Unit 2 only)

3 **INSERT 10**

for reasons other than Condition D

3 **INSERT 11**

of Required Action A.1

(Unit 2 only)

3 **INSERT 12**

D.1

With both trains of the SI System inoperable due to one or more cross tie valves closed, the small break LOCA analysis assumptions are not met. Therefore, THERMAL POWER must be reduced to $\leq$ 3304 MWt within 1 hour. This will place the unit back within the assumptions of the small break LOCA analysis. The 1 hour Completion Time minimizes the amount of time the unit is not within the accident analysis assumptions, yet provides a sufficient amount of time to reduce power to within the required limit.



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(11) INSERT 12A

BASES

SURVEILLANCE REQUIREMENTS (continued)

or securing. A valve that receives an actuation signal is allowed to be in a nonaccident position provided the valve will automatically reposition 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 administrative control, and an improper valve position would only affect a single train. This Frequency has been shown to be acceptable through operating experience.

SR 3.5.2.3

With the exception of the operating centrifugal charging pump, the ECCS pumps are normally in a standby, nonoperating mode. As such, flow path piping has the potential to develop voids and pockets of entrained gases. Maintaining the piping from the ECCS pumps to the RCS full of water ensures that the system will perform properly, injecting its full capacity into the RCS upon demand. This will also prevent water hammer, pump cavitation, and pumping of noncondensible gas (e.g., air, nitrogen, or hydrogen) into the reactor vessel following an SI signal or during shutdown cooling. The 31 day Frequency takes into consideration the gradual nature of gas accumulation in the ECCS piping and the procedural controls governing system operation. (3)

SR 3.5.2.4 (3)

Periodic surveillance testing of ECCS pumps to detect gross degradation caused by impeller structural damage or other hydraulic component problems is required by Section XI of 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 plant safety analysis. SRs are specified in the Inservice Testing Program, which encompasses Section XI of the ASME Code. Section XI of the ASME Code provides the activities and Frequencies necessary to satisfy the requirements. (3) (5) INSERT 12B

SR 3.5.2.5 (4) and SR 3.5.2.6 (5) (3)

These Surveillances demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SI signal and

(11) **INSERT 12A**

This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves.

(5) **INSERT 12B**

Verifying that each ECCS pump's developed head at the flow test point is greater than or equal to the required developed head ensures that ECCS pump performance has not degraded to an unacceptable level during the cycle. Flow and differential head are normal tests of ECCS pump performance required by the ASME OM Code (Ref. 10). Since the ECCS pumps cannot be tested with flow through the normal ECCS flow paths, they are tested on recirculation flow (RHR and SI pumps) or normal charging flow path (centrifugal charging pumps). This test confirms one point on the pump design curve and is indicative of overall performance. Such inservice tests confirm component OPERABILITY and detect incipient failures by indicating abnormal performance. The Frequency of this SR is in accordance with the Inservice Testing Program.



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BASES

SURVEILLANCE REQUIREMENTS (continued)

that each ECCS pump starts on receipt of an actual or simulated SI signal. 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 plant 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. The actuation logic is tested as part of ESF Actuation System testing, and equipment performance is monitored as part of the Inservice Testing Program.

SR 3.5.2.7

Realignment of valves in the flow path on an SI signal is necessary for proper ECCS performance. These valves have stops to allow proper positioning for restricted flow to a ruptured cold leg, ensuring that the other cold legs receive at least the required minimum flow. This Surveillance is not required for plants with flow limiting orifices. The 18 month Frequency is based on the same reasons as those stated in SR 3.5.2.5 and SR 3.5.2.6.

SR 3.5.2.8

Periodic inspections of the containment sump suction inlet ensure that it is unrestricted and stays in proper operating condition. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage, on the need to have access to the location, and because of the potential for an unplanned transient if the Surveillance were performed with the reactor at power. This Frequency has been found to be sufficient to detect abnormal degradation and is confirmed by operating experience.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 35.

2. 10 CFR 50.46.

3. FSAR, Section [ ].

4. FSAR, Chapter [15], "Accident Analysis."

9 **INSERT 13**

Proper throttle valve position

9 **INSERT 14**

This Surveillance verifies the mechanical stop of each listed ECCS throttle valve is in the correct position.

2 **INSERT 15**

UFSAR, Section 1.4.7.

2 **INSERT 16**

Section 14.3.2.

2 **INSERT 17**

5. UFSAR, Section 14.2.4.

6. UFSAR, Section 14.2.5.

7. UFSAR, Section 14.3.4.



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BASES

REFERENCES (continued)

(8) ~~10~~. NRC Memorandum to V. Stello, Jr., from R.L. Baer, "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975. (2)

(9) ~~11~~. IE Information Notice No. 87-01. (2)

INSERT 18 (5)



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5 **INSERT 18**

10. ASME, Operations and Maintenance Standards and Guides (OM Codes).



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## JUSTIFICATION FOR DEVIATIONS
## ITS 3.5.2 BASES, ECCS - OPERATING

1. These punctuation corrections have been made consistent with the Writer's Guide for the Improved Standard Technical Specifications, NEI 01-03, Section 5.1.3.

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

3. Changes are made to reflect those changes made to the Specification. The following requirements are renumbered or revised, where applicable, to reflect the changes.

4. CNP Units 1 and 2 were designed and under construction prior to the promulgation of 10 CFR 50, Appendix A. CNP Units 1 and 2 were designed and constructed to meet the intent of the proposed General Design Criteria, published in 1967. However, the CNP UFSAR contains discussions of the Plant Specific Design Criteria (PSDCs) used in the design of CNP Units 1 and 2. Bases references to the 10 CFR 50, Appendix A criteria have been replaced with references to the appropriate section of the UFSAR.

5. Editorial change made for consistency with similar phrases in other ITS Bases.

6. Statements regarding specific accidents representing the design basis of ECCS pumps have been corrected. The ECCS pumps design characteristics are inputs to the accident analysis, not outputs.

7. The listed LCOs concern the shutdown cooling function of the RHR System, not the ECCS function. The Applicability Section has adequately described why ECCS is not needed in MODES 5 and 6, and it is not necessary to describe why normal shutdown cooling is required. Therefore, this inappropriate information has been deleted.

8. The first sentence of this Bases paragraph describes how a single component can result in the inoperability of both ECCS trains. This description is adequately covered in the LCO Section (in the description that each flow path must maintain its designed independence) and is not appropriate for the Bases of this ACTION (one or more ECCS trains inoperable but 100% capability maintained). In addition, the second and third sentences are covered by the Bases of ACTION C.1, and, consistent with the content of the ISTS Bases for many other ACTIONS, is not necessary to be included in the Bases for this ACTION.

9. Change made to be consistent with the actual Specification.

10. The statement that the instrumentation is tested as part of the ESF Actuation System Testing and that equipment performance is monitored as part of the Inservice Testing Program is not necessary. This cross reference type information is included in the appropriate Specifications and is not needed to be referenced in this SR Bases.

11. Changes are made to be consistent with similar statements in the Bases (e.g., B 3.7.5, B 3.7.6, and B 3.7.8).

# Specific No Significant Hazards Considerations (NSHCs)

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

There are no specific NSHC discussions for this Specification.

# ATTACHMENT 3

## ITS 3.5.3, ECCS - SHUTDOWN

# Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

ITS 3.5.3

A.1

ITS

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - Tavg < 350°F

LIMITING CONDITION FOR OPERATION

LCO 3.5.3

3.5.3 As a minimum, one ECCS subsystem comprised of the following shall be OPERABLE:

a. One OPERABLE centrifugal charging pump.#

b. One OPERABLE residual heat removal heat exchanger.

c. One OPERABLE residual heat removal pump, and

d. An OPERABLE flow path capable of taking suction from the refueling water storage tank upon being manually realigned and transferring suction to the containment sump during the recirculation phase of operation.

See ITS 3.4.12

LA.1

APPLICABILITY: MODE 4.

ACTION:

centrifugal charging

LA.1

ACTION B

a. With no ECCS subsystem OPERABLE because of the inoperability of either the centrifugal charging pump or the flow path from the refueling water storage tank, restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.

L.1

ACTION C

24

RHR

ACTION A

b. With no ECCS subsystem OPERABLE because of the inoperability of either the residual heat removal heat exchanger or residual heat removal pump, restore one ECCS subsystem to OPERABLE status or maintain the Reactor Coolant System Tavg less than 350°F by use of alternate heat removal methods.

LA.1

M.1

c. With more than one charging pump OPERABLE or with a safety injection pump(s) OPERABLE when the temperature of any RCS cold leg is less than or equal to 152°F, remove the additional charging pump(s) and the safety injection pump(s) motor circuit breakers from the electrical power circuit within 1 hour.

See ITS 3.4.12

d. 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.

L.2

#A maximum of one centrifugal charging pump shall be OPERABLE and both safety injection pumps shall be inoperable whenever the temperature of one or more of the RCS cold legs is less than or equal to 152°F.

See ITS 3.4.12

ITS 3.5.3

A.1

ITS

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS

SR 3.5.2.2 (as modified by the Note), SR 3.5.2.3, SR 3.5.2.6, and SR 3.5.2.7

A.2

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 All charging pumps and safety injection pumps, except the above required OPERABLE charging pump, shall be demonstrated inoperable, by verifying that the motor circuit breakers have been removed from their electrical power supply circuits, at least once per 12 hours whenever the temperature of one or more of the RCS cold legs is less than or equal to 152°F as determined at least once per hour when any RCS cold leg temperature is between 152°F and 200°F.

See ITS 3.4.12

ITS 3.5.3

A.1

ITS

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - $T_{avg}$ < 350°F

LIMITING CONDITION FOR OPERATION

LCO 3.5.3

3.5.3 As a minimum, one ECCS subsystem comprised of the following shall be OPERABLE:

a. One OPERABLE centrifugal charging pump,#

b. One OPERABLE residual heat removal heat exchanger,

c. One OPERABLE residual heat removal pump, and

d. An OPERABLE flow path capable of taking suction from the refueling water storage tank upon being manually realigned and transferring suction to the containment sump during the recirculation phase of operation.

See ITS 3.4.12

LA.1

APPLICABILITY: MODE 4.

ACTION:

ACTION B

a. With no ECCS subsystem OPERABLE because of the inoperability of either the centrifugal charging pump or the flow path from the refueling water storage tank, restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.

centrifugal charging

LA.1

L.1

24

ACTION C

ACTION A

b. With no ECCS subsystem OPERABLE because of the inoperability of either the residual heat removal heat exchanger or residual heat removal pump, restore at least one ECCS subsystem to OPERABLE status or maintain the Reactor Coolant System $T_{avg}$ less than 350°F by use of alternate heat removal methods.

