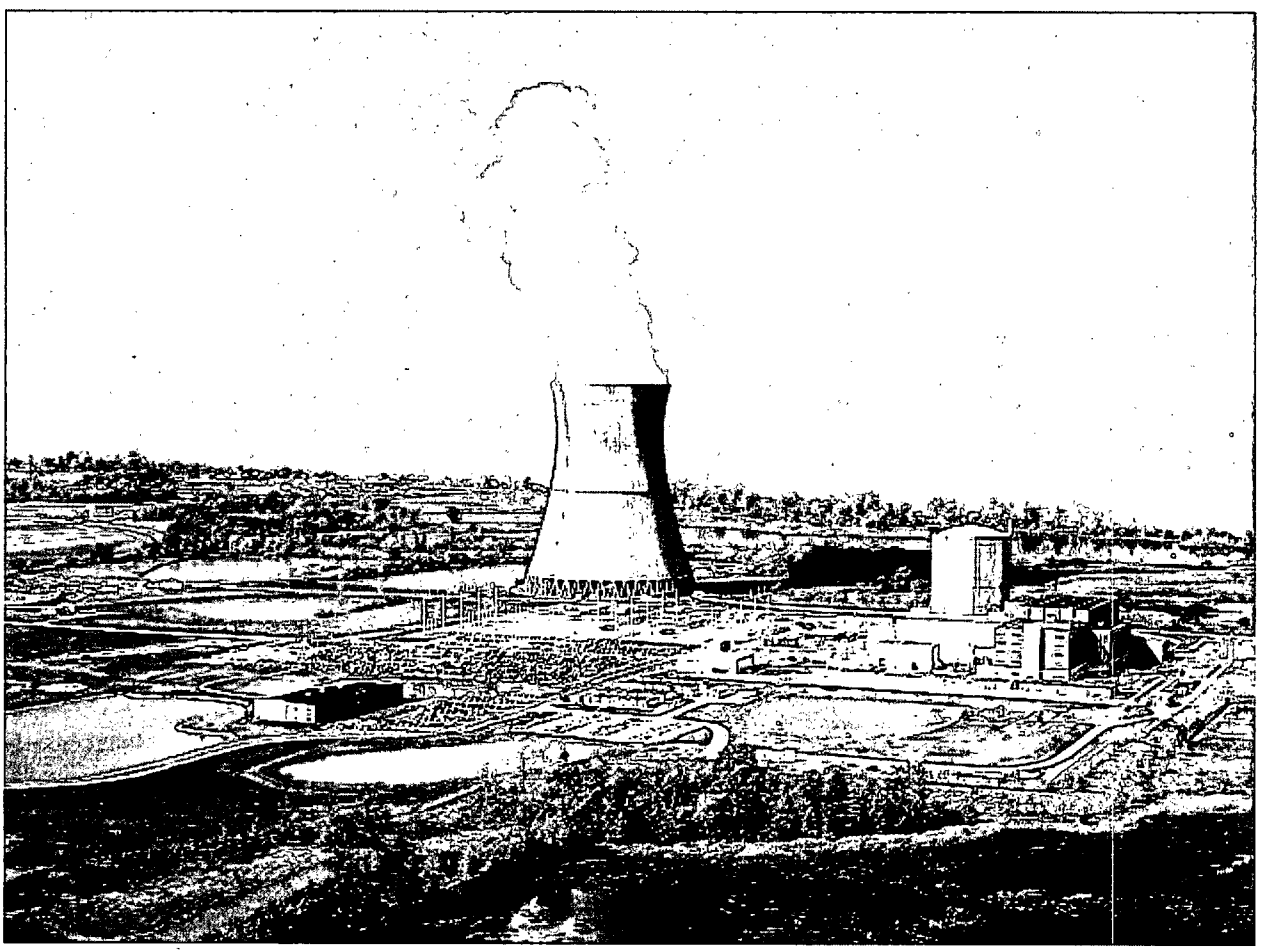
DAVIS-BESSE NUCLEAR POWER STATION
UNIT 1

IMPROVED TECHNICAL SPECIFICATION CONVERSION
LICENSE AMENDMENT REQUEST



VOLUME 10 (Rev. 1)

SECTION 3.5 – EMERGENCY CORE COOLING SYSTEMS (ECCS)

Summary of Changes
ITS Section 3.5

Change Description	Affected Pages
The changes described in the Davis-Besse response to Question 200710032123 have been made. The contained borated water volume and the nitrogen cover pressure have been changed to reflect the site specific calculations, including instrument uncertainty.	Pages 5, 7, 8, 9, 12, 18, 25, and 26.
The changes described in the Davis-Besse response to Question 200802140950 have been made. The relationship between core flooding tanks volume and gallons at the analytical limits has been added.	Page 18
The changes described in the Davis-Besse response to Question 200801311241 and continued in 200806230912 have been made.	Pages 30, 35, 38, 42, and 54
The changes described in the Davis-Besse response to Question 200801021633 have been made. The allowance to de-energize certain valves has been moved to the ITS 3.5.2 and 3.5.3 LCO Note versus the SR. Also the word available (in ITS 3.5.4) has been moved to the Bases.	Pages 30, 33, 34, 36, 41, 44, 45, 51, 57, 63, 64, 65, 68, 70, 74, 82, 83, 84, 91, 92, 94, and 96
The changes described in the Davis-Besse response to Question 200801151549 have been made. An editorial correction was made to Discussion of Change (DOC) M01.	Page 34
The changes described in the Davis-Besse response to Question 200801151626 have been made. Additional clarification was added to DOC LA01.	Page 35
The changes described in the Davis-Besse response to Question 200802151005 have been made. An editorial change has been made to the LCO Bases section.	Pages 72 and 73
The changes described in the Davis-Besse response to Question 200802111514 have been made. Information pertaining to CTS 4.5.4.b has been added to the DOC.	Page 83
The changes described in the Davis-Besse response to Question 200802121126 have been made. A minor change has been made to the SR 3.5.4.1 Bases to be consistent with the ASA Section of the Bases.	Page 94

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ATTACHMENT 1

VOLUME 10

DAVIS-BESSE IMPROVED TECHNICAL SPECIFICATIONS CONVERSION

ITS SECTION 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

Revision 1

LIST OF ATTACHMENTS

1. ITS 3.5.1
2. ITS 3.5.2
3. ITS 3.5.3
4. ITS 3.5.4

ATTACHMENT 1

ITS 3.5.1, CORE FLOODING TANKS (CFTs)

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

A01

ITS

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

CORE FLOODING TANKS

LIMITING CONDITION FOR OPERATION

LCO 3.5.1 — 3.5.1 Each (Two) reactor coolant system core flooding tank (CFT) shall be OPERABLE with: — A02

SR 3.5.1.1 — a. The isolation valve open,

SR 3.5.1.2 — b. A contained borated water volume between 7555 and 8004 gallons (≥ 12.6 feet and ≤ 13.3 feet) of borated water, — M01

SR 3.5.1.4 — c. ≥ 2600 and ≤ 3500 ppm of boron, and

SR 3.5.1.3 — d. A nitrogen cover-pressure of between 575 and 625 (≥ 580 and ≤ 620) psig. — M01

APPLICABILITY: MODES 1, 2 and 3*.

ACTION:

ACTION A — a. With one CFT inoperable because of boron concentration not within limits, restore the inoperable CFT to OPERABLE status within 72 hours or be in HOT STANDBY within the next 6 hours and reduce the

ACTION C — RCS pressure to less than 800 psig within the following 12 hours.

ACTION B — b. With any CFT inoperable for reasons other than boron concentration not within limits, restore the CFT to OPERABLE status within one hour or be in HOT STANDBY within the next 6

ACTION C — hours and reduce the RCS pressure to less than 800 psig within the following 12 hours.

Add proposed ACTION D — A03

SURVEILLANCE REQUIREMENTS

4.5.1 Each core flooding tank 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 tank isolation valve is open.

Applicability — *With Reactor Coolant pressure > 800 psig.

A01

ITS

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

SR 3.5.1.4 b. At least once per 31 days, and within 6 hours of each solution volume increase of ≥ 80 gallons that is not the result of addition from the borated water storage tank (BWST), by verifying the boron concentration of the CFT solution.

SR 3.5.1.5 c. At least once per 31 days by verifying that power to the isolation valve operator is disconnected by locking the breakers in the open position. LA01

d. At least once per REFUELING INTERVAL by verifying that each core flooding tank isolation valve opens automatically and is interlocked against closing whenever the Reactor Coolant System pressure exceeds 800 psig. L02

DISCUSSION OF CHANGES
ITS 3.5.1, CORE FLOODING TANKS (CFTs)

ADMINISTRATIVE CHANGES

A01 In the conversion of the Davis-Besse 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-1430, Rev. 3.1, "Standard Technical Specifications-Babcock and Wilcox Plants" (ISTS).

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

A02 CTS 3.5.1 requires "each" reactor coolant system core flooding tank (CFT) to be OPERABLE. ITS LCO 3.5.1 requires "two" CFTs to be OPERABLE. This changes the CTS by specifying the exact number of ECCS CFTs required to be OPERABLE.

This change is acceptable because the total number of ECCS CFTs installed in the Davis-Besse design is two. This change is designated as administrative because it does not result in any technical changes to the CTS.

A03 CTS 3.5.1 does not contain a specific ACTION for two CFTs inoperable. With two CFTs inoperable, CTS 3.0.3 would be entered. ITS 3.5.1 ACTION D directs entry into LCO 3.0.3 when two CFTs 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 CFTs are inoperable are unchanged. Adding this ACTION is consistent with the ITS convention of directing entry into ITS 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.

MORE RESTRICTIVE CHANGES

M01 CTS LCO 3.5.1.b requires each core flooding tank (CFT) contained water volume to be between 7555 gallons and 8004 gallons of borated water. CTS LCO 3.5.1.d requires each CFT nitrogen cover pressure to be between 575 psig and 625 psig. In the ITS, the CFT borated water volume is specified in ITS SR 3.5.1.2 and the CFT nitrogen cover pressure is specified in the ITS SR 3.5.1.3. ITS SR 3.5.1.2 requires the borated water volume in CFT to be $\geq$ 12.6 feet and $\leq$ 13.3 feet and ITS SR 3.5.1.3 requires the nitrogen cover pressure in each CFT to be $\geq$ 580 psig and $\leq$ 620 psig. This changes the CTS by specifying a narrower range for the CFT borated water volume and nitrogen cover pressure.

The OPERABILITY of each Reactor Coolant System (RCS) CFT ensures that sufficient volume of borated water will be immediately forced into the reactor vessel in the event the RCS pressure falls below the pressure of the tanks. This initial surge of water into the vessel provides the initial cooling mechanism during large RCS pipe ruptures. The CTS LCO limits on volume, boron concentration,

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DISCUSSION OF CHANGES
ITS 3.5.1, CORE FLOODING TANKS (CFTs)

and nitrogen cover pressure ensures that the assumptions used for CFT injection in the safety analysis are met.

CTS LCO 3.5.1.b presently requires each RCS CFT to be OPERABLE with a combined water volume between 7555 and 8004 gallons of borated water. For ITS SR 3.5.1.2, this requirement is modified to require ≥ 12.6 feet and ≤ 13.3 feet of borated water. CTS LCO 3.5.1.d presently requires each RCS CFT to be OPERABLE with a nitrogen cover pressure of between 575 and 625 psig. For ITS SR 3.5.1.3, this requirement is modified to require a nitrogen cover pressure of ≥ 580 psig and ≤ 620 psig.

