Summary of Changes
ITS Section 3.5

Change Description	Affected Pages
The changes described in the KPS response to question MEH-002 have been made. This change deletes ISTS SR 3.5.2.3 from the KPS ITS submittal.	Pages 37, 41, 47, 50, 51, 61, and 65

ATTACHMENT 1

VOLUME 10

KEWAUNEE POWER STATION IMPROVED TECHNICAL SPECIFICATIONS CONVERSION

ITS SECTION 3.5 EMERGENCY CORE COOLING SYSTEM (ECCS)

Revision 1

LIST OF ATTACHMENTS

ATTACHMENT 1

ITS 3.5.1, ACCUMULATORS

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

3.3 ENGINEERED SAFETY FEATURES AND AUXILIARY SYSTEMS

APPLICABILITY

Applies to the OPERATING status of Engineered Safety Features and Auxiliary Systems.

OBJECTIVE

To define those LIMITING CONDITIONS FOR OPERATION that are necessary: (1) to remove decay heat from the core in emergency or normal shutdown situations, and (2) to remove heat from containment in normal OPERATING and emergency situations.

SPECIFICATIONS

a. Accumulators

Add proposed LCO 3.5.1 statement — A02

Applicability — 1. The reactor shall not be made critical unless the following conditions are satisfied, except for LOW POWER PHYSICS TESTING and except as provided by TS 3.3.a.2. — M01

Add proposed second Applicability — M02

SR 3.5.1.3 — A. Each accumulator is pressurized to at least 700 psig (and ≤ 775 psig — M05) and contains 1250 ft^3 ±
SR 3.5.1.2 — 25 ft^3 of water with a boron concentration of at least 2400 ppm (and ≤ 2625 ppm — M05), and is not
SR 3.5.1.4 — isolated.

SR 3.5.1.1 — B. Accumulator isolation valves SI-20A and SI-20B shall be opened with their
SR 3.5.1.5 — power breakers locked out at or before the Reactor Coolant System pressure — LA01
Applicability — exceeds 1000 psig.

Add proposed SR 3.5.1.1 and SR 3.5.1.5 — M03

2. During power operation or recovery from an inadvertent trip, the following conditions of inoperability may exist during the time interval specified: — M02

ACTION A — A. One accumulator may have a boron concentration < 2400 ppm (and >2625 ppm — M05) for 72 hours.

ACTION B — B. One accumulator may be inoperable for a reason other than TS 3.3.a.2.A for 24 hours.

ACTION C — If OPERABILITY is not restored within the time specified, then within 1 hour action shall be initiated to: — M04

- Achieve HOT STANDBY within the next 6 hours.
- Achieve HOT SHUTDOWN within the following 6 hours.
- Achieve COLD SHUTDOWN within an additional 36 hours. — L01

Add proposed Required Action C.2 — M02

Add proposed ACTION D — A03

A01

ITS 3.5.1

3. Containment Fancoil Units

Each fancoil unit shall be tested once every operating cycle or once every 18 months, whichever occurs first, to verify proper operation of the motor-operated service water outlet valves and the fancoil emergency discharge and associated backdraft dampers.

See ITS 3.6.6

b. Component Tests

1. Pumps

A. The safety injection pumps, residual heat removal pumps, and containment spray pumps shall be started and operated quarterly during power operation and within 1 week after the plant is returned to power operation, if the test was not performed during plant shutdown.

B. Acceptable levels of performance are demonstrated by the pumps' ability to start and develop head within an acceptable range.

See ITS 3.5.2 and ITS 3.6.6

2. Valves

A. The containment sump outlet valves shall be tested during the pump tests.

See ITS 3.5.2

B. The accumulator check valves shall be checked for OPERABILITY during each major REFUELING outage. The accumulator block valves shall be checked to assure "valve open" requirements during each major REFUELING outage.

LA02

C. Deleted

D. Spray additive tank valves shall be tested during each major REFUELING outage.

See ITS 3.6.7

E. Deleted

F. Residual Heat Removal System valve interlocks shall be tested once per operating cycle.

See ITS 3.4.14

Attachment 1, Volume 10, Rev. 1, Page 6 of 132

CTS A01 ITS 3.5.1

4.1 OPERATIONAL SAFETY REVIEW

APPLICABILITY

Applies to items directly related to safety limits and LIMITING CONDITIONS FOR OPERATION.