RHR

LA.1

M.1

c. With more than one charging pump OPERABLE or with a safety injection pump(s) OPERABLE when the temperature of any RCS cold leg is less than or equal to 152°F, remove the additional charging pump(s) and the safety injection pump(s) motor circuit breakers from the electrical power circuit within 1 hour.

See ITS 3.4.12

d. 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.

L.2

#A maximum of one centrifugal charging pump shall be OPERABLE and both safety injection pumps shall be inoperable whenever the temperature of one or more of the RCS cold legs is less than or equal to 152°F.

See ITS 3.4.12

ITS 3.5.3

A.1

ITS

SR 3.5.2.2 (as modified by the Note), SR 3.5.2.3, SR 3.5.2.6, and SR 3.5.2.7

A.2

3/4 LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS
3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

SURVEILLANCE REQUIREMENTS

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 All charging pumps and safety injection pumps, except the above required OPERABLE charging pump, shall be demonstrated inoperable, by verifying that the motor circuit breakers have been removed from their electrical power supply circuits, at least once per 12 hours whenever the temperature of one or more of the RCS cold legs is less than or equal to 152°F as determined at least once per hour when any RCS cold leg temperature is between 152°F and 200°F.

See ITS 3.4.12

**DISCUSSION OF CHANGES**
**ITS 3.5.3, ECCS - SHUTDOWN**

ADMINISTRATIVE CHANGES

A.1 In the conversion of the CNP 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-1431, Rev. 2, "Standard Technical Specifications-Westinghouse Plants" (ISTS).

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

A.2 CTS 4.5.3.1 states that the ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2. ITS SR 3.5.3.1 states the specific Surveillances of ITS 3.5.2 that must be performed.

This change is acceptable because the change is editorial. The Surveillances listed in ITS SR 3.5.3.1 are those that are considered “applicable” under the CTS. All ITS 3.5.2 Surveillances are included in SR 3.5.3.1 except those that are not applicable in MODE 4. ITS SR 3.5.2.1 verifies certain ECCS valves, whose alignment could render both ECCS trains inoperable, are secured in the correct position. It is excluded since only one ECCS train is required in MODE 4. SRs 3.5.2.4 and 3.5.2.5 are excluded since the automatic starting of ECCS is not required in MODE 4. This change is designated as administrative because it does not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M.1 CTS 3.5.3 Action b requires that when the required RHR subsystem is inoperable, the RHR subsystem must be restored to OPERABLE status or the RCS $T_{avg}$ must be maintained < 350°F by use of alternate heat removal methods. The CTS does not provide any finite start time or completion time to perform the Action. ITS 3.5.3 ACTION A requires the immediate initiation of action to restore the required RHR train to OPERABLE status. This changes the CTS by specifically stating that action to restore the RHR train to OPERABLE status must be initiated immediately, and does not allow alternate decay heat methods to be used.

The purpose of CTS Action b is to provide compensatory measures for when the required RHR train is inoperable. While the CTS Action compensates for the decay heat removal aspect of the inoperable RHR train, it does not address the ECCS function of the RHR train. Therefore, this new ACTION is acceptable because it ensures that action is immediately initiated to restore the RHR train to OPERABLE status, which compensates for both functions that the RHR train performs. This change is designated as more restrictive because it provides a finite start time for the action and it ensures that action is taken to restore the ECCS function of the RHR train to OPERABLE status.



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**DISCUSSION OF CHANGES**
**ITS 3.5.3, ECCS - SHUTDOWN**

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA.1 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS LCO 3.5.3 states that an ECCS subsystem shall be OPERABLE and contains a description of what constitutes an OPERABLE subsystem. ITS 3.5.3 requires an ECCS train be OPERABLE, but the details of what constitutes an OPERABLE train are moved to the Bases. CTS 3.5.3 Action a provides an action for when a ECCS subsystem is inoperable "because of the inoperability of either the centrifugal charging pump or the flow path from the refueling water storage tank" and CTS 3.5.3 Action b provides an action for when an ECCS subsystem is inoperable "because of the inoperability of either the residual heat removal heat exchanger or residual heat removal pump." ITS 3.5.3 ACTION A uses the term "residual heat removal (RHR) subsystem" and ITS 3.5.3 ACTION B uses the term "centrifugal charging subsystem" instead of stating the reasons the subsystem is inoperable, and the reasons listed in the CTS are moved 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 one ECCS train to be OPERABLE and provides proper Conditions to identify the various allowed inoperabilities. 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 of the ITS. 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

L.1 *(Category 3 – Relaxation of Completion Time)* CTS 3.5.3 Action a allows 20 hours to reach MODE 5 when a centrifugal charging pump or its flow path from the refueling water storage tank is inoperable and is not restored to OPERABLE status within 1 hour of discovery. ITS 3.5.3 ACTION C allows 24 hours to reach MODE 5. This changes the CTS by extending the Completion Time from 20 to 24 hours if the centrifugal charging subsystem is not restored to OPERABLE status within 1 hour of discovery.

The purpose of CTS 3.5.3 is to ensure the unit is capable of being cooled down by whatever means available when no high head ECCS subsystem is OPERABLE. This change is acceptable because the Completion Time is consistent with safe operation under the specified Condition, considering the capacity and capability of remaining features, a reasonable time for repairs or replacement of required features, and the low probability of a DBA occurring during the allowed Completion Time. The 24 hour Completion Time is reasonable based on operating experience to reach MODE 5 in an orderly manner and without challenging plant systems or operators. This is consistent with LCO 3.0.3, which allows 24 hours to transition from MODE 4 to MODE 5. 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.

L.2 *(Category 8 – Deletion of Reporting Requirements)* CTS 3.5.3 Action d requires that a Special Report be prepared and submitted to the NRC within 90 days following an ECCS actuation that results in water being injected into the Reactor Coolant System. The report is to include the description of the circumstances of the actuation and the total accumulated actuation cycles to date. ITS 3.5.3 does not include this requirement.

The purpose of CTS 3.5.3 Action d is to provide information about the event to the NRC. This change is acceptable because the regulations provide adequate reporting requirements, and the reports do not affect continued plant operation. A Licensee Event Report is required to be submitted by 10 CFR 50.73(a)(2)(iv) describing any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF). Therefore, a report to the NRC is still required. However, 10 CFR 50.73 does not require that the report include the total accumulated actuation cycles to date. ITS 5.5.4, "Component Cyclic or Transient Limits," requires that controls are in place to track the cyclic and transient occurrences to ensure that components are maintained within the design limits. 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)

CTS

## 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

### 3.5.3 ECCS - Shutdown

LCO 3.5.3 — LCO 3.5.3 One ECCS train shall be OPERABLE.

- NOTE -
An RHR train may be considered OPERABLE during alignment and operation for decay heat removal if capable of being manually realigned to the ECCS mode of operation. (3)

APPLICABILITY: MODE 4.

ACTIONS

| | CONDITION | REQUIRED ACTION | COMPLETION TIME | |
|---|---|---|---|---|
| Action b | A. (1) Required ECCS residual heat removal (RHR) subsystem inoperable. | A.1 Initiate action to restore required ECCS RHR subsystem to OPERABLE status. | Immediately (1) | (1) |
| Action a | B. Required ECCS high head subsystem (1) inoperable. | B.1 Restore required ECCS high head subsystem (1) to OPERABLE status. | 1 hour centrifugal charging | (1) |
| Action a | C. Required Action and associated Completion Time (1) of Condition B (1) not met. | C.1 Be in MODE 5. | 24 hours | (1) |

ITS

INSERT 1 (3)

SURVEILLANCE REQUIREMENTS

| | SURVEILLANCE | FREQUENCY |
|---|---|---|
| 4.5.3.1 SR 3.5.3.1 | The following SRs are applicable for all equipment required to be OPERABLE:<br>~~[SR 3.5.2.1]~~ SR 3.5.2.2 (SR 3.5.2.1) ~~[SR 3.5.2.3]~~ SR 3.5.2.4 SR 3.5.2.8 and SR 3.5.2.9 | In accordance with applicable SRs (2) (3) |

3

**INSERT 1**

-----------------------------------------------------------------------------------------------

-NOTE-

For SR 3.5.2.2, the SR is modified to allow the valves to not be in the correct position, provided they can be aligned to the correct position.

-----------------------------------------------------------------------------------------------

**JUSTIFICATION FOR DEVIATIONS**
**ITS 3.5.3, ECCS - SHUTDOWN**

1. The brackets are removed and the proper plant specific information/value is provided.

2. Changes have been made to SR 3.5.3.1 due to changes made to the SRs of ITS 3.5.2.

3. ISTS SR 3.5.3.1 has been modified to include a requirement for ITS SR 3.5.2.2 to be met. ITS SR 3.5.2.2, which verifies proper valve position, is required for the associated ECCS train to be OPERABLE. In conjunction with this addition, a Note to ISTS SR 3.5.3.1 has been added to allow ITS SR 3.5.2.2 to be met provided the valves "can be aligned to the correct position." The words in ITS SR 3.5.2.2 states that the valves must be "in the correct position." In the ITS, this means that the valves are in the accident position or can be automatically aligned to the accident position within the assumed time. Since the automatic feature of the valves is not required in MODE 4, the Note allows ITS SR 3.5.2.2 to be met as long as the valves can be manually realigned to their accident position. In addition, since the valves are not required to reposition automatically, the Note to the LCO is not necessary and has been deleted.



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# 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

BASES

BACKGROUND

The Background section for Bases 3.5.2, "ECCS - Operating," is applicable to these Bases, with the following modifications.

In MODE 4, the required ECCS train consists of two separate subsystems: centrifugal charging (high head) and residual heat removal (RHR) (low head).

The ECCS flow paths consist of piping, valves, heat exchangers, and pumps such that water from the refueling water storage tank (RWST) can be injected into the Reactor Coolant System (RCS) following the accidents described in Bases 3.5.2.

APPLICABLE SAFETY ANALYSES

The Applicable Safety Analyses section of Bases 3.5.2 also applies to this Bases section.

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

Only one train of ECCS is required for MODE 4. This requirement dictates that single failures are not considered during this MODE of operation. The ECCS trains satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

In MODE 4, one of the two independent (and redundant) ECCS trains is required to be OPERABLE to ensure that sufficient ECCS flow is available to the core following a DBA.

In MODE 4, an ECCS train consists of a centrifugal charging subsystem and an RHR subsystem. Each train includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWST and transferring suction to the containment sump.