The CFT borated water volume and nitrogen cover gas requirements specified in the CTS have not changed since the original issuance of the Technical Specification and are believed to be based on values that account for some instrument uncertainty. However, based on the most recent calculations, additional uncertainty is warranted. The new specified values allow for instrument inaccuracies in maintaining the analytical limits. In the case of CFT volume, the new value is also specified in feet (which is the readout of the available indication). The values specified for volume and pressure are based on the most accurate available indications (i.e., computer points).

In summary, the proposed changes will result in ITS values that are more restrictive than the CTS values for CFT borated water volume and nitrogen cover pressure. These values allow for instrument inaccuracies in maintaining the analytical limits. The ITS values specified for volume and pressure will provide confidence that the analytical limits will not be violated. Therefore, there will be no adverse effect on nuclear safety. This change is designated as more restrictive since a narrower range for the CFT borated water volume and nitrogen cover pressure limits is specified in the ITS than is allowed in the CTS.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 4.5.1.c specifies that each CFT shall be demonstrated OPERABLE by verifying that the power to the isolation valve operator is disconnected "by locking the breaker in the open position" once per 31 days. ITS SR 3.5.1.5 requires the same verification, but does not specify the manner in which to remove power. This changes the CTS by moving the procedural detail of power removal to the Bases.

The removal of this detail for performing a Surveillance Requirement for CFT isolation valve power removal from the Technical Specifications is acceptable because this type of information is not necessary to be in the Technical Specifications in order to provide adequate protection of the public health and safety. The ITS retains the requirement for verification that power is removed

DISCUSSION OF CHANGES
ITS 3.5.1, CORE FLOODING TANKS (CFTs)

from each CFT isolation valve operator (ITS SR 3.5.1.5). Also, this change is acceptable because this type of procedural detail will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Bases Control Program which is specified in Chapter 5 of the Technical Specifications. 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 a procedural detail for meeting Technical Specification requirements is being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 Not used.

L02 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.5.1.d requires verification that each CFT isolation valve opens automatically and is interlocked against closing whenever the Reactor Coolant System pressure exceeds 800 psig at least once per REFUELING INTERVAL. ITS 3.5.1 does not retain this requirement. This changes the CTS by deleting the Surveillance Requirement.

The purpose of CTS 4.5.1.d is to verify that each CFT isolation valve opens automatically and is interlocked open when the RCS pressure is > 800 psig. 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 function. ITS SR 3.5.1.1 requires verification every 12 hours that each CFT isolation valve is open and ITS SR 3.5.1.5 requires verification every 31 days that the power is removed from each CFT isolation valve. Removing power from the isolation valves, as required by ITS SR 3.5.1.5, effectively defeats the automatic feature being tested by CTS 4.5.1.d. Furthermore, since the LCO Applicability includes MODES 1 and 2 and MODE 3 with RCS pressure > 800 psig, meeting ITS SR 3.5.1.1 and SR 3.5.1.5 prior to entering the Applicability (as required by ITS SR 3.0.4) and during operation in the Applicability (as required by ITS SR 3.0.1) will always ensure that the CFT isolation valves are locked open with power removed anytime the RCS pressure is > 800 psig. This will preclude the need for the automatic feature. In addition, the ability of the isolation valves to open automatically is not credited in the safety analysis - the analysis assumes the valves are open at the time the accident occurs. This change is designated as less restrictive because a Surveillance which is required in the CTS is not required in the ITS.

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

CTS

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Core Flood Tanks (CFTs)

Flooding (3)

LCO 3.5.1 **LCO 3.5.1** Two CFTs shall be OPERABLE.

APPLICABILITY: MODES 1 and 2;
MODE 3 with Reactor Coolant System (RCS) pressure > [750] psig. (800) (1)

ACTIONS

	CONDITION	REQUIRED ACTION		COMPLETION TIME
Action a	A. One CFT inoperable due to boron concentration not within limits.	A.1	Restore boron concentration to within limits.	72 hours
Action b	B. One CFT inoperable for reasons other than Condition A.	B.1	Restore CFT to OPERABLE status.	1 hour
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 ≤ [750] psig. (800)	[72] hours (18) (1)
DOC A03	D. Two CFTs inoperable.	D.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

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

CTS

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
LCO 3.5.1.b, 4.5.1.a.1	SR 3.5.1.2	Verify borated water volume in each CFT is ≥ [7555 gallons, [ ] ft (12.6) and ≤ 8005 gallons, [ ] ft (13.3)].	12 hours	1
LCO 3.5.1.d, 4.5.1.a.1	SR 3.5.1.3	Verify nitrogen cover pressure in each CFT is ≥ [575] psig (580) and ≤ [625] psig (620).	12 hours	1
LCO 3.5.1.c, 4.5.1.b	SR 3.5.1.4	Verify boron concentration in each CFT is ≥ [2270] ppm (2600) and ≤ [3500] ppm.	31 days AND --------NOTE-------- Only required to be performed for affected CFT Once within 6 hours after each solution volume increase of ≥ [80 gallons] that is not the result of addition from the borated water storage tank	1 1
4.5.1.c	SR 3.5.1.5	Verify power is removed from each CFT isolation valve operator when RCS pressure is ≥ [2000] psig.	31 days	2

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.1, CORE FLOODING TANKS (CFTs)

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

2. The Davis-Besse current licensing basis requires the power to be removed from each CFT isolation valve operator whenever the CFTs are required OPERABLE (CTS 4.5.1.c). Therefore the allowance to only remove it at a RCS pressure above the Applicability pressure of 800 psig is not needed and has been deleted.

3. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature.

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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 3.5.1 Core Flood Tanks (CFTs)

Flooding

4

BASES

BACKGROUND

The function of the ECCS CFTs is 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. Two CFTs are provided for these functions.

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.

1

large break

In the refill phase of a LOCA, which follows immediately, reactor coolant inventory has vacated the core through steam flashing and ejection through the break. The core is essentially in adiabatic heatup. The balance of 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 water.

The CFTs are pressure vessels partially filled with borated water and pressurized with nitrogen gas. The CFTs are passive components, since no operator or control actions are required for them to perform their function. Internal tank pressure is sufficient to discharge the contents of the CFTs to the RCS if RCS pressure decreases below the CFT pressure. Each CFT is piped separately into the reactor vessel downcomer. The CFT injection lines are also utilized by the Low Pressure Injection (LPI) System. Each CFT is isolated from the RCS by a motor operated isolation valve and two check valves in series.

1

can be

The motor operated isolation valves are normally open, with power removed from the valve motor to prevent inadvertent closure prior to or during an accident.

BASES

BACKGROUND (continued)

The CFTs thus form a passive system for injection directly into the reactor vessel. Except for the core flood line break LOCA, a unique accident that also disables a portion of the injection system, both tanks are assumed to operate in the safety analyses for Design Basis Events. Because injection is directly into the reactor vessel downcomer, and because it is a passive system not subject to the single active failure criterion, all fluid injection is credited for core cooling.

The CFT gas/water volumes, gas pressure, and outlet pipe size are selected to provide core cooling for a large break LOCA prior to the injection of coolant by the LPI System.

APPLICABLE SAFETY ANALYSES

The CFTs are taken credit for in both the large and small break LOCA analyses at full power (Ref. 1). These Design Basis Accident (DBA) analyses establish the acceptance limits for the CFTs. Reference to the analyses for these DBAs is used to assess changes in the CFTs as they relate to the acceptance limits. In performing the LOCA calculations, conservative assumptions are made concerning the availability of emergency injection flow. The assumption of the loss of offsite power is required by regulations. In the early stages of a LOCA with the loss of offsite power, the CFTs provide the sole source of makeup water to the RCS.

This is because the LPI pumps and high pressure injection (HPI) pumps cannot deliver flow until the emergency diesel generators (EDGs) start, come to rated speed, and go through their timed loading sequence.

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

During this event, the CFTs discharge to the RCS as soon as RCS pressure decreases below CFT pressure. As a conservative estimate, no credit is taken for HPI for large break LOCAs. LPI is not assumed to occur until 35 seconds after the RCS pressure decreases to the ESFAS actuation pressure. No operator action is assumed during the blowdown stage of a large break LOCA. (1)

In the LOCA analysis, HPI and LPI are not credited until 40 seconds after actuation of the associated Safety Features Actuation System (SFAS) signal.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The small break LOCA analysis also assumes a time delay after [ESFAS] actuation 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 by the CFTs, with pumped flow then providing continued cooling. As break size decreases, the CFTs and HPI pumps both play a part in terminating the rise in clad temperature. As break size continues to decrease, the role of the CFTs continues to decrease until the tanks are not required and the HPI pumps become responsible for terminating the temperature increase. (1)

This 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 of 2200°F[;] (2)

b. Maximum cladding oxidation of ≤ 0.17 times the total cladding thickness before oxidation[;] (2)

c. Maximum hydrogen generation from a zirconium water reaction of ≤ 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 (2)

d. Core maintained in a coolable geometry.

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

The limits for operation with a CFT that is inoperable for any reason other than the boron concentration not being within limits minimize the time that the plant is exposed to a LOCA event occurring along with failure of a CFT, which might result in unacceptable peak cladding temperatures. If a closed isolation valve cannot be opened, or the proper water volume or nitrogen cover pressure cannot be restored, the full capability of one CFT is not available and prompt action is required to place the reactor in a MODE in which this capability is not required.

In addition to LOCA analyses, the CFTs have been assumed to operate to provide borated water for reactivity control for severe overcooling events such as a large steam line break (SLB). (1)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The CFTs are part of the primary success path that functions or actuates to mitigate a DBA that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

The minimum volume requirement for the CFTs ensures that both CFTs can provide adequate inventory to reflood the core and downcomer following a LOCA. The downcomer then remains flooded until the HPI and LPI systems start to deliver flow.

The analytical limits for CFT volume are 7480 gallons (12.412 ft) and 8078 gallons (13.588 ft).

The maximum volume limit is based upon the need to maintain adequate gas volume to ensure proper injection, ensure the ability of the CFTs to fully discharge, and limit the maximum amount of boron inventory in the CFTs. Values of [7555] gallons and [8005] gallons are specified. These values allow for instrument inaccuracies. Values of other parameters are treated similarly.

≥ 12.6 ft

≤ 13.3 ft

3

1

allow for instrument inaccuracies in maintaining the analytical limits.

580

The minimum nitrogen cover pressure requirement of [525] psig ensures that the contained gas volume will generate discharge flow rates during injection that are consistent with those assumed in the safety analysis.

3

These values allow for instrument inaccuracies in maintaining the analytical limits. The values specified for volume and pressure are based in the most accurate available indications (i.e., computer points). Additional allowances for instrument inaccuracies are included in the implementing procedures when less accurate indications are used. ¶

620

The maximum nitrogen cover pressure limit of [625] psig ensures that the amount of CFT inventory that is discharged while the RCS depressurizes, and is therefore lost through the break, will not be larger than that predicted by the safety analysis. The maximum allowable boron concentration of [3500] ppm in the CFTs ensures that the sump pH will be maintained between 7.0 and 11.0 following a LOCA.

3

3

2600

The minimum boron requirement of [2270] ppm is selected to ensure that the reactor will remain subcritical during the reflood stage of a large break LOCA. During a large break LOCA, all control rod assemblies are assumed not to insert into the core, and the initial reactor shutdown is accomplished by void formation during blowdown. Sufficient boron concentration must be maintained in the CFTs to prevent a return to criticality during reflood.

3

50% of the

1

The CFT isolation valves are not single failure proof; therefore, whenever these valves are open, power shall be removed from them. This precaution ensures that both CFTs are available during an accident. With power supplied to the valves, a single active failure could result in a valve closure, which would render one CFT unavailable for injection. Both CFTs are required to function in the event of a large break LOCA.