OBJECTIVE

To assure that instrumentation shall be checked, tested, and calibrated, and that equipment and sampling tests shall be conducted at sufficiently frequent intervals to ensure safe operation.

SPECIFICATION

a. Calibration, testing, and checking of protective instrumentation channels and testing of logic channels shall be performed as specified in Table TS 4.1-1. See other ITS

SR 3.5.1.4 b. Equipment and sampling tests shall be conducted as specified in Table TS 4.1-2 and TS 4.1-3.

c. Deleted

d. Deleted

e. Deleted

Attachment 1, Volume 10, Rev. 1, Page 7 of 132

ITS

A01

ITS 3.5.1

TABLE TS 4.1-1

MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TEST OF INSTRUMENT CHANNELS

See ITS 3.6.9

See ITS 3.3.2

CHANNEL DESCRIPTION	CHECK	CALIBRATE	TEST	REMARKS
18. a. Containment Pressure (SIS signal)	Each shift	Each refueling cycle	Monthly(a)	(a) Isolation Valve Signal
b. Containment Pressure (Steamline Isolation)	Each shift(a)	Each refueling cycle(a)	Monthly(a)	(a) Narrow range containment pressure (-3.0, +3.0 psig excluded)
c. Containment Pressure (Containment Spray Act)	Each shift	Each refueling cycle	Monthly	
d. Annulus Pressure (Vacuum Breaker)	Not applicable	Each refueling cycle	Each refueling cycle	
19. Radiation Monitoring System	Daily (a,b)	Each refueling cycle (a)	Quarterly (a)	(a) Includes only channels R11 thru R15, R19, R21, and R23 (b) Channel check required in all plant modes
20. Deleted				
21. Containment Sump Level	Not applicable	Not applicable	Each refueling cycle	
22. Accumulator Level and Pressure	Each shift	Deleted	Not applicable	
23. Steam Generator Pressure	Each shift	Each refueling cycle	Monthly	

SR 3.5.1.2, SR 3.5.1.3

See ITS 3.3.2

See ITS 3.4.15

See ITS 3.3.2, 3.3.6, 3.3.7, 3.4.15, and CTS 3.8.a.9

Attachment 1, Volume 10, Rev. 1, Page 8 of 132

ITS

A01

ITS 3.5.1

M06

Add proposed SR 3.5.1.4 second Frequency

See ITS 3.5.4

TABLE TS 4.1-2

MINIMUM FREQUENCIES FOR SAMPLING TESTS

SAMPLING TESTS	TEST	FREQUENCY
3. Refueling Water Storage Tank Water Sample(7)	Boron Concentration	Monthly(8)
4. Deleted		
5. Accumulator	Boron Concentration	Monthly
6. Spent Fuel Pool	Boron Concentration	Monthly(9)
7. Secondary Coolant	a. Gross Beta or Gamma Activity	Weekly
	b. Iodine Concentration	Weekly when gross beta or gamma activity $\geq$ 0.1 μCi/gram

SR 3.5.1.4

See ITS 3.7.16

See ITS 3.7.14

See ITS 3.5.4

(7) A refueling water storage tank (RWST) boron concentration sample does not have to be taken when the RWST is empty during REFUELING outages.
(8) And after adjusting tank contents.
(9) Sample will be taken monthly when fuel is in the pool.

See ITS 3.7.14

Attachment 1, Volume 10, Rev. 1, Page 9 of 132

DISCUSSION OF CHANGES
ITS 3.5.1, ACCUMULATORS

ADMINISTRATIVE CHANGES

A01 In the conversion of the Kewaunee Power Station (KPS) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1431, Rev. 3.0, "Standard Technical Specifications-Westinghouse Plants" (ISTS).

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

A02 CTS 3.3.a.1 requires various accumulator parameters and components to be OPERABLE for each accumulator, but does not specifically provide an LCO statement. ITS 3.5.1 states that two SI accumulators shall be OPERABLE. This changes the CTS by specifically stating that both accumulators are required to be OPERABLE.