During an event requiring ECCS actuation, a flow path is required to provide an abundant supply of water from the RWST to the RCS via the ECCS 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

(2) **INSERT 1**

, as it describes the design of the ECCS,

(2) **INSERT 1A**

The CNP Licensing Basis does not require performance of an analysis to determine the effects of a Loss of Coolant Accident (LOCA) occurring in MODE 4, nor does it require an analysis to prove ECCS equipment capability to mitigate a MODE 4 LOCA. However, these Technical Specifications require certain ECCS subsystems to be OPERABLE in MODE 4 to ensure sufficient ECCS flow is available to the core and adequate core cooling is maintained following a MODE 4 LOCA.

BASES

LCO (continued)

take its supply from the containment sump and to deliver its flow to the RCS hot and cold legs.

This LCO is modified by a Note that allows an RHR train to be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned (remote or local) to the ECCS mode of operation and not otherwise inoperable. This allows operation in the RHR mode during MODE 4. (10)

APPLICABILITY

In MODES 1, 2, and 3, the OPERABILITY requirements for ECCS are covered by LCO 3.5.2.

In MODE 4 with RCS temperature below 350°F, one OPERABLE ECCS train is acceptable without single failure consideration, on the basis of the stable reactivity of the reactor and the limited core cooling requirements.

In MODES 5 and 6, plant [unit] conditions are such that the probability of an event requiring ECCS injection is extremely low. (2) 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 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation - High Water Level," and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level." (3)

ACTIONS

A.1

With no ECCS RHR subsystem OPERABLE, the plant [unit] is not prepared to respond to a loss of coolant accident or to continue a cooldown using the RHR pumps and heat exchangers. (2) The Completion Time of immediately to initiate actions that would restore at least one ECCS RHR subsystem to OPERABLE status ensures that prompt action is taken to restore the required cooling capacity. Normally, in MODE 4, reactor decay heat is removed from the RCS by an RHR loop. If no RHR loop is OPERABLE for this function, reactor decay heat must be removed by some alternate method, such as use of the steam generators. The alternate means of heat removal must continue until the inoperable RHR loop components can be restored to operation so that decay heat removal is continuous. (4)

With both RHR pumps and heat exchangers inoperable, it would be unwise to require the plant to go to MODE 5, where the only available heat removal system is the RHR. Therefore, the appropriate action is to

BASES

ACTIONS (continued)

initiate measures to restore one ECCS RHR subsystem and to continue the actions until the subsystem is restored to OPERABLE status.

B.1 centrifugal charging (2)

With no ECCS high head subsystem OPERABLE, due to the inoperability of the centrifugal charging pump or flow path from the RWST, the plant is not prepared to provide high pressure response to Design Basis Events requiring SI. The 1 hour Completion Time to restore at least one ECCS high head subsystem to OPERABLE status ensures that prompt action is taken to provide the required cooling capacity or to initiate actions to place the plant in MODE 5, where an ECCS train is not required. (5) unit (2) (2) (6)

C.1

When the Required Actions of Condition B cannot be completed within the required Completion Time, a controlled shutdown should be initiated. INSERT 2 Twenty-four hours is a reasonable time, based on operating experience, to reach MODE 5 in an orderly manner and without challenging plant unit systems or operators. (7) (8) (2)

SURVEILLANCE REQUIREMENTS

SR 3.5.3.1

The applicable Surveillance descriptions from Bases 3.5.2 apply. INSERT 3 (10)

REFERENCES

The applicable references from Bases 3.5.2 apply. None. (9)

(8) **INSERT 2**

the unit should be placed in MODE 5.

(10) **INSERT 3**

However, a Note has been added that allows the acceptance criteria of SR 3.5.2.2 to be modified. The Note allows valves to not be in the correct position (i.e., in the nonaccident position and not capable of being automatically repositioned within the assumed time), provided the valves can be aligned to the correct position (e.g., using the valve control switches). This is acceptable since automatic actuation of the ECCS train is not required in MODE 4.

## JUSTIFICATION FOR DEVIATIONS
## ITS 3.5.3 BASES, ECCS - SHUTDOWN

1. Editorial change made for consistency with similar phrases in other ITS Bases.

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

3. The listed LCOs concern the shutdown cooling function of the RHR System, not the ECCS function. The Applicability Section has adequately described why ECCS is not needed in MODES 5 and 6, and it is not necessary to describe why normal shutdown cooling is required. Therefore, this inappropriate information has been deleted.

4. The statement in ACTION A.1 Bases concerning how decay heat is removed is not appropriate for this Specification. ITS 3.5.3 concerns ECCS, not normal decay heat removal. Normal decay heat removal in MODE 4 is covered by ITS LCO 3.4.6. In addition, the actual ITS Required Action A.1 does not discuss normal decay heat removal requirements; it only requires the ECCS train to be restored. Therefore, the statement has been deleted.

5. The statement in ACTION B.1 Bases concerning why a centrifugal charging subsystem is inoperable has been deleted, since there may be other reasons the centrifugal charging subsystem is inoperable. The statement that the centrifugal charging subsystem is inoperable is sufficient and is consistent with the actual wording of ITS Required Action B.1.

6. The statement in ACTION B.1 Bases concerning initiation of actions to place the plant in MODE 5 has been deleted, since it is not consistent with the actual wording of ITS Required Action B.1. ITS Required Action B.1 does not address a plant cooldown to MODE 5; it only address restoring the subsystem to OPERABLE status. ITS Required Action C.1 provides the requirements to place the unit in MODE 5.

7. Typographical/grammatical error corrected.

8. The Bases of the action to take when Required Action B.1 cannot be completed is changed to state that the unit must be brought to MODE 5. This is a more accurate description than the ISTS Bases statement that a controlled shutdown should be initiated since the LCO only applies during shutdown.

9. There are no References in the ITS 3.5.3 Bases, therefore, the statement referring to the ITS 3.5.2 Bases has been deleted and the word "none" has been added.

10. Changes are made to be consistent with changes made to the ISTS.

# Specific No Significant Hazards Considerations (NSHCs)

**DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS**
**ITS 3.5.3, ECCS - SHUTDOWN**

There are no specific NSHC discussions for this Specification.



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# ATTACHMENT 4

# ITS 3.5.4, REFUELING WATER STORAGE TANK

# Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

ITS 3.5.4

A.1

ITS

3/4 LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS
3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3/4.5.5 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

LCO 3.5.4 3.5.5 The refueling water storage tank (RWST) shall be OPERABLE with:

SR 3.5.4.2 a. A minimum contained volume of 375,500 gallons of borated water.

SR 3.5.4.3 b. Between 2400 and 2600 ppm of boron, and

SR 3.5.4.1 c. A minimum water temperature of 70°F and a maximum water temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION: [Add proposed ACTION A] L.1

ACTION B With the refueling water storage tank inoperable, [for reasons other than concentration or temperature not within limits] restore the tank to OPERABLE status within 1 hour or be in at
ACTION C least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.5 The RWST shall be demonstrated OPERABLE:

a. At least once per 7 days by:

SR 3.5.4.2 1. Verifying the contained borated water level in the tank, and

SR 3.5.4.3 2. Verifying the boron concentration of the water.

SR 3.5.4.1 b. At least once per 24 hours by verifying the RWST temperature.

ITS 3.5.4

A.1

ITS

3/4 LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS
3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3/4.5.5 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

LCO 3.5.4 — 3.5.5 The refueling water storage tank (RWST) shall be OPERABLE with:

SR 3.5.4.2 — a. A minimum contained volume of 375,500 gallons of borated water.

SR 3.5.4.3 — b. Between 2400 and 2600 ppm of boron, and

SR 3.5.4.1 — c. A minimum water temperature of 70°F and a maximum water temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION: [Add proposed ACTION A] (L.1)

ACTION B / ACTION C — With the refueling water storage tank inoperable [for reasons other than concentration or temperature not within limits], 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.

SURVEILLANCE REQUIREMENTS

4.5.5 The RWST shall be demonstrated OPERABLE:

a. At least once per 7 days by:

SR 3.5.4.2 — 1. Verifying the contained borated water level in the tank, and

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

SR 3.5.4.1 — b. At least once per 24 hours by verifying the RWST temperature.

**DISCUSSION OF CHANGES**
**ITS 3.5.4, REFUELING WATER STORAGE TANK**

ADMINISTRATIVE CHANGES

A.1 In the conversion of the CNP 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-1431, Rev. 2, "Standard Technical Specifications-Westinghouse Plants" (ISTS).

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

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

L.1 *(Category 3 – Relaxation of Completion Time)* The CTS 3.5.5 Action allows 1 hour to restore an inoperable RWST. ITS 3.5.4 ACTION A allows 8 hours to restore the RWST to OPERABLE status if the inoperability is due to the RWST boron concentration or temperature not within limits. This changes the CTS by increasing the Completion Time for the specified Conditions from 1 hour to 8 hours.

The purpose of CTS 3.5.5 Action is to require rapid correction of conditions that affect both trains of ECCS. This change is acceptable because the Completion Time is consistent with safe operation under the specified Condition, considering the OPERABILITY status of the redundant systems of required features, the capacity and capability of remaining features, a reasonable time for repairs or replacement of required features, and the low probability of a DBA occurring during the allowed Completion Time. The primary function of the RWST is to provide large volumes of water to the RCS following a Loss of Coolant Accident. This large volume of water continues to be available while in this Condition. As a result, the most important safety function of the RWST can still be provided. Because of the volume of the RWST, changes to the boron concentration or temperature occur slowly, and consequently would not go far out of limit. If one of these parameters was out of limit, more than one hour would likely be required to restore the parameter. Given the remaining abilities of the RWST, 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.



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

CTS



3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.4 Refueling Water Storage Tank (RWST)

LCO 3.5.5 LCO 3.5.4 The RWST shall be OPERABLE.

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

ACTIONS

| | CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|---|
| DOC L.1 | A. RWST boron concentration not within limits.<br><br>OR<br><br>RWST borated water temperature not within limits. | A.1 Restore RWST to OPERABLE status. | 8 hours |
| Action | B. RWST inoperable for reasons other than Condition A. | B.1 Restore RWST to OPERABLE status. | 1 hour |
| Action | C. Required Action and associated Completion Time not met. | C.1 Be in MODE 3.<br><br>AND<br><br>C.2 Be in MODE 5. | 6 hours<br><br><br><br>36 hours |

CTS

RWST
3.5.4

SURVEILLANCE REQUIREMENTS

| CTS | | SURVEILLANCE | FREQUENCY | |
|---|---|---|---|---|
| 4.5.5.b 3.5.5.c | SR 3.5.4.1 | - NOTE - [ Only required to be performed when ambient air temperature is < [35]°F or > [100]°F. ] | | ① |
| | | Verify RWST borated water temperature is ≥ [35] 70 °F and ≤ [100]°F. | 24 hours | ② |
| 3.5.5.a 4.5.5.a.1 | SR 3.5.4.2 | Verify RWST borated water volume is ≥ [466,200] 375,500 gallons ([ ]%). | 7 days | ② |
| 4.5.5.a.2 3.5.5.b | SR 3.5.4.3 | Verify RWST boron concentration is ≥ [2000] 2400 ppm and ≤ [2200] 2600 ppm. | 7 days | ② |

**JUSTIFICATION FOR DEVIATIONS**
**ITS 3.5.4, REFUELING WATER STORAGE TANK**

1. A bracketed Note for ISTS SR 3.5.4.1 associated with the effect of ambient air temperature on RWST temperature is not adopted. CNP RWST borated water is heated and not maintained at ambient temperature, and the current temperature band is not very large.