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

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BASES

LCO

The LCO establishes the minimum conditions required to ensure that the CFTs are available to accomplish their core cooling safety function following a LOCA. Both CFTs are required to function in the event of a large break LOCA. If the entire contents of both tanks are not injected during the blowdown phase of a large break LOCA, the ECCS acceptance criteria of 10 CFR 50.46 (Ref. 2) could be violated. For a CFT to be considered OPERABLE, the isolation valve must be fully open and power removed above [2000] psig, and the limits established in the SR for contained volume, boron concentration, and nitrogen cover pressure must be met.

APPLICABILITY

In MODES 1 and 2, and in MODE 3 with RCS pressure > 750 psig, the CFT OPERABILITY requirements are based on full power operation. Although cooling requirements may decrease as power decreases, the CFTs are still required to provide core cooling as long as elevated RCS pressures and temperatures exist.

This LCO is only applicable at pressures ≥ 750 psig. Below 750 psig, the rate of RCS blowdown is such that the safety injection 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 ≤ 750 psig, and in MODES 4, 5, and 6, the CFT motor operated isolation valves are closed to isolate the CFTs from the RCS. This allows RCS cooldown and depressurization without discharging the CFTs into the RCS or requiring depressurization of the CFTs.

ACTIONS

A.1

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

BASES

ACTIONS (continued)

B.1

If one CFT is inoperable for a reason other than boron concentration, the CFT must be returned to OPERABLE status within 1 hour. In this condition it cannot be assumed that the CFT will perform its required function 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 CFT to OPERABLE status. The Completion Time minimizes the time the plant is potentially exposed to a LOCA in these conditions.

C.1 and C.2

If the CFT 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 RCS pressure reduced to ≤ 750 psig (800) (3) within 12 hours (18). 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)

D.1

If more than one CFT is inoperable, the unit is in a condition outside the accident analysis; therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.5.1.1

Verification every 12 hours that each CFT isolation valve is fully open, as indicated in the control room, ensures that the CFTs 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 accident analysis assumptions not being met. A 12 hour Frequency is considered reasonable in view of administrative controls that ensure that a mispositioned isolation valve is unlikely.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.1.2 and SR 3.5.1.3

Verification every 12 hours of each CFT's nitrogen cover pressure and the borated water volume is sufficient to ensure adequate injection during a LOCA. Due to the static design of the CFTs, a 12 hour Frequency usually allows the operator to identify changes before the limits are reached. Operating experience has shown that this Frequency is appropriate for early detection and correction of off normal trends.

SR 3.5.1.4

Surveillance once every 31 days is reasonable to verify that the CFT boron concentration is within the required limits, because the static design of the CFT limits the ways in which the concentration can be changed. The Frequency is adequate to identify changes that could occur from mechanisms such as stratification or inleakage. Sampling within 6 hours after an 80 gallon volume increase will identify whether inleakage from the RCS 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 borated water storage tank (BWST), because the water contained in the BWST is within CFT boron concentration requirements. This is consistent with the recommendations of NUREG-1366 (Ref. 3).

SR 3.5.1.5

(by locking the breaker in the open position)

Verification every 31 days that power is removed from each CFT isolation valve operator [when the RCS pressure is ≥ [2000] psig] ensures that an active failure could not result in the undetected closure of a CFT motor operated isolation valve coincident with a LOCA. If this closure were to occur and the postulated LOCA is a rupture of the redundant CFT inlet piping, CFT capability would be rendered inoperable. The rupture would render the tank with the open valve inoperable, and a closed valve on the other CFT would likewise render it inoperable. This would cause a loss of function for the CFTs. Since power is removed under administrative control, the 31 day Frequency will provide adequate assurance that the power is removed.

1

BASES

SURVEILLANCE REQUIREMENTS (continued)

This SR is modified by a Note that 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. (5)

REFERENCES

1. FSAR, Section [6.3]. (U) (1) (3)
2. 10 CFR 50.46.
3. Draft NUREG-1366, February 1990. → December 1992 (1)

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.1 BASES, CORE FLOODING TANKS (CFTs)

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, TSTF-GG-05-01, Section 5.1.3.

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

4. Changes made to be consistent with changes made to the Specification.

5. Changes made to be consistent with the Specification. There is no Note to SR 3.5.1.5 in NUREG-1430, Rev. 3.1.

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Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.5.1, CORE FLOODING TANKS (CFTs)

10 CFR 50.92 EVALUATION
FOR
MORE RESTRICTIVE CHANGE M01

Davis-Besse is converting to the Improved Technical Specifications (ITS) as outlined in NUREG-1430, Rev. 3.1, "Standard Technical Specifications Babcock and Wilcox Plants." The proposed change involves making the Current Technical Specifications (CTS) more restrictive. Below is the description of this more restrictive change and the determination of No Significant Hazards Considerations for conversion to NUREG-1430.

The OPERABILITY of each Reactor Coolant System (RCS) core flooding tank (CFT) ensures that a sufficient volume of borated water will be immediately forced into the reactor vessel in the event the RCS pressure falls below the pressure of the tanks. This initial surge of water into the vessel provides the initial cooling mechanism during large RCS pipe ruptures. The CTS LCO limits on volume, boron concentration and nitrogen cover pressure ensure that the assumptions used for CFT injection in the safety analysis are met.

CTS LCO 3.5.1.b presently requires each RCS CFT to be OPERABLE with a contained borated water volume to be between 7555 and 8004 gallons of borated water. For ITS SR 3.5.1.2, this requirement is modified to require ≥ 12.6 and ≤ 13.3 feet of borated water. CTS LCO 3.5.1.d presently requires each RCS CFT to be OPERABLE with a nitrogen cover pressure of between 575 and 625 psig. For ITS SR 3.5.1.3, this requirement is modified to require a cover-pressure of ≥ 580 and ≤ 620 psig.

The CFT borated water volume and nitrogen cover gas requirements specified in the CTS have not changed since the original issuance of the Technical Specifications, and are believed to be based on values that account for some instrument uncertainty. However, based on the most recent calculations, additional uncertainty is warranted. The new specified values allow for instrument inaccuracies in maintaining the analytical limits. In the case of CFT, the new values is also specified in feet (which is the readout of the available indication). The values specified for volume and pressure are based on the most accurate available indications (i.e., computer points).

In summary, the proposed changes will result in ITS values that are more restrictive than the CTS values for CFT borated water volume and nitrogen cover pressure. These values allow for instrument inaccuracies in maintaining the analytical limits. The ITS values specified for volume and pressure will provide confidence that the analytical limits will not be violated. Therefore, there will be no adverse effect on nuclear safety.

An evaluation has been performed to determine whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.5.1, CORE FLOODING TANKS (CFTs)

1. **Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?**

   Response: No.

   The proposed ITS SR 3.5.1.2 borated water volume requirements and ITS SR 3.5.1.3 nitrogen cover-pressure requirements specified are consistent with the existing analytical limits. Accident initial conditions, probability, and assumptions remain as previously analyzed. The proposed changes do not invalidate the assumptions used in evaluating the radiological consequences of any accident. Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. **Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?**

   Response: No.

   The proposed ITS SR 3.5.1.2 borated water volume requirements and ITS SR 3.5.1.3 nitrogen cover-pressure requirements specified are consistent with the existing analytical limits. Accident initial conditions and assumptions remain as previously analyzed, and the proposed changes do not introduce any new or different accident initiators. Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

3. **Does the proposed change involve a significant reduction in a margin of safety?**

   Response: No.

   The proposed ITS SR 3.5.1.2 borated water volume requirements and ITS SR 3.5.1.3 nitrogen cover-pressure requirements specified are consistent with the existing analytical limits. Under the proposed changes, a sufficient margin of safety will continue to be provided. Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

Based on the above, it is concluded that the proposed changes present no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, there is a finding of "no significant hazards consideration."

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ATTACHMENT 2

ITS 3.5.2, ECCS – OPERATING

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

ITS

A01

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - $T_{avg} \geq 280°F$

LIMITING CONDITION FOR OPERATION

3.5.2

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

a. One OPERABLE high pressure injection (HPI) pump, *

b. One OPERABLE low pressure injection (LPI) pump,

c. One OPERABLE decay heat cooler, and

d. An OPERABLE flow path capable of taking suction from the borated water storage tank (BWST) on a safety injection signal and manually transferring suction to the containment sump during the recirculation phase of operation.

A03

LA01

APPLICABILITY: MODES 1, 2 and 3 *

A03

ACTION:

ACTION B — **a.** With one HPI train inoperable, restore the inoperable HPI train to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

ACTION C — Add proposed Required Action C.1

M01

ACTION A — **b.** With one LPI train or its associated decay heat cooler inoperable, restore the inoperable equipment to OPERABLE status within 7 days or be in HOT SHUTDOWN within the next 12 hours.

ACTION C

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.

L01

Add proposed ACTION D

A02

SURVEILLANCE REQUIREMENTS

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

SR 3.5.2.1 **a.** 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.

* *An exception applies to the HPI pumps for the purpose of conducting Restart Test Plan inspection activities. This exception is valid during the ongoing Thirteenth Refueling Outage for entries into MODE 3 from MODE 4. Under this exception, neither HPI train is required to be capable of taking suction from the LPI trains when aligned for containment sump recirculation. The HPI trains will otherwise be OPERABLE. Operation in MODE 1 or MODE 2 while relying upon the provisions of this exception is prohibited.*

A03

A01

ITS

Revised by NRC Letter Dated June 6, 1995

SURVEILLANCE REQUIREMENTS (Continued)

SR 3.5.2.3

b. At least once each REFUELING INTERVAL, or prior to operation after ECCS piping has been drained by verifying that the ECCS piping is full of water by venting the ECCS pump casings and discharge piping high points.

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 emergency sump and cause restriction of the pump suction during LOCA conditions. This visual inspection shall be performed:

LA03

1. For all accessible areas of the containment prior to establishing CONTAINMENT INTEGRITY, and

2. For all areas of containment affected by an entry, at least once daily while work is ongoing and again during the final exit after completion of work (containment closeout) when CONTAINMENT INTEGRITY is established.

d. At least once each REFUELING INTERVAL by:

1. Verifying that the interlocks:

a) Close DH-11 and DH-12 and deenergize the pressurizer heaters, if either DH-11 or DH-12 is open and a simulated reactor coolant system pressure which is greater than the Allowable Value (<328 psig) is applied. The interlock to close DH-11 and/or DH-12 is not required if the valve is closed and 480 V AC power is disconnected from its motor operators.

LA07

See ITS 3.4.14

b) Prevent the opening of DH-11 and DH-12 when a simulated or actual reactor coolant system pressure which is greater than the Allowable Value (<328 psig) is applied.

SR 3.5.2.7

2. a) A visual inspection of the containment emergency sump which verifies 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.

LA04

SR 3.5.2.8

b) Verifying that on a Borated Water Storage Tank (BWST) Low-Low Level interlock trip, with the motor operators for the BWST outlet isolation valves and the containment emergency sump recirculation valves energized, the BWST Outlet Valve HV-DH7A (HV-DH7B) automatically close in ≤75 seconds after the operator manually pushes the control switch to open the Containment Emergency Sump Valve HV-DH9A (HV-DH9B) which should be verified to open in ≤75 seconds.