The purpose of CTS 3.3.a.1 is to verify that each SI accumulator is able to perform its safety function. ITS 3.5.1 explicitly states both SI accumulators are required to be OPERABLE. This change is designated as an administrative change and is acceptable because it does not result in a technical change to the CTS.

A03 CTS does not contain a specific ACTION for two accumulators inoperable. With two accumulators inoperable, CTS 3.0.c would be entered. ITS 3.5.1 ACTION D directs entry into LCO 3.0.3 when two accumulators are inoperable. This changes the CTS by specifically stating to enter LCO 3.0.3 in this System Specification.

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

MORE RESTRICTIVE CHANGES

M01 CTS 3.3.a.1 states, in part, that the accumulators are not required to be OPERABLE during LOW POWER PHYSICS TESTING. ITS 3.5.1 does not include this exception; the accumulators are required during PHYSICS TESTS. This changes the CTS by requiring the accumulators to be OPERABLE during PHYSICS TESTS.

The purpose of CTS 3.3.a.1 is to ensure that the accumulators are OPERABLE under both normal operating and accident conditions. Since the KPS Physics Tests do not require the accumulators to be inoperable to perform the tests, there is no reason to maintain this current allowance. Therefore, this change is acceptable and is more restrictive because the accumulators are now required to be OPERABLE under more conditions in the ITS than in the CTS.

DISCUSSION OF CHANGES
ITS 3.5.1, ACCUMULATORS

M02 CTS 3.3.a.1 requires the accumulators to be OPERABLE when the reactor is critical. In addition, CTS 3.3.a.2 provides actions when the accumulators are inoperable during power operation or recovery from an inadvertent trip. ITS 3.5.1 is applicable in MODES 1 and 2 and MODE 3 with RCS pressure > 1000 psig. Thus, ITS 3.5.1 ACTIONS A and B must be entered if an accumulator is inoperable in MODES 1 and 2 and MODE 3 with RCS pressure > 1000 psig. In addition, ITS 3.5.1 Required Action C.2 requires reducing RCS pressure to ≤ 1000 psig within 12 hours when a unit shutdown is required. This changes the CTS by adding a new MODE of Applicability (MODE 3 with RCS pressure > 1000 psig) and commensurate ACTIONS to cover this new Applicability.

This change is acceptable because the accumulators may be needed in MODE 3 when the RCS pressure is greater than 1000 psig. This change is designated as more restrictive because the accumulators are now required to be OPERABLE in MODE 3 with the RCS pressure > 1000 psig.

M03 CTS 3.3.a.1.B requires that the accumulator isolation valves are open, but does not provide a Surveillance Requirement to periodically verify this requirement is met. ITS SR 3.5.1.1 requires verification that each accumulator isolation valve is fully open every 12 hours. CTS 3.3.a.1.B requires that the accumulator isolation valves have the power breaker locked out at or before the RCS pressure exceeds 1000 psig, but does not provide a Surveillance Requirement to periodically verify this requirement is met. ITS SR 3.5.1.5 requires verification that the motive power is removed from each accumulator isolation valve operator when RCS pressure is ≥ 1000 psig every 31 days. This changes the CTS by adding specific Surveillances to periodically verify these requirements are met.

The purpose of SR 3.5.1.1 and SR 3.5.1.5 is to verify that the accumulators will be able to perform their safety function. This change is acceptable because specific Surveillances have been added to verify that the LCO will be met. This change is designated as more restrictive because Surveillances have been added to the ITS that are not required by the CTS.

M04 CTS 3.3.a.2, in part, requires that if the accumulator's actions of CTS 3.3.a.2.A or CTS 3.3.a.2.B are not met, then within 1 hour, initiate action to achieve HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the following 6 hours. ITS 3.5.1 Required Action C.1 requires that the unit be in MODE 3 (equivalent to CTS HOT SHUTDOWN) within 6 hours. This deletes the requirement to be in HOT STANDBY (equivalent to ITS MODE 2) within 6 hours and changes the time required to be in MODE 3 from 12 hours to 6 hours. The addition of the requirement to reduce reactor pressure to < 1000 psig is discussed in DOC M02.