2. The brackets are removed and the proper plant specific information/value is provided.



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# 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 Storage Tank (RWST)

BASES

BACKGROUND

The RWST supplies borated water to the Chemical and Volume Control System (CVCS) during abnormal operating conditions, to the refueling pool during refueling, and to the ECCS and the Containment Spray System during accident conditions.

The RWST supplies both trains of the ECCS and the Containment Spray System through separate, redundant supply headers during the injection phase of a loss of coolant accident (LOCA) recovery. A motor operated isolation valve is provided in each header to isolate the RWST from the ECCS once the system has been transferred to the recirculation mode. The recirculation mode is entered when pump suction is transferred to the containment sump following receipt of the RWST - Low Low (Level 1) signal. Use of a single RWST to supply both trains of the ECCS and Containment Spray System is acceptable since the RWST is a passive component, and passive failures are not required to be assumed to occur coincidentally with Design Basis Events.

The switchover from normal operation to the injection phase of ECCS operation requires changing centrifugal charging pump suction from the CVCS volume control tank (VCT) to the RWST through the use of isolation valves. Each set of isolation valves is interlocked so that the VCT isolation valves will begin to close once the RWST isolation valves are fully open. Since the VCT is under pressure, the preferred pump suction will be from the VCT until the tank is isolated. This will result in a delay in obtaining the RWST borated water. The effects of this delay are discussed in the Applicable Safety Analyses section of these Bases.

During normal operation in MODES 1, 2, and 3, the safety injection (SI) and residual heat removal (RHR) pumps are aligned to take suction from the RWST.

The ECCS and Containment Spray System pumps are provided with recirculation lines that ensure each pump can maintain minimum flow requirements when operating at or near shutoff head conditions.

When the suction for the ECCS and Containment Spray System pumps is transferred to the containment sump, the RWST flow paths must be isolated to prevent a release of the containment sump contents to the RWST, which could result in a release of contaminants to the atmosphere and the eventual loss of suction head for the ECCS pumps.

(1) **INSERT 1**

Separate piping off the common supply header supplies each ECCS subsystem and each Containment Spray subsystem.

(1) **INSERT 2**

(a common motor operated isolation valve for the safety injection pumps, an individual motor operated isolation valve for each residual heat removal pump, and two common motor operated isolation valves for the centrifugal charging pumps)

(1) **INSERT 3**

after sufficient water has been transferred from the RWST to the containment recirculation sump.

(1) **INSERT 3A**

during the injection phase of ECCS operation



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BASES

BACKGROUND (continued)

This LCO ensures that:

a. The RWST contains sufficient borated water to support the ECCS during the injection phase; (2)

b. Sufficient water volume exists in the containment sump to support continued operation of the ECCS and Containment Spray System pumps at the time of transfer to the recirculation mode of cooling; and (2)

c. The reactor remains subcritical following a LOCA.

Insufficient water in the RWST could result in insufficient cooling capacity 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 the LOCA, as well as excessive caustic stress corrosion of mechanical components and systems inside the containment.

APPLICABLE SAFETY ANALYSES

During accident conditions, the RWST provides a source of borated water to the ECCS and Containment Spray System 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 B 3.5.2, "ECCS - Operating," B 3.5.3, "ECCS - Shutdown," and B 3.6.6, "Containment Spray and Cooling Systems." These analyses are used to assess changes to the RWST in order to evaluate their effects in relation to the acceptance limits in the analyses. (1) (3)

Refs. 1 and 2

The RWST must also meet volume, boron concentration, and temperature requirements for non-LOCA events. The volume is not an explicit assumption in non-LOCA events since the required volume is a small fraction of the available volume. The deliverable volume limit is set by the LOCA and containment analyses. For the RWST, the deliverable volume is different from the total volume contained since, due to the design of the tank, more water can be contained than can be delivered. The minimum boron concentration is an explicit assumption in the main steam line break (MSLB) analysis to ensure the required shutdown capability. The importance of its value is small for units with a boron injection tank (BIT) with a high boron concentration. For units with no BIT or reduced BIT boron requirements, the minimum boron concentration (1)

BASES

APPLICABLE SAFETY ANALYSES (continued)

limit is an important assumption in ensuring the required shutdown capability. The maximum boron concentration is an explicit assumption in the inadvertent ECCS actuation analysis, although it is typically a nonlimiting event and the results are very insensitive to boron concentrations. The maximum temperature ensures that the amount of cooling provided from the RWST during the heatup phase of a feedline break is consistent with safety analysis assumptions; the minimum is an assumption in both the MSLB and inadvertent ECCS actuation analyses, although the inadvertent ECCS actuation event is typically nonlimiting.

The MSLB analysis has considered a delay associated with the interlock between the VCT and RWST isolation valves, and the results show that the departure from nucleate boiling design basis is met. The delay has been established as [27] seconds, with offsite power available, or [37] seconds without offsite power. This response time includes [2] seconds for electronics delay, a [15] second stroke time for the RWST valves, and a [10] second stroke time for the VCT valves. Plants with a BIT need not be concerned with the delay since the BIT will supply highly borated water prior to RWST switchover, provided the BIT is between the pumps and the core.

For a large break LOCA analysis, the minimum water volume limit of [466,200] gallons and the lower boron concentration limit of [2000] ppm are used to compute the post LOCA sump boron concentration necessary to assure subcriticality. The large break LOCA is the limiting case since the safety analysis assumes that all control rods are out of the core.

The upper limit on boron concentration of [2200] ppm is used to determine the maximum allowable time to switch to hot leg recirculation following a LOCA. The purpose of switching from cold leg to hot leg injection is to avoid boron precipitation in the core following the accident.

In the ECCS analysis, the containment spray temperature is assumed to be equal to the RWST lower temperature limit of [35]°F. If the lower temperature limit is violated, the containment spray further reduces containment pressure, which decreases the rate at which steam can be vented out the break and increases peak clad temperature. The upper temperature limit of [100]°F is used in the small break LOCA analysis and containment OPERABILITY analysis. Exceeding this temperature will result in a higher peak clad temperature, because there is less heat transfer from the core to the injected water for the small break LOCA and higher containment pressures due to reduced containment spray cooling

(1) **INSERT 3B**

An RWST temperature more conservative (i.e., a lower RWST temperature) than the minimum RWST temperature is assumed in the MSLB analysis.

(1) **INSERT 4**

, except during hot leg switchover

(1) **INSERT 5**

minimize the potential for

(1) **INSERT 6**

Maintaining RWST water temperature $\leq$ 100°F ensures the Containment Spray System will provide sufficient pressure suppression capability to limit the containment peak pressure transient to less than the containment design internal pressure, and that containment cooling will be maintained following a LOCA or MSLB.

(1) **INSERT 7**

The lower temperature limit of 70°F is assumed in the ECCS analysis to determine the $F_Q(Z)$ limit. This temperature determines the Containment Spray System water temperature delivered to the containment following a LOCA. It is one of the factors that determines the containment backpressure in the ECCS analyses.

BASES

APPLICABLE SAFETY ANALYSES (continued)

INSERT 7A

capacity. For the containment response following an MSLB, the lower limit on boron concentration and the upper limit on RWST water temperature are used to maximize the total energy release to containment. (1)

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

LCO

The RWST 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), to cool and cover the core in the event of a LOCA, to maintain the reactor subcritical following a DBA, and to ensure adequate level in the containment sump to support ECCS and Containment Spray System pump operation in the recirculation mode.

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

APPLICABILITY

In MODES 1, 2, 3, and 4, RWST OPERABILITY requirements are dictated by 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 RWST must also be OPERABLE to support their operation. 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 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation - High Water Level," and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level." (5)

INSERT 8

ACTIONS

A.1

With RWST boron concentration or borated water temperature not within limits, they must be returned to within limits within 8 hours. Under these conditions neither the ECCS nor the Containment Spray System can perform its design function. Therefore, prompt action must be taken to restore the tank [RWST] to OPERABLE condition. The 8 hour limit to restore the RWST temperature or boron concentration to within limits was developed considering the time required to change either the boron concentration or temperature and the fact that the contents of the tank are still available for injection. (6)

(1) **INSERT 7A**

a conservative value with respect to

(5) **INSERT 8**

In MODES 5 and 6, unit conditions are such that the probability of an event requiring ECCS injection is extremely low.

BASES

ACTIONS (continued)

B.1

With the RWST inoperable for reasons other than Condition A (e.g., water volume), it must be restored to OPERABLE status within 1 hour.

In this Condition, neither the ECCS nor the Containment Spray System can perform its design function. Therefore, prompt action must be taken to restore the tank to OPERABLE status or to place the plant in a MODE in which the RWST is not required. The short time limit of 1 hour to restore the RWST to OPERABLE status is based on this condition simultaneously affecting redundant trains. (7) (6)

C.1 and C.2

If the RWST cannot be returned 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. (1) (1)

SURVEILLANCE REQUIREMENTS

SR 3.5.4.1

The RWST borated water temperature should be verified every 24 hours to be within the limits assumed in the accident analyses band. This Frequency is sufficient to identify a temperature change that would approach either limit and has been shown to be acceptable through operating experience.

The SR is modified by a Note that eliminates the requirement to perform this Surveillance when ambient air temperatures are within the operating limits of the RWST. With ambient air temperatures within the band, the RWST temperature should not exceed the limits. (3)

SR 3.5.4.2

The RWST water volume should be verified every 7 days to be above the required minimum level in order to ensure that a sufficient initial supply is available for injection and to support continued ECCS and Containment Spray System pump operation on recirculation. Since the RWST volume is normally stable and is protected by an alarm, a 7 day Frequency is

BASES

SURVEILLANCE REQUIREMENTS (continued)

appropriate and has been shown to be acceptable through operating experience.