A04

LA04

LA04

LCO 3.5.2 Note

SR 3.5.2.8

3. Deleted

A01

ITS

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4. Verifying that a minimum of 290 cubic feet of trisodium phosphate dodecahydrate (TSP) is contained within the TSP storage baskets. — See ITS 3.6.7

5. Deleted

6. Deleted

e. At least once each REFUELING INTERVAL, by — that is not locked, sealed, or otherwise secured in position — L03

SR 3.5.2.4 1. Verifying that each automatic valve in the flow path actuates to its correct position on a safety injection test signal. — actuation — actual or — L04

SR 3.5.2.5 2. Verifying that each HPI and LPI pump starts automatically upon receipt of a SFAS test signal. — actual or — LA06 — L04

f. Deleted

SR 3.5.2.6 g. By verifying the correct position of each mechanical position stop for valves DH-14A and DH-14B.

1. Within 4 hours following completion of the opening of the valves to their mechanical position stop or following completion of maintenance on the valve when the LPI system is required to be OPERABLE. — L05

2. At least once each REFUELING INTERVAL.

A01

ITS

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

SR 3.5.2.2 h. By verifying each ECCS pump's developed head at the test flow point is greater than or equal to the required developed head, when tested pursuant to the requirements of Specification 4.0.5.

DISCUSSION OF CHANGES
ITS 3.5.2, ECCS – OPERATING

ADMINISTRATIVE CHANGES

A01 In the conversion of the Davis-Besse 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-1430, Rev. 3.1, "Standard Technical Specifications-Babcock and Wilcox Plants" (ISTS).

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

A02 CTS 3.5.2 Action a states that when one High Pressure Injection (HPI) train is inoperable, it must be returned to OPERABLE status within 72 hours. CTS Action b states that when one Low Pressure Injection (LPI) train or it associated decay heat removal cooler is inoperable, it must be returned to OPERABLE status within 7 days. CTS 3.5.3 does not contain specific actions if there is less than 100% of the ECCS flow equivalent to a single OPERABLE train available (i.e., two HPI subsystems or two LPI subsystems inoperable). Thus a CTS 3.0.3 entry would be required. ITS 3.5.2 ACTION D directs entry into ITS LCO 3.0.3 when there is less than 100% of the ECCS flow equivalent to a single OPERABLE train available. This changes the CTS by specifically stating to enter ITS LCO 3.0.3 in this Specification.

This change is acceptable because the actions taken when there is less than 100% of the ECCS flow equivalent to a single OPERABLE train available 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 functions. This change is designated as administrative because it does not result in any technical changes to the CTS.

A03 CTS LCO 3.5.2.a and Applicability footnote * states that an exception applies to the HPI pumps for the purpose of conducting Restart Test Plant inspection activities. This exception is valid during the ongoing Thirteenth Refueling Outage for entries into MODE 3 from MODE 4. Under this exception, neither HPI train is required to be capable of taking suction from the LPI trains when aligned for containment sump recirculation. The HPI trains will otherwise be OPERABLE. Operation in MODE 1 or MODE 2 while relying upon the provisions of this exception is prohibited. ITS 3.5.2 does not retain this footnote. This changes the CTS by deleting this footnote, which applies only to the thirteenth refueling outage.

The CTS LCO 3.5.2.a and Applicability footnote is only valid for the thirteenth refueling outage. Currently, Davis-Besse is now past the thirteenth refueling outage cycle; thus there is no need to maintain this footnote in the Technical Specifications. This change is considered administrative because it does not result in any technical changes to the CTS.

A04 CTS 4.5.2.d.2.b) requires verification that on a Borated Water Storage Tank (BWST) Low – Low Level interlock trip, with the motor operators for the BWST outlet isolation valves and the containment emergency sump recirculation valves

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DISCUSSION OF CHANGES
ITS 3.5.2, ECCS – OPERATING

energized, the BWST Outlet Valve HV-DH7A (HV-DH7B) automatically close in ≤ 75 seconds after the operator manually pushes the control switch to open the Containment Emergency Sump Valve HV-DH9A (HV-DH9B) which should be verified to open in ≤ 75 seconds. ITS SR 3.5.2.8 requires the same Surveillance, however the exception statement "with the motor operators for the BWST outlet isolation valves and the containment emergency sump recirculation valves energized" has been moved to the LCO as a Note. The LCO Note states "The borated water storage tank (BWST) outlet and containment emergency sump valves may be considered OPERABLE when the associated valve motors are de-energized, provided the valves are not otherwise inoperable." This changes the CTS by moving the location of the exception from the specific Surveillance to the LCO statement.

The purpose of the exception is to allow the valve motors to be de-energized in MODES 1, 2, 3, and 4 to meet 10 CFR 50 Appendix R requirements. This is documented in the NRC Safety Evaluation for Amendment 182, dated 12/21/1993. While the valves are de-energized for this reason only, they are still considered OPERABLE (i.e., the LCO is still being met). Thus, the change is acceptable since it is not changing the current requirement; it is only moving the exception to the LCO statement to be consistent with the format of the ISTS. This change is considered administrative because it does not result in any technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 3.5.2 Actions a and b requires that when one inoperable ECCS subsystem is not restored to OPERABLE status within the allowed Completion Times, the unit must be in HOT SHUTDOWN within the next 12 hours. In addition to maintaining the requirement for the unit to be in MODE 4 within 12 hours (ITS 3.5.2 Required Action C.2) if the inoperable ECCS train is not restored to OPERABLE status within the allowed Completion Time, ITS 3.5.2 Required Action C.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

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DISCUSSION OF CHANGES
ITS 3.5.2, ECCS – OPERATING

REMOVED DETAIL CHANGES

LA01 *(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. 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. This changes the CTS by moving the details of what constitutes an OPERABLE train to the Bases.

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

LA02 Not used.

LA03 *(Type 4 – Removal of LCO, SR, or other TS requirement to the TRM, UFSAR, ODCM, QAPM, IST Program, or IIP)* CTS 4.5.2.c requires a visual inspection for loose debris in containment for all accessible areas of containment prior to establishing containment integrity, and for all areas of containment affected by an entry, daily while work is ongoing and again during the final exit after completion of work when containment integrity is established. ITS 3.5.2 does not include this requirement. This changes the CTS by moving this requirement to the Technical Requirement Manual (TRM).

The removal of this 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 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 TRM. The TRM is currently incorporated by reference into the UFSAR, thus any changes to the TRM are made under 10 CFR 50.59, which ensures changes are properly evaluated. This change is designated as a less restrictive removal of detail change because a Surveillance Requirement is being removed from the Technical Specifications.

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DISCUSSION OF CHANGES
ITS 3.5.2, ECCS – OPERATING

LA04 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 4.5.2.d.2.b) requires verification that on a Borated Water Storage Tank (BWST) Low – Low Level interlock trip, with the motor operators for the BWST outlet isolation valves and the containment emergency sump recirculation valves energized, the BWST Outlet Valve HV-DH7A (HV-DH7B) automatically close in $\leq$ 75 seconds after the operator manually pushes the control switch to open the Containment Emergency Sump Valve HV-DH9A (HV-DH9B) which should be verified to open in $\leq$ 75 seconds. ITS SR 3.5.2.8.a only requires verification that each BWST outlet valve and containment emergency sump valve actuate to the correct position on a manual actuation signal. This changes the CTS by moving the details of how to perform the verification 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 verify that each BWST outlet valve and containment emergency sump valve actuate to the correct position on a manual actuation signal. 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 CTS.

LA05 Not used.

LA06 *(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" test signal or "SFAS" test signal, respectively. ITS SR 3.5.2.4 and SR 3.5.2.5 do not state the specific type of signal, but only specify an actual or simulated "actuation" signal. This changes CTS by moving the type of actuation signal (i.e., SFAS) to the Bases. The change to replace "test" with "simulated" and allow both "actual or simulated actuation" signals to be used for these SRs is discussed in DOC L04.

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.

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DISCUSSION OF CHANGES
ITS 3.5.2, ECCS – OPERATING

LA07 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 4.5.2.d.1.a) requires, in part, verifying the pressurizer heaters are de-energized on a Decay Heat Removal (DHR) System interlock signal. ITS 3.5.2 does not require verification that the pressurizer heaters are deenergized. This changes the CTS by moving the requirement to verify the pressurizer heaters are deenergized on a DHR System interlock signal to the Technical Requirements Manual (TRM).

If the RCS pressure exceeds the DHR System interlock setpoint (approximately 328 psig), the pressurizer heaters will de-energize unless both DHR System suction isolation valves (DH11 and DH12) are closed. This is to protect against over pressurizing the DHR System. However, the DHR System interlock signal also closes the two DHR System suction isolation valves. This feature of the DHR System interlock signal is being maintained and tested in the ITS, as shown in ITS LCO 3.4.14 and SR 3.4.14.4. Therefore, the pressurizer heater portion of the interlock, which provides a backup type signal is not necessary to be included in the ITS and is being moved to the TRM. The removal of these details from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. Also this change is acceptable because the removed information will be adequately controlled in the TRM. The TRM is currently incorporated by reference into the UFSAR, thus any changes to the TRM are made under 10 CFR 50.59, which ensures changes are properly evaluated. This change is designated as a less restrictive removal of detail change because information relating to meeting a Technical Specification requirement is being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 8 – Deletion of Reporting Requirements)* CTS 3.5.2 Action c 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 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 c 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, this 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 5.5.5, "Component Cyclic or Transient Limit," 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.

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DISCUSSION OF CHANGES
ITS 3.5.2, ECCS – OPERATING

L02 Not used.

L03 *(Category 6 – Relaxation of Surveillance Requirement Acceptance Criteria)* CTS 4.5.2.e.1 requires verification that each ECCS automatic valve in the flow path 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 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.

L04 *(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 "test" signal or SFAS "test" signal, respectively. ITS SR 3.5.2.4 and SR 3.5.2.5 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 change to remove the specific type of actuation signal (i.e., safety injection and SFAS) to be used for these SRs is discussed in DOC LA07.

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 cannot 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.

L05 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.5.2.g.1 describes a test that must be performed following repositioning of or maintenance to certain LPI System valves. The ITS does not include this testing requirement. This changes the CTS by deleting a conditional Surveillance Requirement.

DISCUSSION OF CHANGES
ITS 3.5.2, ECCS – OPERATING

The purpose of CTS 4.5.2.g.1 is to verify OPERABILITY of the LPI System following repositioning or maintenance on a valve that may 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 control 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.