The purpose of CTS 3.3.a.2.B is to place the unit in a condition in which the LCO does not apply. This change is acceptable because the Completion Time is consistent with safe operation under the specified Condition, considering the OPERABLE status of the redundant systems or features. This includes the capability of remaining systems or features, a reasonable time for repairs or replacement, and the low probability of a DBA occurring during the allowed Completion Time. Allowing 6 hours to be in MODE 3 in lieu of the current 12 hours ensures a unit shutdown is commenced and completed within a

DISCUSSION OF CHANGES
ITS 3.5.1, ACCUMULATORS

reasonable period of time upon failure to meet the inoperable Accumulator compensatory measures. Additionally, since ITS 3.5.1 Required Action C.1 requires the unit to be in MODE 3 within 6 hours, there is no need to maintain the requirement to be in MODE 2 within 6 hours. This change is designated as more restrictive because less time is allowed for the unit to reach MODE 3 than was allowed in the CTS.

M05 CTS 3.3.a.1.A provides a minimum boron concentration requirement and minimum nitrogen cover pressure for the accumulators, but does not provide a maximum limit. Furthermore, CTS 3.3.a.2.A provides the action when the minimum boron concentration limit is not met. ITS SR 3.5.1.3 provides a new maximum nitrogen cover pressure limit of 775 psig and ITS SR 3.5.1.4 provides a new maximum boron concentration limit of 2625 ppm for the accumulators. In addition, ITS 3.5.1 ACTION A provides a 72 hour time to restore the boron concentration to within limits, and applies when the maximum boron concentration is not met. This changes the CTS by adding a new maximum nitrogen cover pressure and a maximum boron concentration limit (including an ACTION) for the accumulators.

The purpose of the maximum nitrogen cover pressure limit is to prevent accumulator relief valve actuation, and ultimately preserves accumulator integrity. The purpose of the maximum boron concentration limit is to ensure the minimum ph in the sump is maintained and that excessive boron precipitation does not occur. The proposed maximum nitrogen cover pressure limit is less than the minimum opening pressure of the accumulator relief valves and the proposed maximum boron limit is consistent with the values assumed in the USAR analysis. The proposed 72 hour restoration time is consistent with the time provided for restoration when the minimum boron concentration limit is not met. Therefore these changes are acceptable and are more restrictive since a new maximum nitrogen cover pressure and boron concentration limit are being added to the CTS.

M06 CTS Table TS 4.1-2 Sampling Test 5 requires the performance of a Sampling Test of the accumulator boron concentration monthly. ITS SR 3.5.1.4 requires a similar verification of the accumulator boron concentration every 31 days, but also requires the verification once within 6 hours after each solution volume increase of > 15% of indicated level that is not the result of addition from the refueling water storage tank (as specified in the second Frequency). The ITS SR 3.5.1.4 second Frequency also includes a Note that states the additional sampling is only required to be performed for affected accumulators. This changes the CTS by adding a new Surveillance Requirement Frequency.

The purpose of the second Frequency of SR 3.5.1.4 is to identify if accumulator inleakage has caused a reduction in boron concentration to below the required limit. The functions of the accumulators are to supply water to the reactor vessel during the blowdown phase of a loss of cooling accident (LOCA), to provide inventory to help accomplish the refill phase that follows thereafter, and to provide Reactor Coolant System makeup for a small break LOCA. The minimum boron concentration limit is used in the post LOCA boron concentration calculation which is performed to assure reactor subcriticality in a post LOCA environment. This change is acceptable because a specific Surveillance

DISCUSSION OF CHANGES
ITS 3.5.1, ACCUMULATORS

Frequency has been added to verify that the accumulator boron concentration limit is met if an accumulator unexpectedly increases in level. This change is more restrictive because a new Surveillance Frequency has been added.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 3.3.a.1.B requires accumulator isolation valves SI-20A and SI-20B to be open. ITS SR 3.5.1.1 requires that the isolation valves be verified open. The ITS does not define the component name of the isolation valves. This changes the CTS by moving the detail of the isolation valves to the Bases.

The removal of these details which are related to system design from the Technical Specifications is acceptable because this type of information in not necessary to be included to provide adequate protection of public health and safety. The ITS includes the verification that the isolation valves are open (SR 3.5.1.1). 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 less restrictive because information relating to system design is being removed from the Technical Specifications.