SR 3.5.4.3

The boron concentration of the RWST should be verified every 7 days to be within the required limits. This SR ensures that the reactor will remain subcritical following a LOCA. Further, it assures that the resulting sump pH will be maintained in an acceptable range so that boron precipitation in the core will not occur and the effect of chloride and caustic stress corrosion on mechanical systems and components will be minimized. Since the RWST volume is normally stable, a 7 day sampling Frequency to verify boron concentration is appropriate and has been shown to be acceptable through operating experience.

REFERENCES

1. UFSAR, Chapter [6] and Chapter [15]. (1)

INSERT 10

INSERT 9

(1) **INSERT 9**

Section 6.2.2

(1) **INSERT 10**

2. UFSAR, Section 14.3.



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## JUSTIFICATION FOR DEVIATIONS
## ITS 3.5.4 BASES, REFUELING WATER STORAGE TANK

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

2. These punctuation corrections have been made consistent with the Writer's Guide for the Improved Standard Technical Specifications, NEI 01-03, Section 5.1.3.

3. Changes are made to reflect those changes made to the Specification. Subsequent requirements are renumbered or revised, where applicable, to reflect the changes.

4. The brackets have been removed and the proper plant specific information/value has been provided.

5. The listed LCOs concern the shutdown cooling function of the RHR System, not the ECCS function. The Applicability Section should describe why ECCS is not needed in MODES 5 and 6, similar to that in the ITS 3.5.2 Bases, and it is not necessary to describe why normal shutdown cooling is required. Therefore, this inappropriate information has been deleted and wording about MODES 5 and 6, consistent with the ITS 3.5.2 Bases, has been added.

6. Change made to be consistent with the actual Specification.

7. Typographical/grammatical error corrected.

8. The paragraph is not appropriate for this Specification. It is discussing how the ECCS and Containment Spray System pumps maintain minimum flow requirements. A description concerning ECCS pump minimum flow requirements has been added to the ITS 3.5.2 Bases, Background Section (this issue is already discussed in the ITS 3.6.6 Bases).



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# Specific No Significant Hazards Considerations (NSHCs)

## DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
## ITS 3.5.4, REFUELING WATER STORAGE TANK

There are no specific NSHC discussions for this Specification.

# ATTACHMENT 5

# ITS 3.5.5, SEAL INJECTION FLOW

# Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

ITS 3.5.5

A.1

ITS

3/4 LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS
3/4.4 REACTOR COOLANT SYSTEM

OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.2 Reactor Coolant System leakage shall be limited to:

a. No PRESSURE BOUNDARY LEAKAGE,

b. 1 GPM UNIDENTIFIED LEAKAGE,

c. 600 gallons per day total primary-to-secondary leakage through all steam generators and 150 gallons per day through any one steam generator,

d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System,

See ITS 3.4.13

e. Seal line resistance greater than or equal to 2.27E-1 ft/gpm$^2$ and,

f. The leakage from each Reactor Coolant System Pressure Isolation Valves specified in Table 3.4-0 shall be limited to 0.5 gpm per nominal inch of valve size up to a maximum of 5 gpm, at a Reactor Coolant System average pressure within 20 psi of the nominal full pressure value.

See ITS 3.4.14

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

ACTION:

a. With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

See ITS 3.4.13

ACTION A

ACTION B

b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Seal line resistance not within

A.2

MODE 4 within 12 hours

L.1

c. With any reactor coolant system pressure isolation valve(s) leakage greater than the above limit, declare the leaking valve inoperable and isolate the high pressure portion of the affected system from the low pressure portion by the use of a combination of at least two closed valves, one of which may be the OPERABLE check valve and the other a closed de-energized motor operated valve. Verify the isolated condition of the closed de-energized motor operated valve at least once per 24 hours, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

See ITS 3.4.14

LA.1

SR 3.5.5.1 Note

* Specification 3.4.6.2.e is applicable with average pressure within 20 psi of the nominal full pressure value.

10

A.3

M.1

ITS 3.5.5

A.1

ITS

REACTOR COOLANT SYSTEM

LIMITING CONDITIONS FOR OPERATION (Continued)

SURVEILLANCE REQUIREMENTS

4.4.6.2.1 Reactor Coolant System leakages shall be demonstrated to be within each of the above limits by:

a. Monitoring the containment atmosphere particulate radioactivity monitor at least once per 12 hours. [See ITS 3.4.13]

b. Monitoring the containment sump inventory and discharge at least once per 12 hours. [LA.1]

SR 3.5.5.1 — c. Determining the seal line resistance at least [10] once per 31 days when the average pressurizer pressure is within 20 psi of its nominal full pressure value. The seal line resistance measured during the surveillance must be greater than or equal to 2.27 E-1 ft/gpm². The seal line resistance, $R_{SL}$, is determined from the following expression: [M.1] [A.3]

$$R_{SL} = \frac{2.31\,(P_{CHP} - P_{SI})}{Q^2}$$

where: $P_{CHP}$ = charging pump header pressure, psig [LA.2]

$P_{SI}$ = ~~2112~~ [2138] psig (low pressure operation) [M.1]

~~2262~~ [2290] psig (high pressure operation)

2.31 = conversion factor $(12\ in/ft)^2/(62.3\ lb/ft^3)$

Q = the total seal injection flow, gpm

Note to SR 3.5.5.1 — ~~The provisions of Specification 4.0.4 are not applicable for entry into MODES 3 and 4.~~ [M.2]

d. Performance of a Reactor Coolant System water inventory balance at least once per 72 hours during steady state operation, and [See ITS 3.4.13]

e. Monitoring the reactor head flange leakoff system at least once per 24 hours.

4.4.6.2.2 Each reactor coolant system pressure isolation valve specified in Table 3.4-0 shall be demonstrated OPERABLE pursuant to Specification 4.0.5. [See ITS 3.4.14]

ITS 3.5.5

A.1

ITS

REACTOR COOLANT SYSTEM

OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.2 Reactor Coolant System leakage shall be limited to:

a. No PRESSURE BOUNDARY LEAKAGE,

b. 1 GPM UNIDENTIFIED LEAKAGE,

c. 1 GPM total primary-to-secondary leakage through all steam generators and 500 gallons per day through any one steam generator,

d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System,

See ITS 3.4.13

LCO 3.5.5 e. Seal line resistance greater than or equal to 2.27E-1 ft/gpm$^2$ and,

f. The leakage from each Reactor Coolant System Pressure Isolation Valve specified in Table 3.4-0 shall be limited to 0.5 gpm per nominal inch of valve size up to a maximum of 5 gpm, at a Reactor Coolant System average pressure within 20 psi of the nominal full pressure value.

See ITS 3.4.14

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

L.1

ACTION:

a. With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

See ITS 3.4.13

ACTION A b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY

ACTION B within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Seal line resistance not within

A.2

MODE 4 within 12 hours

L.1

c. With any reactor coolant system pressure isolation valve(s) leakage greater than the above limit, declare the leaking valve inoperable and isolate the high pressure portion of the affected system from the low pressure portion by the use of at least two closed valves, one of which may be the OPERABLE check valve and the other a closed de-energized motor operated valve. Verify the isolated condition of the closed de-energized motor operated valve at least once per 24 hours, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

See ITS 3.4.14

SR 3.5.5.1 Note * Specification 3.4.6.2.e is applicable with average pressurizer pressure within 20 psi of the nominal full pressure value.

LA.1

A.3

10

M.1





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ITS 3.5.5

A.1

ITS

REACTOR COOLANT SYSTEM

LIMITING CONDITIONS FOR OPERATION (Continued)

SURVEILLANCE REQUIREMENTS

4.4.6.2.1 Reactor Coolant System leakages shall be demonstrated to be within each of the above limits by;

a. Monitoring the containment atmosphere particulate radioactivity monitor at least once per 12 hours. See ITS 3.4.13

b. Monitoring the containment sump inventory and discharge at least once per 12 hours. LA.1

SR 3.5.5.1 c. Determining the seal line resistance at least once per 31 days when the average pressurizer pressure is within 20 (10) psi of its nominal full pressure value. The seal line resistance measured during the surveillance must be greater than or equal to 2.27 E-1 ft/gpm². The seal line resistance, $R_{SL}$, is determined from the following expression: M.1 A.3

$$R_{SL} = \frac{2.31 (P_{CHP} - P_{SI})}{Q^2}$$

where: $P_{CHP}$ = charging pump header pressure, psig LA.2

$P_{SI}$ = 2262 (2290) psig (high pressure operation) M.1

2.31 = conversion factor (12 in/ft)$^2$/(62.3 lb/ft$^3$)

Q = the total seal injection flow, gpm

Note to SR 3.5.5.1 The provisions of Specification 4.0.4 are not applicable for entry into MODES 3 and 4. M.2

d. Performance of a Reactor Coolant System water inventory balance at least once per 72 hours during steady state operation, and

e. Monitoring the reactor head flange leakoff system at least once per 24 hours. See ITS 3.4.13

4.4.6.2.2. Each reactor coolant system pressure isolation valve specified in Table 3.4-0 shall be demonstrated OPERABLE pursuant to Specification 4.0.5. See ITS 3.4.14

**DISCUSSION OF CHANGES**
**ITS 3.5.5, SEAL INJECTION FLOW**

ADMINISTRATIVE CHANGES

A.1 In the conversion of the CNP 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-1431, Rev. 2, "Standard Technical Specifications-Westinghouse Plants" (ISTS).

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

A.2 CTS 3.4.6.2 Action b provides the actions for when any Reactor Coolant System (RCS) leakage is greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE. The Condition for ITS 3.5.5 ACTION A is specific as to which of the RCS leakage limits is not met, specifically, the seal injection flow resistance not within limits. This changes the CTS by replacing "Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE" with "seal injection flow resistance not within limit."

The purpose of CTS 3.4.6.2 Action b is to provide a specific action to restore the RCS leakage to within the specified limits of CTS LCO 3.4.6.2. The RCS leakage limits for CTS LCO 3.4.6.2.a through CTS LCO 3.4.6.2.d are covered in ITS 3.4.13. The RCS leakage limit for CTS LCO 3.4.6.2.f is covered in ITS LCO 3.4.14. Changes to the CTS Actions are discussed in the Discussion of Changes for these Technical Specifications. ITS 3.5.5 only covers seal injection flow resistance (CTS LCO 3.4.6.2.e). Therefore, replacing the name "RCS leakage" with the explicit "seal injection flow resistance" limit does not change the action. This change is designated as administrative because it does not result in technical changes to the CTS.