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

CTS

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS - Operating

3.5.2 LCO 3.5.2 Two ECCS trains shall be OPERABLE.

4.5.2.d.2.b)

----------NOTE----------
[Operation in MODE 3 with high pressure injection (HPI) de-activated in accordance with LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," is allowed for up to [4] hours.]
---------- (5)

The borated water storage tank (BWST) outlet and containment emergency sump valves may be considered OPERABLE when the associated valve motors are de-energized, provided the valves are not otherwise inoperable (4)

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
Action b	A. One low pressure injection (LPI) subsystem inoperable.	A.1	Restore LPI subsystem to OPERABLE status.	[7] days	(1)
Action a	B. One or more trains inoperable for reasons other than Condition A.	B.1	Restore train(s) to OPERABLE status.	72 hours	
Action a, Action b	C. Required Action and associated Completion Time not met. of Condition A or B	C.1 AND C.2	Be in MODE 3. Be in MODE 4.	6 hours 12 hours	(2)
DOC A02	D. Less than 100% of the ECCS flow equivalent to a single OPERABLE train available.	D.1	Enter LCO 3.0.3.	Immediately	

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
	SR 3.5.2.1	[Verify the following valves are in the listed position with power to the valve operator removed. Valve Number / Position / Function [ ] / [ ] / [ ] [ ] / [ ] / [ ] [ ] / [ ] / [ ]	12 hours]	3
4.5.2.a	SR 3.5.2.2 [1]	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	3
4.5.2.b	SR 3.5.2.3	by venting the ECCS pump casings and discharge piping high points [ ] Verify ECCS piping is full of water.	31 days] 24 months AND Prior to declaring ECCS OPERABLE after draining ECCS piping	1
4.5.2.h	SR 3.5.2.4 [2]	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	3
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	3 1
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	3 1
	SR 3.5.2.7	[Verify the correct settings of stops for the following HPI stop check valves: a. [MUV-2], b. [MUV-6], and c. [MUV-10].	[18] months]	3

CTS

correct position of each mechanical stop for the following valves

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY	
4.5.2.g	SR 3.5.2.8 [6]	[Verify the flow controllers for the following LPI throttle valves operate properly: [DH-14A; a. [DHV-110] and b. [DHV-111]. DH-14B]	[18] months [24]	3 1
4.5.2.d.2.a)	SR 3.5.2.9 [7]	Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion.	[18] months [24]	3 1

INSERT 1 (4)

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CTS

(4) **INSERT 1**

4.5.2.d.2.b)	SR 3.5.2.8	Verify the following: a) Each BWST outlet valve and containment emergency sump valve actuate to the correct position on a manual actuation of the containment emergency sump valve; and b) The actuation time of each BWST outlet valve and containment emergency sump valve is $\leq$ 75 seconds.	24 months

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.2, ECCS – OPERATING

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

2. This change is made consistent with the Writer's Guide for Plant-Specific Improved Technical Specifications, TSTF-GG-05-01, Section 4.1.6.i.5.ii.

3. ISTS SR 3.5.2.1 and ISTS SR 3.5.2.7, which are bracketed Surveillance Requirements, have not been included in the Davis-Besse ITS. This is consistent with current licensing basis. The remaining SRs have been renumbered, as necessary, due to these deletions.

4. ITS SR 3.5.2.8, which requires a verification that each BWST outlet valve and containment emergency sump valve actuate to the correct position on a manual actuation signal and the valves actuate within the proper times, has been added consistent with current licensing basis. These valves do not receive an automatic signal from the Safety Features Actuation System (SFAS) instrumentation to place the valves in the containment recirculation mode. Thus, they are not part of the testing required by ISTS SR 3.5.2.5 (ITS SR 3.5.2.4), and a specific Surveillance is required for these valves. Furthermore, the CTS allows the valves to be de-energized while in MODES 1, 2, 3, and 4 to meet the requirements of 10 CFR 50, Appendix R. This is documented in the NRC Safety Evaluation for Amendment 182, dated 12/21/1993. While in the de-energized state, the valves are still considered OPERABLE. To be consistent with the format of the ITS, this Surveillance allowance has been placed into the LCO statement as a Note. The Note states "The borated water storage tank (BWST) outlet and containment emergency sump valves may be considered OPERABLE when the associated valve motors are de-energized, provided the valves are not otherwise inoperable." The Note allowance and its format is consistent with a Note in NUREGs-1433 and -1434 for ITS 3.5.1, ECCS - Operating (the Note was needed since a different Technical Specification required ECCS valves to be in the non-accident position and incapable of automatically being positioned).

5. The ISTS 3.5.2 LCO Note has been deleted since ITS 3.4.12 does not require the high pressure injection pumps to be de-activated.

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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 to ensure that the reactor core is protected after any of the following accidents:

a. Loss of coolant accident (LOCA)

b. Rod ejection accident (REA)

c. Steam generator tube rupture (SGTR) and

d. Steam line break (SLB).

There are two phases of ECCS operation: injection and recirculation. In the injection phase, all injection is initially added to the Reactor Coolant System (RCS) via the cold legs and to the reactor vessel. After the borated water storage tank (BWST) has been depleted, the ECCS recirculation phase is entered as the ECCS suction is transferred to the containment sump.

Two redundant, 100% capacity trains are provided. In MODES 1, 2, and 3, each train consists of high pressure injection (HPI) and low pressure injection (LPI) subsystems. In MODES 1, 2, and 3, both trains must be OPERABLE. This ensures that 100% of the core cooling requirements can be provided even in the event of a single active failure.

A suction header supplies water from the BWST or the containment sump to the ECCS pumps. Separate piping supplies each train. HPI discharges into each of the four RCS cold legs between the reactor coolant pump and the reactor vessel. LPI discharges into each of the two core flood nozzles on the reactor vessel that discharge into the vessel downcomer area. Control valves are set to balance the HPI flow to the RCS. This flow balance directs sufficient flow to the core to meet the analysis assumptions following a small break LOCA in one of the RCS cold legs near an HPI nozzle.

The HPI pumps are capable of discharging to the RCS at an RCS pressure above the opening setpoint of the pressurizer safety valves. The LPI pumps are capable of discharging to the RCS at an RCS pressure of approximately 200 psia. When the BWST has been nearly emptied, the suction for the LPI pumps is manually transferred to the

BASES

BACKGROUND (continued)

containment sump. The HPI pumps cannot take suction directly from the sump. If HPI is still needed, a cross connect from the discharge side of the LPI pump to the suction of the HPI pumps would be opened. This is known as "piggy backing" HPI to LPI and enables continued HPI to the RCS, if needed, after the BWST is emptied.

In the long term cooling period, flow paths in the LPI System are established to preclude the possibility of boric acid in the core region reaching an unacceptably high concentration. One flow path is from the hot leg through the decay heat suction line from the hot leg and then in a reverse direction through the containment sump outlet line into the sump. The other flow path is through the pressurizer auxiliary spray line from one LPI train into the pressurizer and through the hot leg into the top region of the core.

INSERT 1

HPI pump 2 in piggy-back with LPI pump 2.

2

2

The HPI subsystem also functions to supply borated water to the reactor core following increased heat removal events, such as large SLBs.

M

2

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

3

During a large break LOCA, RCS pressure will decrease to < 200 psia in < 20 seconds. The ECCS is actuated upon receipt of an Engineered Safety Feature Actuation System (ESFAS) 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 diesel generators. 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.

s

Engineered Safety Features (ESF)

ESF

essential

emergency

ESF

2

The active ECCS components, along with the passive core flood tanks (CFTs) and the BWST covered in LCO 3.5.1, "Core Flood Tanks (CFTs)," and LCO 3.5.4, "Borated Water Storage Tank (BWST)," provide the cooling water necessary to meet 10 CFR 50.46 (Ref. 1).

ing

ing

2

3

(2) **INSERT 1**

uses the discharge of LPI pump 1 through a line that bypasses the RCS to Decay Heat Removal (DHR) System suction line and allows reverse flow into the DHR System drop line.

BASES

APPLICABLE SAFETY ANALYSES

The LCO helps to ensure that the following acceptance criteria for the ECCS, established by 10 CFR 50.46 (Ref. 1), will be met following a LOCA:

a. Maximum fuel element cladding temperature is ≤ 2200°F[U];

b. Maximum cladding oxidation is ≤ 0.17 times the total cladding thickness before oxidation[U];

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[U];

d. Core is maintained in a coolable geometry[U] and

e. Adequate long term core cooling capability is maintained. (1)

The LCO also helps ensure that containment temperature limits are met.

Both HPI and LPI subsystems are assumed to be OPERABLE in the large break LOCA analysis at full power (Ref. 2). This analysis establishes a minimum required flow for the HPI and LPI pumps, as well as the minimum required response time for their actuation. The HPI pump is credited in the small break LOCA analysis. This analysis establishes the flow and discharge head requirements at the design point for the HPI pump. The SGTR and SLB analyses also credit the HPI pump but are not limiting in their design. [M] (2)

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

The LCO ensures that an ECCS train will deliver sufficient water to match decay heat ~~boiloff~~ [boil off] rates soon enough to minimize core uncovery for a large break LOCA. It also ensures that the HPI pump will deliver sufficient water for a small break LOCA and provide sufficient boron to maintain the core subcritical. (8)

BASES

APPLICABLE SAFETY ANALYSES (continued)

associated

In the LOCA analyses, HPI and LPI are not credited until 35 (40) seconds after actuation of the ESFAS signal. This is based on a loss of offsite power and the associated time delays in startup and loading of the emergency diesel generator (EDG). Further, LPI flow is not credited until RCS pressure drops below the pump's shutoff head. For a large break LOCA, HPI is not credited at all. (4) (2) (2)

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 at least one is available, assuming a single failure in the other train. Additionally, individual components within the ECCS trains may be called upon to mitigate the consequences of other transients and accidents.

the decay heat removal cooler (for the LPI subsystem only),

In MODES 1, 2, and 3, an ECCS train consists of an HPI subsystem and an LPI subsystem. Each train includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the BWST upon an ESFAS signal and manually transferring suction to the containment sump. (2) (2)

During an event requiring ECCS actuation, a flow path is provided to ensure an abundant supply of water from the BWST to the RCS via the HPI and LPI pumps and their respective discharge flow paths to each of the four cold leg injection nozzles and the reactor vessel. In the long term, this flow path may be manually transferred to take its supply from the containment sump and to supply its flow to the RCS via two paths, as described in the Background section.

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

As indicated in the Note, operation in MODE 3 with ECCS trains de-activated pursuant to LCO 3.4.12 is necessary for plants with an LTOP System arming temperature at or near the MODE 3 boundary temperature of [350]°F. LCO 3.4.12 requires that certain components be de-activated at and below the LTOP System arming temperature. When this temperature is at or near the MODE 3 boundary temperature, time is needed to restore the systems to OPERABLE status. (3)

As Noted, the BWST outlet and containment emergency sump valves may be considered OPERABLE when the associated valve motors are de-energized, provided the valves are not otherwise inoperable. This allowance is necessary since the motor operators are normally de-energized in MODES 1, 2, 3, and 4 to prevent spurious closing of the BWST outlet valves and opening of the containment emergency sump valves in the event of a control room fire (i.e., to meet the 10 CFR 50 Appendix R requirements). This allowance was originally approved by the NRC in References 6 and 7. (3)

BASES

APPLICABILITY

In MODES 1, 2, and 3, the ECCS train 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 HPI pump performance is based on the small break LOCA, which establishes the pump performance curve and is less dependent on power. The HPI pump performance requirements are based on a small break LOCA. MODES 2 and 3 requirements are bounded by the MODE 1 analysis. (10)

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 3.9.4, "Decay Heat Removal (DHR) and Coolant Circulation - High Water Level," and LCO 3.9.5, "Decay Heat Removal (DHR) and Coolant Circulation - Low Water Level."

ACTIONS

A.1

With one LPI subsystem inoperable, action must be taken to restore it to OPERABLE status within 7 days. In this condition, the remaining OPERABLE ECCS train is adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure to the remaining LPI subsystem could result in loss of ECCS function. The [7] day Completion Time is reasonable to perform corrective maintenance on the inoperable LPI subsystem. The [7] day Completion Time is based on the findings of the deterministic and probabilistic analysis in Reference 3. Reference 3 concluded that extending the Completion Time to [7] days for an inoperable LPI subsystem (im) proves plant operational flexibility while simultaneously reducing overall plant risk. This is because the risks incurred by having the LPI subsystem unavailable for a longer time at power will be substantially offset by the benefits associated with avoiding unnecessary plant transitions and by reducing risk during plant shutdown operations. (5) (8)

B.1

With one or more trains inoperable and at least 100% of the injection flow equivalent to a single OPERABLE ECCS train available, components inoperable for reasons other than Condition A must be returned to OPERABLE status within 72 hours. The 72 hour Completion Time is based on NRC recommendations (Ref. 4) that are based on a risk evaluation and is a reasonable time for many repairs. (7)

BASES

ACTIONS (continued)

An ECCS train is inoperable if it is not capable of delivering the design flow to the RCS.