LA02 *(Type 4 – Removal of LCO, SR, or other TS Requirement to the TRM, USAR, ODCM, NFQAPD, CLRT Program, IST Program, ISI Program, or Setpoint Control Program)* CTS 4.5.b.2.B requires accumulator check valves to be checked for OPERABILITY during each major REFUELING outage. Additionally, CTS 4.5.b.2.B requires accumulator block valves to be checked to assure "valve open" requirements during each major refueling outage. ITS 3.5.1 does not contain these requirements. This changes the CTS by moving these requirements to the Technical Requirements Manual (TRM).

The removal of these 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. This change is acceptable because the removed requirements will be adequately controlled in TRM. Any changes to the TRM are made under 10 CFR 50.59, which ensures changes are properly evaluated. This change is designated as less restrictive removal of detail because a Technical Specification Requirement is being removed from the Technical Specifications.

DISCUSSION OF CHANGES
ITS 3.5.1, ACCUMULATORS

LESS RESTRICTIVE CHANGES

L01 *(Category 4 – Relaxation of Required Action)* CTS 3.3.a.2, in part, requires that when an accumulator is inoperable and a unit shutdown is required, the unit must be in COLD SHUTDOWN (ITS equivalent MODE 5) within an additional 36 hours (after the time to reach HOT STANDBY and HOT SHUTDOWN). ITS 3.5.1 Required Action C.2 only requires that the unit reduce RCS pressure to ≤ 1000 psig. This deletes the requirement to be in COLD SHUTDOWN (equivalent to ITS MODE 5) within an additional 36 hours.

The purpose of ITS 3.5.1 ACTION C is to place the unit in a condition in which the LCO does not apply. This change is acceptable because the Applicability of ITS 3.5.1 is MODES 1 and 2 and MODE 3 with RCS pressure > 1000 psig. Thus, the proposed ITS ACTION does take the unit outside the Applicability of the LCO. This is acceptable since at pressures ≤ 1000 psig, the rate of RCS blowdown is such that the ECCS pumps can provide adequate injection to ensure that peak clad temperature remains below the 10 CFR 50.46 limit of 2200°F. This change is designated as less restrictive because a requirement to be in COLD SHUTDOWN is being deleted.

Attachment 1, Volume 10, Rev. 1, Page 14 of 132

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

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

DOC A02 LCO 3.5.1 [Four] ECCS accumulators shall be OPERABLE. (Two) (SI) 1 3

3.3.a.1, DOC M02 APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > [1000] psig. 1

ACTIONS

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
3.3.a.2.A	A. One accumulator inoperable due to boron concentration not within limits.	A.1	Restore boron concentration to within limits.	72 hours	
3.3.a.2.B	B. One accumulator inoperable for reasons other than Condition A.	B.1	Restore accumulator to OPERABLE status.	24 hours	
3.3.a.2.C, DOC M02	C. Required Action and associated Completion Time of Condition A or B not met.	C.1 AND C.2	Be in MODE 3. Reduce RCS pressure to ≤ [1000] psig.	6 hours 12 hours	1
DOC A04	D. Two or more accumulators inoperable.	D.1	Enter LCO 3.0.3.	Immediately	2

CTS

Accumulators
3.5.1

SURVEILLANCE REQUIREMENTS

CTS		SURVEILLANCE	FREQUENCY	
3.3.a.1.B, DOC M03	SR 3.5.1.1	Verify each accumulator isolation valve is fully open.	12 hours	
3.3.a.1.A, Table 4.1-1 Channel Description	SR 3.5.1.2	Verify borated water volume in each accumulator is ≥ [7853 gallons ( )% and ≤ 8171 gallons ( )%]. 1225 ft^3 1275 ft^3	12 hours	1
3.3.a.1.A, Table 4.1-1 Channel Description	SR 3.5.1.3	Verify nitrogen cover pressure in each accumulator is ≥ [385] psig and ≤ [481] psig. 700 775	12 hours	1
3.3.a.1.A, Table 4.1-2 Sampling Test 5	SR 3.5.1.4	Verify boron concentration in each accumulator is ≥ [1900] ppm and ≤ [2100] ppm. 2400 2625	31 days AND --------NOTE-------- Only required to be performed for affected accumulators ------------------------ Once within 6 hours after each solution volume increase of ≥ [[ ] gallons, ( )% of indicated level] that is not the result of addition from the refueling water storage tank 15	1 1
3.3.a.1.B, DOC M03	SR 3.5.1.5	Verify motive power is removed from each accumulator isolation valve operator when RCS pressure is ≥ [2000] psig.	31 days	5 4

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.1, ACCUMULATORS

1. The ITS contains bracketed information and/or values that are generic to all Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is provided. This acceptable since the generic specific information/value is revised to reflect the current plant design.