A.3 CTS 3.4.6.2.e Applicability Footnote * states that Specification 3.4.6.2.e is applicable with average pressure within 20 psi "of the nominal full pressure value." CTS 4.4.6.2.1.c states that the seal line resistance shall be determined when the average pressurizer pressure is within 20 psi "of its nominal full pressure value." The ITS SR 3.5.5.1 Note states that the Surveillance is not required to be performed until 4 hours after the pressurizer pressure stabilizes at $\geq$ 2075 psig and $\leq$ 2095 psig (Unit 1) and $\geq$ 2225 psig and $\leq$ 2245 psig (Unit 2). This changes the CTS by including the explicit pressure limits. Changes to the detail that the pressurizer pressure must be an average pressure are discussed in DOC LA.1 and changes to the pressure band are discussed in DOC M.1.

The purpose of CTS 3.4.6.2.e Applicability Footnote * and CTS 4.4.6.2.1.c is to perform the test at the appropriate pressurizer pressure. The appropriate nominal range has been proposed. This change is acceptable because the proposed values are consistent with the current application of the requirements, as modified by DOC M.1. This change is designated as administrative because it does not result in technical changes to the CTS.

**DISCUSSION OF CHANGES**
**ITS 3.5.5, SEAL INJECTION FLOW**

MORE RESTRICTIVE CHANGES

M.1 CTS 3.4.6.2.e Applicability Footnote * states that Specification 3.4.6.2.e is applicable with average pressure within "20" psi of the nominal full pressure value. CTS 4.4.6.2.1.c states that the seal line resistance shall be determined when the average pressurizer pressure is within "20" psi of its nominal full pressure value. The ITS SR 3.5.5.1 Note states that the Surveillance is not required to be performed until 4 hours after the pressurizer pressure stabilizes at ≥ 2075 psig and ≤ 2095 psig (Unit 1) and ≥ 2225 psig and ≤ 2245 psig (Unit 2). This changes the CTS by decreasing the pressure band from ± 20 psi to ± 10 psi. Other changes related to Footnote * are described in DOC A.3. In addition, CTS 4.4.6.2.1.c provides a pressure constant, $P_{SI}$, to be used in the calculation of seal line resistance. The values for this constant (two values for Unit 1 and one value for Unit 2), which are moved to the Bases as described in DOC LA.2, have been increased and results in a decrease in the calculated seal line resistance at any given charging pump pressure. This changes the CTS by increasing the pressure constant value, resulting in a decrease in the calculated seal line resistance flow.

The purpose of CTS 3.4.6.2.e and 4.4.6.2.1.c is to ensure seal line resistance is high enough to ensure the appropriate ECCS flows assumed in the LOCA analysis. This change effectively increases the seal line flow resistance limit due to the increase in the pressure constant. It also narrows the test pressure band that is required to be maintained. This change is based on the most recent seal line resistance calculation and is acceptable because it will slightly increase the overall ECCS borated water pumped into the RCS such that there would be an insignificant impact as a result. The change has been designated as more restrictive because it effectively increases the seal line flow resistance limit.

M.2 CTS 4.4.6.2.1.c states that the seal line resistance must be determined at least once per 31 days when the average pressurizer pressure is within 20 psi of its nominal full pressure value. CTS 4.4.6.2.1.c also states that the provisions of CTS 4.0.4 are not applicable for entry into MODES 3 and 4. ITS SR 3.5.5.1 requires verification that the seal injection flow resistance is ≥ 0.227 $ft/gpm^2$ and is modified by a Note that states the Surveillance is not required to be performed until 4 hours after the pressurizer pressure stabilizes at the specified pressure band. This changes the CTS by explicitly specifying the time required to perform the Surveillance after entering the specified pressure band.

The purpose of CTS 4.4.6.2.1.c is to accurately determine the seal line injection flow resistance. This change is acceptable because the new Surveillance has been evaluated to ensure that it provides an acceptable level of equipment reliability. An accurate measurement of the seal line injection flow resistance must be performed at stable pressurizer pressure conditions. The Note applies a 4 hour period after reaching the specified pressurizer pressure band to perform the test. This is a reasonable period to establish stable operating conditions, install the test equipment, perform the test, and analyze the results. This change is designated as more restrictive as it specifies an explicit time period to perform the test.

**DISCUSSION OF CHANGES**
**ITS 3.5.5, SEAL INJECTION FLOW**

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA.1 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 3.4.6.2.e Applicability Footnote * states that Specification 3.4.6.2.e is applicable with "average" pressure within 20 psi of the nominal full pressure value. CTS 4.4.6.2.1.c states that the seal line resistance shall be determined when the "average" pressurizer pressure is within 20 psi of its nominal full pressure value. ITS SR 3.5.5.1 Note states that the Surveillance is not required to be performed until 4 hours after the pressurizer pressure stabilizes at ≥ 2075 psig and ≤ 2095 psig (Unit 1) and ≥ 2225 psig and ≤ 2245 psig (Unit 2). This changes the CTS by relocating the detail that the pressurizer pressure is an averaged value to the Bases.

The removal of these details for performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the requirement to perform the seal line injection flow resistance evaluation at a pressurizer pressure of ≥ 2075 psig and ≤ 2095 psig (Unit 1) and ≥ 2225 psig and ≤ 2245 psig (Unit 2). 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.

LA.2 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 4.4.6.2.1.c provides a detailed formula to determine the actual seal line resistance. ITS SR 3.5.5.1 does not include this detailed formula. This changes the CTS by relocating the detailed formula of how to determine seal line resistance to the Bases.

The removal of these details for performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the seal line resistance limit and the requirement to determine the actual seal line resistance is within the limit every 31 days. Also, this change is acceptable because these types of procedural details will be adequately controlled in 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.

**DISCUSSION OF CHANGES**
**ITS 3.5.5, SEAL INJECTION FLOW**

LESS RESTRICTIVE CHANGES

L.1 *(Category 2 – Relaxation of Applicability)* CTS 3.4.6.2.e is applicable in MODES 1, 2, 3, and 4. If the requirement of the LCO (seal line resistance) is not met, CTS 3.4.6.2 Action b allows 4 hours to restore the seal line resistance to within limit or be in HOT STANDBY (MODE 3) within the next 6 hours and in COLD SHUTDOWN (MODE 5) within the following 30 hours. ITS 3.5.5 is applicable only in MODES 1, 2, and 3. If the requirement of ITS 3.5.5 is not met, ITS 3.5.5 ACTIONS A and B require similar Required Actions as the CTS. However, the requirement to be in MODE 5 is replaced with a requirement to be in MODE 4 within 12 hours. This changes the CTS by deleting MODE 4 from the Applicability and making corresponding changes to the Action.

The purpose of CTS 3.4.6.2.e is to maintain proper ECCS injection flow in the event of an accident. This change is acceptable because the requirements continue to ensure that the process variables are maintained in the MODES and other specified conditions assumed in the safety analyses and licensing basis. Seal injection flow resistance is less critical in MODE 4 than in MODES 1, 2, and 3. Should an accident occur in MODE 4, it would be less severe due to the lower RCS pressure and decreased decay heat generation. Therefore, it is not necessary to limit seal injection flow in MODE 4 due to the lesser requirements of safety injection flow needed for long term cooling. Requiring the unit be in MODE 4, which is outside the Applicability of the Specification, within 12 hours corresponds with similar Completion Times in the ITS. This change is designated as less restrictive because the LCO requirements are applicable in fewer operating conditions than in the CTS.



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

CTS

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.5 Seal Injection Flow

(resistance) TSTF-337

LCO 3.4.6.2.e

LCO 3.5.5 Reactor coolant pump seal injection flow shall be ≤ [40] gpm with [centrifugal charging pump discharge header] pressure ≥ [2480] psig and the [charging flow] control valve full open. ① 

INSERT 1 TSTF-337 ① ③

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

| CTS | CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|---|
| Action b | A. Seal injection flow (resistance) not within limit. | A.1 (Restore seal injection) Adjust manual seal injection throttle valves to give a flow within limit with [centrifugal charging pump discharge header] pressure ≥ [2480] psig and the [charging flow] control valve full open. (to) | 4 hours ④ TSTF-337 ① |
| Action b | B. Required Action and associated Completion Time not met. | B.1 Be in MODE 3.<br>AND<br>B.2 Be in MODE 4. | 6 hours<br><br>12 hours |

3.5.5

TSTF-337

**INSERT 1**

or ≥ [0.2117] ft/gm$^2$ or within the limit of Figure 3.5.5-1] (1)

0.227 (P) (3)



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Seal Injection Flow
3.5.5

CTS

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| 4.4.6.2.1.c SR 3.5.5.1 | - NOTE - Not required to be performed until 4 hours after the Reactor Coolant System (pressurizer) pressure stabilizes at ≥ [2215 psig and ≤ 2255 psig]. (INSERT 2) | |
| | Verify manual seal injection throttle valves are adjusted to give a flow (resistance) within limit with [centrifugal charging pump discharge header] pressure ≥ [2480] psig and the [charging flow] control valve full open. [of ≤ [40 gpm] TSTF-337] | 31 days |

INSERT 3 (1) (4) TSTF-337

NOTE - FIGURE 3.5.5-1 added by TSTF-337 Not shown (1)

3.5.5

(1) **INSERT 2**

$\geq$ 2075 psig and $\leq$ 2095 (Unit 1) and $\geq$ 2225 psig and $\leq$ 2245 psig (Unit 2)

(TSTF-337) **INSERT 3**

or $\geq$ [0.2117] ft/gpm$^2$ or within the limit of Figure 3.5.5-1.(1) (1)

(15) (0.227)

(4)

**JUSTIFICATION FOR DEVIATIONS**
**ITS 3.5.5, SEAL INJECTION FLOW**

1. The brackets are removed and the proper plant specific information/value is provided.

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

3. Typographical/grammatical error corrected.

4. ISTS 3.5.5 Required Action A.1 requires the manual seal injection throttle valves to be adjusted to give a flow resistance within limit. This is essentially describing "how" to restore the LCO to within the required limit. In the ISTS, the manner in which the LCO limit is restored is normally relegated to the Bases. In this case, there may be other correct ways to restore the LCO limit without having to adjust a manual seal injection throttle valve. For example, the actual calculation that determined the seal injection flow resistance may be in error. Therefore, consistent with most other Required Actions that simply state to restore the variable to within limit, ISTS 3.5.5 Required Action A.1 has been changed to require restoration of the seal injection flow resistance to within limit. In addition, ISTS SR 3.5.5.1, the Surveillance that verifies the LCO limit is met, has also been changed to require verification that the seal injection flow resistance is within limit.



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

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.5 Seal Injection Flow

BASES

BACKGROUND

This LCO is applicable only to those units that utilize the centrifugal charging pumps for safety injection (SI). The function of the seal injection throttle valves during an accident is similar to the function of the ECCS throttle valves in that each restricts flow from the centrifugal charging pump header to the Reactor Coolant System (RCS).