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. 4) has shown the risk of having one full ECCS train inoperable to be sufficiently low to justify continued operation for 72 hours.

With one or more components inoperable such that 100% of the flow equivalent to a single OPERABLE ECCS train is not available, the facility is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be immediately entered. (6)

C.1 and C.2

If the inoperable components 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 at least 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.

D.1

(B)

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. (7)

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BASES

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 the valves cannot change position as the result of an active failure. These valves are of the type described in Reference 5, which can disable the function of both ECCS trains and invalidate the accident analyses. The 12 hour Frequency is considered reasonable in view of other administrative controls that will ensure the unlikelihood of a mispositioned valve.

3

SR 3.5.2.2

1

3

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an actuation signal is allowed to be in a nonaccident position provided the valve 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 inoperable valve position would only affect a single train. This Frequency has been shown to be acceptable through operating experience.

Move SR 3.5.2.2 from Page B 3.5.2-8 to here

SR 3.5.2.3

, by venting the ECCS pump casings and discharge piping high points,

2

With the exception of systems in operation, the ECCS pumps are normally in a standby, nonoperating mode. As such, the 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

This SR requires

to

2

ensure 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 ESFAS signal or during shutdown cooling. The 31 day Frequency takes into consideration the gradual nature of gas accumulation in the ECCS piping and the existence of procedural controls governing system operation.

24 month

2

3

2

, and the fact that some venting points are not accessible during normal operation. The second Frequency is required to ensure the ECCS subsystem is refilled after draining prior to declaring the ECCS subsystem OPERABLE.

3

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.4 (2)

Periodic surveillance testing of ECCS pumps to detect gross degradation caused by impeller structural damage or other hydraulic component problems is required by the ASME Code (Ref. 6). (5) This type of testing may be accomplished by measuring the pump's developed head at only one point of the pump's 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 accident analysis. SRs are specified in the Inservice Testing Program of the ASME Code. The ASME Code provides the activities and Frequencies necessary to satisfy the requirements. (3) (2)

Move to Page B 3.5.2-7 before SR 3.5.2.3

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

These SRs demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated ESFAS signal and that each ECCS pump starts on receipt of an actual or simulated ESFAS signal. This SR is not required for valves that are locked, sealed, or otherwise secured in position under administrative controls. The 18 (24) month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. The 18 (24) 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 the ESFAS testing, and equipment performance is monitored as part of the Inservice Testing Program. (2) (3) (3)

SR 3.5.2.7

This Surveillance ensures that these valves are in the proper position to prevent the HPI pump from exceeding its runout limit. This 18 month Frequency is based on the same reasons as those stated for SR 3.5.2.5 and SR 3.5.2.6. (3)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.8

This Surveillance ensures that the flow controllers for the LPI throttle valves will automatically control the LPI train flow rate in the desired range and prevent LPI pump runout as RCS pressure decreases after a LOCA. The 18 month Frequency is justified by the same reasons as those stated for SR 3.5.2.5 and SR 3.5.2.6.

SR 3.5.2.9

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 preserve access to the location, and on 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 has been confirmed by operating experience.

REFERENCES

1. 10 CFR 50.46.
2. FSAR, Section 6.3.
3. BAW-2295-A, Revision 1, Justification for Extension of Allowed Outage Time for Low Pressure Injection and Reactor Building Spray System.
4. NRC Memorandum to V. Stello, Jr., from R.L. Baer, "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.
5. IE Information Notice 87-01, "RHR Valve Misalignment Causes Degradation of ECCS in PWRs," January 6, 1987.
6. ASME Code for Operation and Maintenance of Nuclear Power Plants.

6. NRC letter from J.B. Hopkins (NRC) to D.C. Shelton, Administrative Changes to Technical Specifications Bases, dated October 21, 1992.
7. NRC letter from J.B. Hopkins (NRC) to L.F. Storz, Issuance of Amendment 182, dated December 16, 1993.

(3) **INSERT 2**

SR 3.5.2.8

This Surveillance verifies that the BWST outlet valve (HV-DH7A and HV-DH7B) automatically closes after the operator manually pushes the control switch to open the containment emergency sump valve (HV-DH9A and HV-DH9B), and the containment emergency sump valve opens, following receipt of a Borated Water Storage Tank Level – Low Low signal (i.e., Table 3.3.5-1, Function 5). This SR also verifies each valve's closure or opening time, as applicable, is $\leq$ 75 seconds. The closure and opening times are measured from when the operator pushes the control switch for the associated containment emergency sump valve until the valve is either fully open or closed, as applicable. The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage.

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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, TSTF-GG-05-01, 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.

4. ISTS Applicable Safety Analyses has been changed to reflect the Davis-Besse LOCA analyses time for when HPI and LPI are credited after actuation of the SFAS signal.

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

6. The last paragraph in ACTIONS B.1 Bases is discussing the actions to take if less than 100% of the flow equivalent to a single OPERABLE ECCS train is not available. This is describing ACTION D, and the ACTIONS D.1 Bases adequately discusses the actions to take in this condition. Therefore, the paragraph has been deleted.

7. Changes have been made to be consistent with the Specification.

8. Typographical error corrected.

9. Editorial change for clarity.

10. Duplicate sentence deleted.

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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.

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ATTACHMENT 3

ITS 3.5.3, ECCS – SHUTDOWN

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

ITS 3.5.3

A01

ITS

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - T_{avg} < 280°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 decay heat (DH) pump,

b. One OPERABLE DH cooler, and

c. An OPERABLE flow path capable of taking suction from the borated water storage tank (BHST) and manually transferring suction to the containment emergency sump during the recirculation phase of operation.

LA01

Add proposed LCO Note

LA01

APPLICABILITY: MODE 4.

ACTION:

Add proposed ACTION Note

A02

ACTION A

a. With no ECCS subsystem OPERABLE because of the inoperability of the DH pump, the DH cooler or the flow path from the BHST, restore at least one ECCS subsystem to OPERABLE status within one hour or maintain the Reactor Coolant System Tavg less than 280°F by use of alternate heat removal methods.

LA01

M01

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.

L01

SURVEILLANCE REQUIREMENTS

SR 3.5.3.1

4.5.3 The ECCS subsystems shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2.

DAVIS-BESSE, UNIT 1 3/4 5-6 Amendment No. ~~38~~, 57

SR 3.5.2.1, SR 3.5.2.2, SR 3.5.2.3, SR 3.5.2.4, SR 3.5.2.5, SR 3.5.2.6, SR 3.5.2.7, SR 3.5.2.8

A03

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DISCUSSION OF CHANGES
ITS 3.5.3, ECCS - SHUTDOWN

ADMINISTRATIVE CHANGES

A01 In the conversion of the Davis-Besse 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-1430, Rev. 3.1, "Standard Technical Specifications-Babcock and Wilcox Plants" (ISTS).

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

A02 The ITS 3.5.3 ACTIONS include a Note that states LCO 3.0.4.b is not applicable to the ECCS low pressure injection (LPI) subsystem. CTS 3.5.3 does not include this Note. This changes the CTS by including the ACTION Note.

The purpose of the ITS 3.5.3 ACTIONS Note is to prohibit entry into the Applicability of LCO 3.5.3 with an inoperable ECCS LPI subsystem. Currently, CTS 3.5.3 precludes entering MODE 4 when the ECCS subsystem is inoperable. ITS LCO 3.0.4 has been added in accordance with the Discussion for Changes for ITS Section 3.0, DOC L01. This LCO allows entry into a MODE or other specified condition in the Applicability under certain conditions when a Technical Specification required component is inoperable. ITS LCO 3.0.4.b allows entry into a MODE or other specified condition in the Applicability of a Specification if a risk assessment is performed and determines it is acceptable to enter the Applicability, and appropriate risk management actions are established. This addition of this restriction (LCO 3.0.4.b is not applicable) is acceptable because there is an increased risk associated with entering a MODE or other specified condition in the Applicability with an inoperable ECCS LPI subsystem, and therefore the provisions of LCO 3.0.4.b should not be applied in this circumstance. The change is acceptable because CTS 3.5.3 does not currently allow this option. This change is considered administrative because it does not result in technical changes to the CTS.

A03 CTS 4.5.3 states that 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 changes the CTS by clearly stating the SRs to perform.

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 ITS SR 3.5.3.1. This change is designated as administrative because it does not result in a technical change to the CTS.

A04 CTS 4.5.3 states that ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2. One of the Surveillance Requirements is CTS 4.5.2.d.2.b), which requires verification that on a Borated Water Storage Tank (BWST) Low – Low Level interlock trip, with the motor operators for the BWST outlet isolation valves and the containment emergency sump recirculation valves energized, the BWST Outlet Valve HV-DH7A (HV DH7B) automatically close in $\leq$ 75 seconds after the operator manually pushes

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DISCUSSION OF CHANGES
ITS 3.5.3, ECCS - SHUTDOWN

the control switch to open the Containment Emergency Sump Valve HV DH9A (HV-DH9B) which should be verified to open in ≤ 75 seconds. ITS SR 3.5.2.8 requires the same Surveillance, and is now specified in ITS SR 3.5.3.1, as justified in Discussion of Change (DOC) A03. However the exception statement "with the motor operators for the BWST outlet isolation valves and the containment emergency sump recirculation valves energized" is not included in ITS SR 3.5.2.8, and has been moved to LCO 3.5.2 as a Note. This is justified in ITS 3.5.2 DOC A04. Thus, the same Note needs to be included in ITS 3.5.3. The LCO 3.5.3 Note states "The borated water storage tank (BWST) outlet and containment emergency sump valves may be considered OPERABLE when the associated valve motors are de-energized, provided the valves are not otherwise inoperable." This changes the CTS by moving the location of the exception from the specific Surveillance to the LCO statement.

The purpose of the exception is to allow the valve motors to be de-energized in MODES 1, 2, 3, and 4 to meet 10 CFR 50 Appendix R requirements. This is documented in the NRC Safety Evaluation for Amendment 182, dated 12/21/1993. While the valves are de-energized for this reason only, they are still considered OPERABLE (i.e.,the LCO is still being met). Thus, the change is acceptable since it is not changing the current requirement; it is only moving the exception to the LCO statement to be consistent with the format of the ISTS. This change is considered administrative because it does not result in any technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 3.5.3 Action a requires that when the ECCS subsystem is inoperable, the ECCS subsystem must be restored to OPERABLE status within 1 hour or the RCS T_{avg} must be maintained < 280°F by use of alternate heat removal methods. ITS 3.5.3 ACTION A requires the immediate initiation of action to restore the required ECCS LPI subsystem to OPERABLE status. This changes the CTS by specifically stating that action to restore the ECCS LPI subsystem to OPERABLE status must be initiated immediately, and does not allow alternate decay heat methods to be used in lieu of restoring the subsystem.

The purpose of CTS 3.5.3 Action a is to provide compensatory measures for when the required ECCS LPI subsystem is inoperable. While CTS Action a appears to provide a finite completion time to restore the LPI subsystem, it does not. Maintaining the Reactor Coolant System T_{avg} less than 280°F is the same as remaining in MODE 4. This would allow the unit to not meet the restoration requirement of CTS 3.5.3 Action a, but still remain in the Applicability of the LCO. Therefore, this new ITS 3.5.3 ACTION is acceptable because it ensures that action is immediately initiated to restore the ECCS LPI subsystem to OPERABLE status and continues to be taken until the LPI subsystem is restored to OPERABLE status. This change is designated as more restrictive because it ensures that action is taken to restore the ECCS LPI subsystem to OPERABLE status.