2. ISTS 3.5.1 Condition D is applicable when two or more accumulators are inoperable. ITS 3.5.1 Condition D is applicable when two accumulators are inoperable. This change is acceptable because there are only two accumulators at the Kewaunee Power Station (KPS).

3. The correct KPS nomenclature has been used. The accumulators are part of the Safety Injection System.

4. The KPS pressure at which power to the accumulator isolation valve needs to be removed is 1000 psig. Since the Applicability includes the same RCS pressure limit, the words in ISTS SR 3.5.1.5 “when RCS pressure is ≥ [2000] psig” are redundant and have not been included in ITS SR 3.5.1.5. Thus, the SR will always be required when > 1000 psig.

5. The KPS design is such that the valve operator still has AC power when the power breaker is locked out. This AC power is only provided so that valve position indication is available in the control room. However, locking out of the breaker does ensure that the motor operator cannot move the valve, since there is no motive power. Therefore, the word "motive" has been added to ISTS SR 3.5.1.5 to clarify that while the motor operator has power, there is no motive power. This still accomplishes the intent of the ISTS SR.

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

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.1 Accumulators

BASES

Safety Injection (SI)

BACKGROUND

The functions of the ECCS accumulators are to supply water to the reactor vessel during the blowdown phase of a loss of coolant accident (LOCA), to provide inventory to help accomplish the refill phase that follows thereafter, and to provide Reactor Coolant System (RCS) makeup for a small break LOCA. 1

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

collapsed liquid level in the lower plenum reaches a minimum

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

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

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

one
two
is
one
is

The accumulator size, water volume, and nitrogen cover pressure are selected so that three of the four accumulators are sufficient to partially cover the core before significant clad melting or zirconium water reaction can occur following a LOCA. The need to ensure that three accumulators are adequate for this function is consistent with the LOCA assumption that the entire contents of one accumulator will be lost via the RCS pipe break during the blowdown phase of the LOCA. 1

BASES

APPLICABLE SAFETY ANALYSES

s

and 3

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

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

split-type

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

suction

(cold leg)

1

As a conservative estimate, no credit is taken for ECCS pump flow until an effective delay has elapsed. This delay accounts for the diesels starting and the pumps being loaded and delivering full flow. The delay time is conservatively set with an additional 2 seconds to account for SI signal generation. During this time, the accumulators are analyzed as providing the sole source of emergency core cooling. No operator action is assumed during the blowdown stage of a large break LOCA. 1

time

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

Safety Injection 1

Safety Injection 1

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

APPLICABLE SAFETY ANALYSES (continued)

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

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

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

d. Core is maintained in a coolable geometry.

and the first few seconds of the refill phase

Since the accumulators discharge during the blowdown phase of a LOCA, they do not contribute to the long term cooling requirements of 10 CFR 50.46. (1)

INSERT 1

For both the large and small break LOCA analyses, a nominal contained accumulator water volume is used. The contained water volume is the same as the deliverable volume for the accumulators, since the accumulators are emptied, once discharged. For small breaks, an increase in water volume is a peak clad temperature penalty. For large breaks, an increase in water volume can be either a peak clad temperature penalty or benefit, depending on downcomer filling and subsequent spill through the break during the core reflooding portion of the transient. The analysis makes a conservative assumption with respect to ignoring or taking credit for line water volume from the accumulator to the check valve. The safety analysis assumes values of [6468] gallons and [6879] gallons. To allow for instrument inaccuracy, values of [6520] gallons and [6820] gallons are specified. (1) (2) (1) (3) (2)

INSERT 2

1225 ft^3 and 1275 ft^3

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

Attachment 1, Volume 10, Rev. 1, Page 22 of 132

(1)

INSERT 1

The large break LOCA analysis considers a range of accumulator water volumes based on minimum and maximum volumes of 1225 cubic feet and 1275 cubic feet.