The restriction on reactor coolant pump (RCP) seal injection flow limits the amount of ECCS flow that would be diverted from the injection path following an accident. This limit is based on safety analysis assumptions that are required because RCP seal injection flow is not isolated during SI.

APPLICABLE SAFETY ANALYSES

All ECCS subsystems are taken credit for in the large break loss of coolant accident (LOCA) at full power (Ref. 1). The LOCA analysis establishes the minimum flow for the ECCS pumps. The centrifugal charging pumps are also credited in the small break LOCA analysis. This analysis establishes the flow and discharge head at the design point for the centrifugal charging pumps. The steam generator tube rupture and main steam line break event analyses also credit the centrifugal charging pumps, but are not limiting in their design. Reference to these analyses is made in assessing changes to the Seal Injection System for evaluation of their effects in relation to the acceptance limits in these analyses.

This LCO ensures that seal injection flow of ≤ [40] gpm, with centrifugal charging pump discharge header pressure ≥ [2480] psig and charging flow control valve full open, will be sufficient for RCP seal integrity but limited so that the ECCS trains will be capable of delivering sufficient water to match boiloff rates soon enough to minimize uncovering of the core following a large LOCA. It also ensures that the centrifugal charging pumps will deliver sufficient water for a small LOCA and sufficient boron to maintain the core subcritical. For smaller LOCAs, the charging pumps alone deliver sufficient fluid to overcome the loss and maintain RCS inventory. Seal Injection Flow satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The intent of the LCO limit on seal injection flow is to make sure that flow through the RCP seal water injection line is low enough to ensure that sufficient centrifugal charging pump injection flow is directed to the RCS via the injection points (Ref. 2).

B 3.5.5

TSTF-337

**INSERT 1**

The RCP seal injection flow is restricted by the seal injection line flow [resistance] which is adjusted through positioning of the manual RCP seal injection throttle valves. The RCP seal injection flow [resistance] is determined by measuring the pressurizer pressure, the centrifugal charging pump discharge header pressure, and the RCP seal injection flow rate. (3) (3)

The charging flow control valve throttles the centrifugal charging pump discharge header flow as necessasry to maintain the programmed level in the pressurizer. The charging flow control valve fails open to ensure that, in the event of either loss of air or loss of control signal to the valve, when the centrifugal charging pumps are supplying charging flow, seal injection flow to the RCP seals is maintained. Positioning of the charging flow control valve may vary during normal plant operating conditions, resulting in a proportional change to RCP seal injection flow. The flow [resistance] provided by RCP seal injection throttle valves will remain fixed when the charging flow control valve is repositioned provided the throttle valve(s) position/are not adjusted. (3) (4)

BASES

LCO (continued)

The LCO is not strictly a flow limit, but rather a flow limit based on a flow line resistance. In order to establish the proper flow line resistance, a pressure and flow must be known. The flow line resistance is determined by assuming that the RCS pressure is at normal operating pressure and that the centrifugal charging pump discharge pressure is greater than or equal to the value specified in this LCO. The centrifugal charging pump discharge header pressure remains essentially constant through all the applicable MODES of this LCO. A reduction in RCS pressure would result in more flow being diverted to the RCP seal injection line than at normal operating pressure. The valve settings established at the prescribed centrifugal charging pump discharge header pressure result in a conservative valve position should RCS pressure decrease. The additional modifier of this LCO, the control valve (charging flow for four loop units and air operated seal injection for three loop units) being full open, is required since the valve is designed to fail open for the accident condition. With the discharge pressure and control valve position as specified by the LCO, a flow limit is established. It is this flow limit that is used in the accident analyses.

INSERT 2

The limit on seal injection flow, combined with the centrifugal charging pump discharge header pressure limit and an open wide condition of the charging flow control valve, must be met to render the ECCS OPERABLE. If these conditions are not met, the ECCS flow will not be as assumed in the accident analyses.

APPLICABILITY

In MODES 1, 2, and 3, the seal injection flow limit is dictated by ECCS flow requirements, which are specified for MODES 1, 2, 3, and 4. The seal injection flow limit is not applicable for MODE 4 and lower, however, because high seal injection flow is less critical as a result of the lower initial RCS pressure and decay heat removal requirements in these MODES. Therefore, RCP seal injection flow must be limited in MODES 1, 2, and 3 to ensure adequate ECCS performance.

ACTIONS

A.1

With the seal injection flow exceeding its limit, the amount of charging flow available to the RCS may be reduced. Under this Condition, action must be taken to restore the flow to below its limit. The operator has 4 hours from the time the flow is known to be above the limit to correctly position the manual valves and thus be in compliance with the accident analysis. The Completion Time minimizes the potential exposure of the plant to a LOCA with insufficient injection flow and provides a reasonable

B 3.5.5

TSTF-337

**INSERT 2**

OR

(3)

This is accomplished by limiting the seal injection line resistance to a value consistent with the assumptions in the accident analysis. The limit on RCP seal injection flow resistance must be met to assure that the ECCS is OPERABLE. If this limit is not met, the ECCS flow may not be as assumed in the accident analysis. The restriction on seal injection flow is accomplished by maintaining the seal water injection flow resistance ≥ [0.2117] ft/gpm². With the seal injection flow resistance within limit, the resulting total seal injection flow will be within the assumptions made for seal flow during accident conditions. 0.227 (3)

In order to establish the proper flow line resistance, the centrifugal charging pump discharge header pressure, the RCP seal injection flow rate, and the pressurizer pressure are measured. The line resistance is then determined from those inputs. A reduction in RCR pressure with no concurrent decrease in centrifugal charging pump discharge header pressure would increase the differential pressure across the manual throttle valves, and result in more flow being discharged through the RCP seal injection line. The flow resistance limit assures that when RCS pressure drops during a LOCA and seal injection flow increases in response to the higher differential pressure, the resulting flow will be consistent with the accident analysis. s d (4) (4)

OR

The LCO is not strictly a flow limit, but rather a flow limit based on a flow line resistance. In order to establish the proper flow line resistance, a pressure and flow must be known. The flow line resistance is established by adjusting the RCP seal injection flow in the acceptable region of Figure 3.5.5-1 at a given pressure differential between the charging header and the RCS. The centrifugal charging pump discharge header pressure remains essentially constant through all the applicable MODES of this LCO. A reduction in RCS pressure would result in more flow being diverted to the RCP seal injection line than at normal operating pressure. The valve settings established at the prescribed centrifugal charging pump discharge header pressure result in a conservative valve position should RCS pressure decrease. The flow limits established by Figure 3.5.5-1 ensures that the minimum ECCS flow assumed in the safety analyses is maintained. (3)

BASES

ACTIONS (continued)

resistance TSTF-337 3

time to restore seal injection flow within limits. This time is conservative with respect to the Completion Times of other ECCS LCOs; it is based on operating experience and is sufficient for taking corrective actions by operations personnel.

B.1 and B.2

When the Required Actions cannot be completed within the required Completion Time, a controlled shutdown must be initiated. The Completion Time of 6 hours for reaching MODE 3 from MODE 1 is a reasonable time for a controlled shutdown, based on operating experience and normal cooldown rates, and does not challenge plant safety systems or operators. Continuing the plant shutdown begun in Required Action B.1, an additional 6 hours is a reasonable time, based on operating experience and normal cooldown rates, to reach MODE 4, where this LCO is no longer applicable.

SURVEILLANCE REQUIREMENTS

SR 3.5.5.1

INSERT 3 TSTF-337 3 4

Verification every 31 days that the manual seal injection throttle valves are adjusted to give a flow within the limit ensures that proper manual seal injection throttle valve position, and hence, proper seal injection flow, is maintained. The Frequency of 31 days is based on engineering judgment and is consistent with other ECCS valve Surveillance Frequencies. The Frequency has proven to be acceptable through operating experience. INSERT 4 P 2 1

As noted, the Surveillance is not required to be performed until 4 hours after the RCS pressure has stabilized within a ± 20 psig range of normal operating pressure. The RCS pressure requirement is specified since this configuration will produce the required pressure conditions necessary to assure that the manual valves are set correctly. The exception is limited to 4 hours to ensure that the Surveillance is timely. 10 5 pressurizer 5 INSERT 5 2

REFERENCES

1. U FSAR, Chapter [6] and Chapter [15]. Section 14.3.1 2

2. 10 CFR 50.46. 2

INSERT 6 2

B 3.5.5

TSTF-337

**INSERT 3**

seal injection

Verification every 31 days that the manual seal injection throttle valves are adjusted to give a flow [resistance] within the limit ensures that the ECCS injection flows stay within the safety analysis. A differential pressure is established between the charging header and the RCS, and the total seal injection flow is verified to within the limit determined in accordance with the ECCS safety analysis. [The flow [resistance] shall be verified by confirming seal injection flow ≤ [40] gpm with the RCS at normal operating pressure, the charging flow control valve full open, and the charging header pressure > [2480]. OR The flow [resistance] shall be verified by confirming seal injection flow and differential pressure within the acceptable region of Figure 3.5.5-1. OR The flow resistance shall be ≥ [0.2117] ft/gpm$^2$.] Control valves in the flow path between the charging header and the RCS pressure sensing points must be in their post accident position (e.g., charging flow control valve open) during this surveillance to correlate with the acceptance criteria.

is — be — 0.227 — (5) (3) (4) (3) (3) (6)

2

**INSERT 4**

The seal injection flow resistance, $R_{SL}$, is determined from the following expression:

$R_{SL} = 2.31(P_{CHP}-P_{SI})/Q^2$

where:

$P_{CHP}$ = charging pump header pressure (psig);
$P_{SI}$ = 2138 psig (low pressure operation) or 2290 psig (high pressure operation); and
Q = total seal injection flow (gpm).

(Unit 1 only)

2

**INSERT 5**

The pressurizer pressure indications are averaged to determine whether the appropriate pressure has been achieved.

2

**INSERT 6**

2. UFSAR, Section 14.3.2.

3. UFSAR, Section 14.2.4.

4. UFSAR, Section 14.2.5.

## JUSTIFICATION FOR DEVIATIONS
## ITS 3.5.5 BASES, SEAL INJECTION FLOW

1. Editorial change made for enhanced clarity or to be consistent with the ISTS Writers Guide.

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

3. The brackets have been removed and the proper plant specific information/value has been provided.

4. Typographical/grammatical error corrected.

5. Changes have been made to be consistent with changes made to the ISTS.

6. The detail in the ISTS SR 3.5.5.1 Bases, added in accordance with approved TSTF-337, specifying that the control valves in the flow path between the charging header and the RCS pressure sensing points must be in their post accident position during this Surveillance to correlate with the acceptance criteria has been deleted. Seal line resistance ($R_{SL}$) is calculated based on the equation in the CTS and is included in the ITS SR 3.5.5.1 Bases. The only measured variables in this equation are charging pump header pressure ($P_{CHP}$) and total seal injection flow (Q). $P_{CHP}$ is measured downstream of the charging system flow control valves. Therefore, the indicated pressure drop and system resistance calculated will not reflect the pressure drop across the charging system flow control valves. Changes in $P_{CHP}$ that are as a result of changes in charging system control valve position will result in a corresponding change in Q. Therefore, the calculated $R_{SL}$ will not change outside of the accuracy of the measurement instrumentation. None of the components within the $R_{SL}$ calculation boundary are adjustable from the control room.