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DISCUSSION OF CHANGES
ITS 3.5.3, ECCS - SHUTDOWN

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS LCO 3.5.3 states that one ECCS subsystem shall be OPERABLE and contains a description of what constitutes an OPERABLE subsystem. In addition, CTS 3.5.3 Action a also describes what constitutes an inoperable ECCS subsystem. ITS 3.5.3 requires an ECCS LPI subsystem to be OPERABLE, but the details of what constitutes an OPERABLE LPI subsystem are moved to the Bases.

The removal of these details, which relate 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 LPI subsystem 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 removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 8 – Deletion of Reporting Requirements)* CTS 3.5.3 Action b 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 b 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 results 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 5.5.5, "Component Cyclic or Transient Limit," 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

low pressure injection (LPI) subsystem

3.5.3 LCO 3.5.3 One ECCS train shall be OPERABLE. (1) (3)

NOTES

1. A DHR train may be considered OPERABLE during alignment and operation for DHR, if capable of being manually realigned to the ECCS mode of operation. (2)

4.5.2.d.2.b) 2. High pressure injection (HPI) may be de-activated in accordance with LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System." (3)

The borated water storage tank (BWST) outlet and containment emergency sump valves may be considered OPERABLE when the associated valve motors are de-energized, provided the valves are not otherwise inoperable. (6)

APPLICABILITY: MODE 4. (1)

LPI subsystem

ACTIONS

NOTE

DOC A02 LCO 3.0.4.b is not applicable to ECCS DHR loops.

CONDITION	REQUIRED ACTION	COMPLETION TIME
Action a A. Required ECCS decay heat removal (DHR) loop inoperable.	A.1 Initiate action to restore required ECCS DHR loop to OPERABLE status.	Immediately (1)
B. Required ECCS HPI subsystem inoperable.	B.1 Restore required ECCS HPI subsystem to OPERABLE status.	1 hour (3)
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 5.	24 hours

CTS

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY
4.5.3	SR 3.5.3.1	For all equipment required to be OPERABLE, the following SRs are applicable: [SR 3.5.2.1] SR 3.5.2.2 [SR 3.5.2.3] SR 3.5.2.4 SR 3.5.2.5 SR 3.5.2.6 [SR 3.5.2.7] [SR 3.5.2.8] SR 3.5.2.9	In accordance with applicable SRs

(4) (5)

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JUSTIFICATION FOR DEVIATIONS
ITS 3.5.3, ECCS - SHUTDOWN

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature.

2. The ISTS LCO 3.5.3 Note 1 allowance that an LPI subsystem can be placed in the decay heat removal mode and not be considered inoperable for the ECCS function has not been adopted in the Davis-Besse ITS. The current licensing basis for Davis-Besse only requires one LPI subsystem to be OPERABLE. Therefore, it is not appropriate to allow this one required ECCS subsystem to be in a condition such that it cannot be automatically aligned to the ECCS mode. Davis-Besse will continue to consider the LPI subsystem inoperable for the ECCS function if it is aligned in the decay heat removal mode.

3. The ISTS 3.5.3 requirements for the ECCS subsystem to include a high pressure injection (HPI) subsystem have not been adopted in the Davis-Besse ITS, consistent with current licensing basis. The HPI subsystem requirements were deleted as part of Amendment 57, dated May 5, 1983.

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

5. The brackets have been removed and the proper plant specific information/value is provided.

6. CTS 4.5.3 states that ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2. One of the Surveillance Requirements is CTS 4.5.2.d.2.b), which requires verification that on a Borated Water Storage Tank (BWST) Low - Low Level interlock trip, with the motor operators for the BWST outlet isolation valves and the containment emergency sump recirculation valves energized, the BWST Outlet Valve HV-DH7A (HV DH7B) automatically close in $\leq$ 75 seconds after the operator manually pushes the control switch to open the Containment Emergency Sump Valve HV DH9A (HV-DH9B) which should be verified to open in $\leq$ 75 seconds. ITS SR 3.5.2.8 requires the same Surveillance, and is now specified in ITS SR 3.5.3.1, as justified in Discussion of Change (DOC) A03. However the exemption statement "with the motor operators for the BWST outlet isolation valves and the containment emergency sump recirculation valves energized" is not included in ITS SR 3.5.2.8, and has been moved to LCO 3.5.2 as a Note. Thus, the same Note needs to be included in ITS 3.5.3. The LCO 3.5.3 Note states "The borated water storage tank (BWST) outlet and containment emergency sump valves may be considered OPERABLE when the associated valve motors are de-energized, provided the valves are not otherwise inoperable." The justification for adding the Note is more fully described in ITS 3.5.2 Justification for Deviation 4.

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 B 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: high pressure injection (HPI) and low pressure injection (LPI), each consisting of two redundant, 100% capacity trains.

The ECCS flow paths consist of piping, valves, heat exchangers, and pumps, such that water from the borated water storage tank (BWST) 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 is applicable to these Bases.

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. Included in these reductions is that certain automatic Engineered Safety Feature Actuation System (ESFAS) 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 ECCS train is required for MODE 4. This requirement dictates that single failures are not considered during this MODE. The ECCS train shutdown satisfies 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 ensure sufficient ECCS flow is available to the core following a DBA.

In MODE 4, an ECCS train consists of an HPI subsystem and an LPI subsystem. Each train includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the BWST 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 BWST 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.

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(1) **INSERT 1**

an LPI pump, a decay heat cooler, and

Insert Page B 3.5.3-1

As Noted, the BWST outlet and containment emergency sump valves may be considered OPERABLE when the associated valve motors are de-energized, provided the valves are not otherwise inoperable. This allowance is necessary since the motor operators are normally de-energized in MODES 1, 2, 3, and 4 to prevent spurious closing of the BWST outlet valves and opening of the containment emergency sump valves in the event of a control room fire (i.e., to meet 10 CFR 50 Appendix R requirements). This allowance was originally approved by the NRC in References 6 and 7.

BASES

LCO (continued)

This LCO is modified by two Notes. The first allows a DHR 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 DHR mode during MODE 4. The second Note states that HPI actuation may be deactivated in accordance with LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System." Operator action is then required to initiate HPI. In the event of a loss of coolant accident (LOCA) requiring HPI actuation, the time required for operator action has been shown by analysis to be acceptable.

2

APPLICABILITY

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

In MODE 4 with the RCS temperature below 280°F, one OPERABLE ECCS train is acceptable without single failure consideration, on the basis of the stable reactivity condition of the reactor and the limited core cooling requirements.

LPI subsystem

2

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 3.9.4, "DHR and Coolant Circulation - High Water Level," and LCO 3.9.5, "DHR and Coolant Circulation - Low Water Level."

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to inoperable ECCS DHR loops when entering MODE 4 from MODE 5. There is an increased risk associated with entering MODE 4 from MODE 5 with DHR inoperable and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

the

3

LPI subsystem

2

the LPI subsystem

. The provision

4

BASES

ACTIONS (continued)

A.1

If no LPI subsystem train is OPERABLE, the unit is not prepared to respond to a LOCA or to continue cooldown using the LPI pumps and decay heat exchangers. The Completion Time of immediately, which would initiate action to restore at least one ECCS LPI subsystem to OPERABLE status, ensures that prompt action is taken to restore the required cooling capacity. Normally, in MODE 4, reactor decay heat must be removed by an LPI train operating with suction from the RCS. If no LPI train is OPERABLE for this function, reactor decay heat must be removed by some alternate method, such as use of the steam generator(s). The alternate means of heat removal must continue until the inoperable ECCS LPI subsystem can be restored to operation so that continuation of decay heat removal (DHR) is provided.

With both DHR 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 LPI trains operating in the DHR mode. Therefore, the appropriate action is to initiate measures to restore one ECCS LPI subsystem and to continue the actions until the subsystem is restored to OPERABLE status.

B.1

If no ECCS HPI subsystem is OPERABLE, due to the inoperability of the HPI pump or flow path from the BWST, the plant is not prepared to provide high pressure response to Design Basis Events requiring ESFAS. The 1 hour Completion Time to restore at least one ECCS HPI 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.

C.1

When the Required Action of Condition B cannot be completed within the required Completion Time, a controlled shutdown should be initiated. The allowed Completion Time of 24 hours is reasonable, based on operating experience, to reach MODE 5 from full power conditions in an orderly manner and without challenging plant systems.

BASES

SURVEILLANCE REQUIREMENTS	SR 3.5.3.1 The applicable Surveillance descriptions from Bases 3.5.2 apply.
REFERENCES	The applicable references from Bases 3.5.2 apply.

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.3 BASES, ECCS - SHUTDOWN

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. Changes are made to reflect changes made to the Specification.

3. Typographical error corrected.

4. Editorial change for clarity.

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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, BORATED WATER STORAGE TANK (BWST)

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

ITS

A01

EMERGENCY CORE COOLING SYSTEMS

BORATED WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

LCO 3.5.4 3.5.4 The borated water storage tank (BWST) shall be OPERABLE with:

SR 3.5.4.2 a. An ~~available~~ borated water volume of between 500,100 and 550,000 gallons, LA01

SR 3.5.4.3 b. ≥ 2600 and ≤ 2800 ppm of boron, and

SR 3.5.4.1 c. A minimum water temperature of 35°F. Add proposed maximum water temperature M01

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

ACTION:

ACTION A a. With the BWST inoperable because of boron concentration or temperature not within limits, restore the BWST to OPERABLE status within 8 hours or be in at

ACTION C least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

ACTION B b. With the BWST inoperable for reasons other than boron concentration or temperature not within limits, restore the BWST to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD

ACTION C SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.4 The BWST shall be demonstrated OPERABLE:

a. At least once per 7 days by:

SR 3.5.4.2 1. Verifying the ~~available~~ borated water volume in the tank, LA01

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 water temperature when outside air temperature <35°F.

Add proposed maximum outside air temperature M01

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DISCUSSION OF CHANGES
ITS 3.5.4, BORATED WATER STORAGE TANK (BWST)

ADMINISTRATIVE CHANGES

A01 In the conversion of the Davis-Besse 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-1430, Rev. 3.1, "Standard Technical Specifications-Babcock and Wilcox Plants" (ISTS).

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

MORE RESTRICTIVE CHANGES

M01 CTS LCO 3.5.4.c provides a minimum BWST water temperature limit but does not provide a maximum water temperature limit and CTS 4.5.4.b verifies the minimum limit every 24 hours when air temperature is < 35°F. ITS SR 3.5.4.1 includes both a minimum and a maximum BWST water temperature limit. In addition, the ITS SR 3.5.4.1 Note only requires the BWST water temperature to be verified within the limits if the ambient air temperature is greater than new maximum BWST water temperature limit or less than the current minimum BWST water temperature limit. This changes the CTS by adding a new maximum BWST water temperature limit and requires it checked every 24 hours unless the ambient air temperature is less than or equal to the maximum BWST water temperature limit.

The purpose of CTS LCO 3.5.4.c and CTS 4.5.4.b is to ensure the BWST water temperature is within the limits assumed in the accident analysis. However, the CTS only provides the minimum BWST water temperature limit. This change adds a maximum BWST water temperature limit of 90°F. This change is acceptable since the BWST maximum water temperature limit of 90°F is consistent with the maximum injection water temperature assumed in the LOCA analysis. This change is designated as more restrictive because it adds a new maximum BWST water temperature limit

RELOCATED SPECIFICATIONS

LA01 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 3.5.4.a requires an available borated water volume of between 500,100 and 550,000 gallons and CTS 4.5.4.a.1 requires verification that the available borated water volume in the BWST is within limits. ITS SR 3.5.4.2 requires verification of the BWST borated water volume, but does not specify that it is the available volume. This changes the CTS by moving the detail of what constitutes the borated water volume to the Bases.