(1)

INSERT 2

For the small break LOCA (SBLOCA) analysis, a decrease in water volume is a peak clad temperature penalty; thus, a minimum contained water volume is assumed. Both large and small break analysis use a nominal accumulator line volume from the accumulator to the check valve.

Attachment 1, Volume 10, Rev. 1, Page 23 of 132

BASES

APPLICABLE SAFETY ANALYSES (continued)

INSERT 3

The large and small break LOCA analyses are performed at the minimum nitrogen cover pressure, since sensitivity analyses have demonstrated that higher nitrogen cover pressure results in a computed peak clad temperature benefit. The maximum nitrogen cover pressure limit prevents accumulator relief valve actuation, and ultimately preserves accumulator integrity. 1

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

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

LCO

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

Two

one

most

no

and the fact that all the contents from the accumulator in the intact loop may not reach the core during depressurization of the RCS due to the fluid dynamics present during the ECCS bypass period.

For an accumulator to be considered OPERABLE, the isolation valve must be fully open, power removed above [2000] psig, and the limits established in the SRs for contained volume, boron concentration, and nitrogen cover pressure must be met. 5

and motive

APPLICABILITY

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

This LCO is only applicable at pressures > 1000 psig. At pressures ≤ 1000 psig, the rate of RCS blowdown is such that the ECCS pumps can provide adequate injection to ensure that peak clad temperature remains below the 10 CFR 50.46 (Ref. 2) limit of 2200°F. 1

the stored energy in the RCS and potential decay heat rates are significantly reduced. Additionally, at pressures ≤ 1000 psig, the potential consequences of a loss of coolant accident are lower and the minimum core cooling system operability requirements are relaxed

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

1

INSERT 3

The small break LOCA analysis is performed at the minimum nitrogen cover pressure, since sensitivity analyses have demonstrated that higher nitrogen cover pressure results in a computed peak clad temperature benefit. The large break analyses consider a range of nitrogen cover pressure; 675 psig to 825 psig (Ref. 1).

Attachment 1, Volume 10, Rev. 1, Page 25 of 132

BASES

ACTIONS

A.1

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

or boron precipitation affected

while

1

1

B.1

If one accumulator is inoperable for a reason other than boron concentration, the accumulator must be returned to OPERABLE status within 24 hours. In this Condition, the required contents of three accumulators cannot be assumed to reach the core during a LOCA. Due to the severity of the consequences should a LOCA occur in these conditions, the 24 hour Completion Time to open the valve, remove power to the valve, or restore the proper water volume or nitrogen cover pressure ensures that prompt action will be taken to return the inoperable accumulator to OPERABLE status. The Completion Time minimizes the potential for exposure of the plant to a LOCA under these conditions. The 24 hours allowed to restore an inoperable accumulator to OPERABLE status is justified in WCAP-15049-A, Rev. 1 (Ref. 4).

the one

1

C.1 and C.2

If the accumulator cannot be returned to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and RCS pressure reduced to ≤ 1000 psig within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Attachment 1, Volume 10, Rev. 1, Page 26 of 132

BASES

ACTIONS (continued)

D.1

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

SURVEILLANCE REQUIREMENTS

SR 3.5.1.1

isolation (SI-20A and SI-20B)

Each accumulator valve should be verified to be fully open every 12 hours. This verification ensures that the accumulators are available for injection and ensures timely discovery if a valve should be less than fully open. If an isolation valve is not fully open, the rate of injection to the RCS would be reduced. Although a motor operated valve position should not change with power removed, a closed valve could result in not meeting accident analyses assumptions. This Frequency is considered reasonable in view of other administrative controls that ensure a mispositioned isolation valve is unlikely. 1 4