# Specific No Significant Hazards Considerations (NSHCs)

**DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS**
**ITS 3.5.5, SEAL INJECTION FLOW**

There are no specific NSHC discussions for this Specification.

# ATTACHMENT 6

## Improved Standard Technical Specifications (ISTS) not adopted in the CNP ITS

# ISTS 3.5.6, BORON INJECTION TANK

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

(1)



3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.6 Boron Injection Tank (BIT)

LCO 3.5.6 The BIT shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. BIT inoperable. | A.1 Restore BIT to OPERABLE status. | 1 hour |
| B. Required Action and associated Completion Time of Condition A not met. | B.1 Be in MODE 3.<br><br>AND<br><br>B.2 Borate to an SDM equivalent to [1]% Δk/k at 200°F.<br><br>AND<br><br>B.3 Restore BIT to OPERABLE status. | 6 hours<br><br><br><br>6 hours<br><br><br><br>7 days |
| C. Required Action and associated Completion Time of Condition B not met. | C.1 Be in MODE 4. | 12 hours |

TSTS-420 not shown

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.5.6.1 | Verify BIT borated water temperature is ≥ [145]°F. | 24 hours |

1

BIT
3.5.6

SURVEILLANCE REQUIREMENTS (continued)

| | SURVEILLANCE | FREQUENCY |
|---|---|---|
| SR 3.5.6.2 | [ Verify BIT borated water volume is ≥ [1100] gallons. | 7 days ] |
| SR 3.5.6.3 | Verify BIT boron concentration is ≥ [20,000] ppm and ≤ [22,500] ppm. | 7 days |



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**JUSTIFICATION FOR DEVIATIONS**
**ISTS 3.5.6, BORON INJECTION TANK**

1. This Boron Injection Tank Specification is not included in the CNP Units 1 and 2 ITS. The requirements for the Boron Injection Tank have been deleted from the CTS in License Amendments 158 (Unit 1) and 142 (Unit 2) dated November 20, 1991.



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

①



B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.6 Boron Injection Tank (BIT)

BASES

BACKGROUND

The BIT is part of the Boron Injection System, which is the primary means of quickly introducing negative reactivity into the Reactor Coolant System (RCS) on a safety injection (SI) signal.

The main flow path through the Boron Injection System is from the discharge of the centrifugal charging pumps through lines equipped with a flow element and two valves in parallel that open on an SI signal. The valves can be operated from the main control board. The valves and flow elements have main control board indications. Downstream of these valves, the flow enters the BIT (Ref. 1).

The BIT is a stainless steel tank containing concentrated boric acid. Two trains of strip heaters are mounted on the tank to keep the temperature of the boric acid solution above the precipitation point. The strip heaters are controlled by temperature elements located near the bottom of the BIT. The temperature elements also activate High and Low alarms on the main control board. In addition to the strip heaters on the BIT, there is a recirculation system with a heat tracing system, including the piping section between the motor operated isolation valves, which further ensures that the boric acid stays in solution. The BIT is also equipped with a High Pressure alarm on the main control board. The entire contents of the BIT are injected when required; thus, the contained and deliverable volumes are the same.

During normal operation, one of the two BIT recirculation pumps takes suction from the boron injection surge tank (BIST) and discharges to the BIT. The solution then returns to the BIST. Normally, one pump is running and one is shut off. On receipt of an SI signal, the running pump shuts off and the air operated valves close. Flow to the BIT is then supplied from the centrifugal charging pumps. The solution of the BIT is injected into the RCS through the RCS cold legs.

APPLICABLE SAFETY ANALYSES

During a main steam line break (MSLB) or loss of coolant accident (LOCA), the BIT provides an immediate source of concentrated boric acid that quickly introduces negative reactivity into the RCS.

The contents of the BIT are not credited for core cooling or immediate boration in the LOCA analysis, but for post LOCA recovery. The BIT maximum boron concentration of [22,500] ppm is used to determine the

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BASES

APPLICABLE SAFETY ANALYSES (continued)

minimum time for hot leg recirculation switchover. The minimum boron concentration of [20,000] ppm is used to determine the minimum mixed mean sump boron concentration for post LOCA shutdown requirements.

For the MSLB analysis, the BIT is the primary mechanism for injecting boron into the core to counteract any positive increases in reactivity caused by an RCS cooldown. The analysis uses the minimum boron concentration of the BIT, which also affects both the departure from nucleate boiling and containment design analyses. Reference to the LOCA and MSLB analyses is used to assess changes to the BIT to evaluate their effect on the acceptance limits contained in these analyses.

The minimum temperature limit of [145]°F for the BIT ensures that the solution does not reach the boric acid precipitation point. The temperature of the solution is monitored and alarmed on the main control board.

The BIT boron concentration limits are established to ensure that the core remains subcritical during post LOCA recovery. The BIT will counteract any positive increases in reactivity caused by an RCS cooldown.

The BIT minimum water volume limit of [1100] gallons is used to ensure that the appropriate quantity of highly borated water with sufficient negative reactivity is injected into the RCS to shut down the core following an MSLB, to determine the hot leg recirculation switchover time, and to safeguard against boron precipitation.

The BIT satisfies Criteria 2 and 3 of 10 CFR 50.36(c)(2)(ii).

LCO

This LCO establishes the minimum requirements for contained volume, boron concentration, and temperature of the BIT inventory (Ref. 2). This ensures that an adequate supply of borated water is available in the event of a LOCA or MSLB to maintain the reactor subcritical following these accidents.

To be considered OPERABLE, the limits established in the SR for water volume, boron concentration, and temperature must be met.

If the equipment used to verify BIT parameters (temperature, volume, and boron concentration) is determined to be inoperable, then the BIT is also inoperable.

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BASES

APPLICABILITY

In MODES 1, 2, and 3, the BIT OPERABILITY requirements are consistent with those of LCO 3.5.2, "ECCS - Operating."

In MODES 4, 5, and 6, the respective accidents are less severe, so the BIT is not required in these lower MODES.

ACTIONS

A.1

If the required volume is not present in the BIT, both the hot leg recirculation switchover time analysis and the boron precipitation analysis would not be met. Under these conditions, prompt action must be taken to restore the volume to above its required limit to declare the tank OPERABLE, or the plant must be placed in a MODE in which the BIT is not required.

The BIT boron concentration is considered in the hot leg recirculation switchover time analysis, the boron precipitation analysis, and the reactivity analysis for an MSLB. If the concentration were not within the required limits, these analyses could not be relied on. Under these conditions, prompt action must be taken to restore the concentration to within its required limits, or the plant must be placed in a MODE in which the BIT is not required.

The BIT temperature limit is established to ensure that the solution does not reach the boric acid crystallization point. If the temperature of the solution drops below the minimum, prompt action must be taken to raise the temperature and declare the tank OPERABLE, or the plant must be placed in a MODE in which the BIT is not required.

The 1 hour Completion Time to restore the BIT to OPERABLE status is consistent with other Completion Times established for loss of a safety function and ensures that the plant will not operate for long periods outside of the safety analyses.

B.1, B.2, and B.3

When Required Action A.1 cannot be completed within the required Completion Time, a controlled shutdown should be initiated. Six hours is a reasonable time, based on operating experience, to reach MODE 3 from full power conditions and to be borated to the required SDM without challenging plant systems or operators. Borating to the required SDM assures that the plant is in a safe condition, without need for any additional boration.

(1)



BASES

ACTIONS (continued)

After determining that the BIT is inoperable and the Required Actions of B.1 and B.2 have been completed, the tank must be returned to OPERABLE status within 7 days. These actions ensure that the plant will not be operated with an inoperable BIT for a lengthy period of time. It should be noted, however, that changes to applicable MODES cannot be made until the BIT is restored to OPERABLE status pursuant to the provisions of LCO 3.0.4.

C.1

Even though the RCS has been borated to a safe and stable condition as a result of Required Action B.2, either the BIT must be restored to OPERABLE status (Required Action C.1) or the plant must be placed in a condition in which the BIT is not required (MODE 4). The 12 hour Completion Time to reach MODE 4 is reasonable, based on operating experience and normal cooldown rates, and does not challenge plant safety systems or operators.

SURVEILLANCE REQUIREMENTS

SR 3.5.6.1

Verification every 24 hours that the BIT water temperature is at or above the specified minimum temperature is frequent enough to identify a temperature change that would approach the acceptable limit. The solution temperature is also monitored by an alarm that provides further assurance of protection against low temperature. This Frequency has been shown to be acceptable through operating experience.

SR 3.5.6.2

Verification every 7 days that the BIT contained volume is above the required limit is frequent enough to assure that this volume will be available for quick injection into the RCS. If the volume is too low, the BIT would not provide enough borated water to ensure subcriticality during recirculation or to shut down the core following an MSLB. Since the BIT volume is normally stable, a 7 day Frequency is appropriate and has been shown to be acceptable through operating experience.

SR 3.5.6.3

Verification every 7 days that the boron concentration of the BIT is within the required band ensures that the reactor remains subcritical following a LOCA; it limits return to power following an MSLB, and maintains the resulting sump pH in an acceptable range so that boron precipitation will

(1)



BASES

SURVEILLANCE REQUIREMENTS (continued)

not occur in the core. In addition, the effect of chloride and caustic stress corrosion on mechanical systems and components will be minimized.

The BIT is in a recirculation loop that provides continuous circulation of the boric acid solution through the BIT and the boric acid tank (BAT). There are a number of points along the recirculation loop where local samples can be taken. The actual location used to take a sample of the solution is specified in the plant Surveillance procedures. Sampling from the BAT to verify the concentration of the BIT is not recommended, since this sample may not be homogenous and the boron concentration of the two tanks may differ.

The sample should be taken from the BIT or from a point in the flow path of the BIT recirculation loop.

REFERENCES

1. FSAR, Chapter [6] and Chapter [15].
2. 10 CFR 50.46.

**JUSTIFICATION FOR DEVIATIONS**
**ISTS 3.5.6 BASES, BORON INJECTION TANK**

1. Changes are made to be consistent with changes made to the ISTS.