The removal of this detail is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the requirement that the borated water volume is between 500,100 and 550,000 gallons and that it is periodically verified. Also, this type of change is acceptable because these types

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DISCUSSION OF CHANGES
ITS 3.5.4, BORATED WATER STORAGE TANK (BWST)

of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specifications Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail because procedural details for meeting Technical Specification requirements are being removed from the CTS.

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

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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 Borated Water Storage Tank (BWST)

LCO 3.5.4 LCO 3.5.4 The BWST shall be OPERABLE.

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

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
Action a	A. BWST boron concentration not within limits. OR BWST water temperature not within limits.	A.1 Restore BWST to OPERABLE status.	8 hours
Action b	B. BWST inoperable for reasons other than Condition A.	B.1 Restore BWST to OPERABLE status.	1 hour
Actions a and b	C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

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CTS

BWST
3.5.4

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
3.5.4.c, 4.5.4.b	SR 3.5.4.1	NOTE Only required to be performed when ambient air temperature is ≤ [40] (35) °F or > [100] (90) °F.		1
		Verify BWST borated water temperature is ≥ [40] (35) °F and ≤ [100] (90) °F.	24 hours	1
3.5.4.a, 4.5.4.a.1	SR 3.5.4.2	Verify BWST borated water volume is ≥ [415,200] (500,100) gallons [ ] ft. and ≤ [449,000] (550,000) gallons [ ] ft.	7 days	1
3.5.4.b, 4.5.4.a.2	SR 3.5.4.3	Verify BWST boron concentration is ≥ [2270] (2600) ppm and ≤ [2450] (2800) ppm.	7 days	1

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JUSTIFICATION FOR DEVIATIONS
ITS 3.5.4, BORATED WATER STORAGE TANK (BWST)

1. The brackets have been 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 Borated Water Storage Tank (BWST)

BASES

BACKGROUND

The BWST supports the ECCS and the Containment Spray System by providing a source of borated water for ECCS and containment spray pump operation. In addition, the BWST supplies borated water to the refueling ~~pool~~ canal for refueling operations. (3)

The BWST supplies two ECCS trains, each by a separate, redundant supply header. Each header also supplies one train of the Containment Spray System. A normally open, motor operated isolation valve is provided in each header to allow the operator to isolate the BWST from the ECCS after the ECCS pump suction has been transferred to the containment sump following depletion of the BWST during a loss of coolant accident (LOCA). Use of a single BWST to supply both ECCS trains is acceptable because the BWST is a passive component, and passive failures are not assumed in the analysis of Design Basis Events (DBEs) to occur coincidentally with the Design Basis Accident (DBA). manually (3)

The ECCS and containment spray pumps are provided with recirculation lines that ensure each pump can maintain minimum flow requirements when operating at shutoff head conditions. (8)

This LCO ensures that:

a. The BWST contains sufficient borated water to support the ECCS during the injection phase; (1)

b. Sufficient water volume exists in the containment sump to support continued operation of the ECCS and containment spray pumps at the time of transfer to the recirculation mode of cooling; and (1)

c. The reactor remains subcritical following a LOCA.

Insufficient water inventory in the BWST could result in insufficient cooling capacity of the ECCS when the transfer to the recirculation mode occurs.

Improper boron concentrations could result in a reduction of SDM or ~~excessive~~ boric acid precipitation in the core following a LOCA, as well as excessive caustic stress corrosion of mechanical components and systems inside containment. (3)

BASES

APPLICABLE SAFETY ANALYSES

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

The limits on volume of ≥ 415,200 gallons and ≤ 449,000 gallons are based on several factors. Sufficient deliverable volume must be available to provide at least 20 minutes of full flow of all ECCS pumps prior to the transfer to the containment sump for recirculation. Twenty minutes gives the operator adequate time to prepare for switchover to containment sump recirculation.

A second factor that affects the minimum required BWST volume is the ability to support continued ECCS pump operation after the manual transfer to recirculation occurs. When ECCS pump suction is transferred to the sump, there must be sufficient water in the sump to ensure adequate net positive suction head (NPSH) for the LPI and containment spray pumps. This NPSH calculation is described in the FSAR (Ref.), and the amount of water that enters the sump from the BWST and other sources is one of the input assumptions. Since the BWST is the main source that contributes to the amount of water in the sump following a LOCA, the calculation does not take credit for more than the minimum volume of usable water from the BWST.

The third factor is that the volume of water in the BWST must be within a range that will ensure the solution in the sump following a LOCA is within a specified pH range that will minimize the evolution of iodine and the effect of chloride and caustic stress corrosion cracking on the mechanical systems and components.

The volume range ensures that refueling requirements are met and that the capacity of the BWST is not exceeded. Note that the volume limits refer to total, rather than usable, volume required to be in the BWST; a certain amount of water is unusable because of tank discharge line location or other physical characteristics.

BASES

APPLICABLE SAFETY ANALYSES (continued)

2600

The [2270] ppm limit for minimum boron concentration was established to ensure that, following a LOCA, with a minimum BWST level, the reactor will remain subcritical in the cold condition following mixing of the BWST and Reactor Coolant System (RCS) water volumes. Large break LOCAs assume that all control rods remain withdrawn from the core. (2) (3)

50% of the

The minimum and maximum concentration limits both ensure that the solution in the sump following a LOCA is within a specified pH range that will minimize the evolution of iodine and the effect of chloride and caustic stress corrosion cracking on the mechanical systems and components.

2800

The [2450] ppm maximum limit for boron concentration in the BWST is also based on the potential for boron precipitation in the core during the long term cooling period following a LOCA. For a cold leg break, the core dissipates heat by pool nucleate boiling. Because of this boiling phenomenon in the core, the boric acid concentration will increase in this region. If allowed to proceed in this manner, a point may be reached where boron precipitation will occur in the core. Post LOCA emergency procedures direct the operator to establish dilution flow paths in the LPI System to prevent this condition by establishing a forced flow path through the core regardless of break location. These procedures are based on the minimum time in which precipitation could occur, assuming that maximum boron concentrations exist in the borated water sources used for injection following a LOCA. (2)

reduce the time available to initiate boric acid precipitation control measures, which are taken to avoid reaching the solubility limit

Boron concentrations in the BWST in excess of the limit could result in precipitation earlier than assumed in the analysis. (3)

35

The 40°F lower limit on the temperature of the solution in the BWST was established to ensure that the solution will not freeze. This temperature also helps prevent boron precipitation and ensures that water injection in the reactor vessel will not be colder than the lowest temperature assumed in reactor vessel stress analysis. The [100]°F upper limit on the temperature of the BWST contents is consistent with the maximum injection water temperature assumed in the LOCA analysis. (3) (3) (2)

is assumed for the containment vessel vacuum breaker sizing

90

The numerical values of the parameters stated in the SR are actual values and do not include allowance for instrument errors.

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

, with the exception of the BWST minimum volume of 500,100. This value is instrument error compensated to ensure the required minimum volume is available for injection into the core and containment. The remaining values are either instrument uncertainty adjusted in surveillance procedures or include sufficient analysis margin such that the instrument errors would be bounded by the margin. (3)

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BASES

LCO

The BWST exists to ensure that an adequate supply of borated water is available to cool and depressurize the containment in the event of a DBA; to cool and cover the core in the event of a LOCA, thereby ensuring the reactor remains subcritical following a DBA; and to ensure an adequate level exists in the containment sump to support ECCS and containment spray pump operation in the recirculation MODE. To be considered OPERABLE, the BWST must meet the limits for water volume, boron concentration, and temperature established in the SRs. (5)

APPLICABILITY

In MODES 1, 2, 3, and 4, the BWST OPERABILITY requirements are dictated by the ECCS and Containment Spray System OPERABILITY requirements. Since both the ECCS and Containment Spray System must be OPERABLE in MODES 1, 2, 3, and 4, the BWST must 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," respectively. MODE 6 core cooling requirements are addressed by LCO 3.9.4, "DHR and Coolant Circulation - High Water Level," and LCO 3.9.5, "DHR and Coolant Circulation - Low Water Level."

ACTIONS

A.1

With either the BWST boron concentration or borated water temperature not within limits, the condition must be corrected within 8 hours. In this condition, neither the ECCS nor the Reactor Building Spray System can perform its design functions. Therefore, prompt action must be taken to restore the tank to OPERABLE status or to place the plant in a MODE in which these systems are not required. The 8 hour limit to restore the temperature or boron concentration to within limits was developed considering the time required to change boron concentration or temperature and assuming that the contents of the tank are still available for injection.

Containment (3)

B.1

OPERABLE status

With the BWST inoperable for reasons other than Condition A (e.g., water volume), levels must be restored to within required limits within 1 hour. In this condition, neither the ECCS nor the Containment Spray System can perform its design functions. Therefore, prompt action must be taken to restore the tank to OPERABLE status or to place the plant in a MODE in which the BWST is not required. The allowed Completion Time of 1 hour to restore the BWST to OPERABLE status is based on this condition simultaneously affecting multiple redundant trains.

the BWST (3) (4)

BWST (3)

BASES

ACTIONS (continued)

C.1 and C.2

If the BWST cannot be restored to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.5.4.1

Verification every 24 hours that the BWST water temperature is within the specified temperature band ensures that the boron will not precipitate; the fluid will not freeze; the fluid temperature entering the reactor vessel will not be colder than assumed in the reactor vessel stress analysis; and the fluid temperature entering the reactor vessel will not be hotter than assumed in the LOCA analysis. The 24 hour Frequency is sufficient to identify a temperature change that would approach either temperature limit and has been shown to be acceptable through operating experience.

containment vessel vacuum breaker sizing assumption is met:

3

The SR is modified by a Note that requires the Surveillance to be performed only when ambient air temperatures are outside the operating temperature limits of the BWST. With ambient temperatures within this band, the BWST temperature should not exceed the limits.

SR 3.5.4.2

available

Verification every 7 days that the BWST ~~contained~~ volume is within the required range ensures that a sufficient initial supply is available for injection and to support continued ECCS pump operation on recirculation. Since the BWST volume is normally stable and provided with a low level alarm, a 7 day Frequency has been shown to be appropriate through operating experience.

9

The limits on water volume reflect the available volume since a portion of the contained volume of the BWST is not available because of the tank discharge configuration.

9

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.4.3

Verification every 7 days that the boron concentration of the BWST fluid is within the required band ensures that the reactor will remain subcritical following a LOCA. Since the BWST volume is normally stable, a 7 day sampling Frequency is appropriate and has been shown to be acceptable through operating experience.

REFERENCES [2] → [1]. FSAR, Section [6.1] ← [3] 1. NUREG-0800, Section 6.3. (3)(2)

[U]

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.4 BASES, BORATED WATER STORAGE TANK (BWST)

1. These punctuation corrections have been made consistent with the Writer's Guide for the Improved Standard Technical Specifications, TSTF-GG-05-01, Section 5.1.3.

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

3. 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.

4. Changes made to be consistent with the Specification.

5. Typographical error corrected.

6. Editorial change for consistency.

7. Change made to be consistent with the LCO title.

8. This information is not necessary in this ITS Bases. This Specification concerns the BWST requirements, and this information describes minimum flow protection for the ECCS and containment spray pumps. Therefore, the information has been deleted.

9. Changes have been made to explain that the minimum and maximum BWST volumes are the available volume.

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Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.5.4, BORATED WATER STORAGE TANK (BWST)

There are no specific NSHC discussions for this Specification.

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