SR 3.5.1.2 and SR 3.5.1.3

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

SR 3.5.1.4

The boron concentration should be verified to be within required limits for each accumulator every 31 days since the static design of the accumulators limits the ways in which the concentration can be changed. The 31 day Frequency is adequate to identify changes that could occur from mechanisms such as stratification or inleakage. Sampling the affected accumulator within 6 hours after a [1]% volume increase will identify whether inleakage has caused a reduction in boron concentration to below the required limit. It is not necessary to verify boron concentration if the added water inventory is from the refueling water storage tank (RWST), because the water contained in the RWST is within the accumulator boron concentration requirements. This is consistent with the recommendation of NUREG-1366 (Ref. 5). ≥15 5

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.1.5

motive
(SI-20A and SI-20B)
(by locking out the power breakers)
> 1000
active
this
no

Verification every 31 days that power is removed from each accumulator isolation valve operator when the RCS pressure is ≥ [2000] psig ensures that an active failure could not result in the undetected closure of an accumulator motor operated isolation valve. If this were to occur, only two accumulators would be available for injection given a single failure coincident with a LOCA. Since power is removed under administrative control, the 31 day Frequency will provide adequate assurance that power is removed. 5 4 3 1 7

This SR allows power to be supplied to the motor operated isolation valves when RCS pressure is < 2000 psig, thus allowing operational flexibility by avoiding unnecessary delays to manipulate the breakers during plant startups or shutdowns. ≤ 1000 5

REFERENCES

1. FSAR, Chapter [6]. U 6 1

2. 10 CFR 50.46.

3. FSAR, Chapter [15]. U 14 6 1

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

5. NUREG-1366, February 1990.

Attachment 1, Volume 10, Rev. 1, Page 28 of 132

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.1 BASES, ACCUMULATORS

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. ISTS 3.5.1 Bases for the Applicable Safety Analyses have been changed to reflect the Kewaunee specific design. Kewaunee Power Station (KPS) does not have a peak clad temperature penalty for an increase in water volume for small breaks. Additionally, KPS does not give a specific value for instrument uncertainties in large break analysis.

3. The ITS contains bracketed information and/or values that are generic to all Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is provided. This is acceptable since the generic specific information/value is revised to reflect the current plant design.

4. The component numbers of the accumulator isolation valves have been added to ITS Bases for SR 3.5.1.1 and ITS SR 3.5.1.5, consistent with CTS 3.3.a.1.B.

5. The Bases have been changed to reflect changes made to the actual Specification.

6. The ISTS reference to FSAR has been change USAR consistent with KPS terminology.

7. Changed to be consistent with the first sentence. The single failure is the active failure described in the first sentence.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.5.1, ACCUMULATORS

There are no specific NSHC discussions for this Specification.

Attachment 1, Volume 10, Rev. 1, Page 31 of 132

ATTACHMENT 2

ITS 3.5.2, ECCS - OPERATING

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

ITS

A01

ITS 3.5.2

b. Emergency Core Cooling System

Add proposed Applicability Note — M01

Applicability

1. The reactor shall not be made critical unless the following conditions are satisfied, except for LOW POWER PHYSICS TESTING and except as provided by TS 3.3.b.2 and TS 3.3.b.4. — M01, M02

ECCS

LCO 3.5.2

A. TWO SI/RHR trains are OPERABLE with each train comprised of:

1. ONE OPERABLE safety injection pump.

2. ONE OPERABLE residual heat removal pump.

3. ONE OPERABLE residual heat removal heat exchanger.

4. An OPERABLE flow path consisting of all valves, piping and interlocks associated with the above train of components and required to function during accident conditions. This flow path shall be capable of taking suction from the Refueling Water Storage Tank upon a Safety Injection signal and after manual transfer taking suction from the containment sump. — LA01

SR 3.5.2.1

B. Isolation valves SI-9A, SI-11A, SI-11B, and as a minimum either SI-4A or SI-4B are in the open position with their power breaker locked out.

or more — L01

ACTION A

2. During power operation or recovery from an inadvertent trip, ONE SI/RHR train may be inoperable for a period of 72 hours. — M01

ACTION B

A. If the inoperability is due to a component in the Safety Injection System and OPERABILITY is not restored within 72 hours, then within 1 hour action shall be initiated to:

- Achieve HOT STANDBY within the next 6 hours.
- Achieve HOT SHUTDOWN within the following 6 hours.
- Achieve COLD SHUTDOWN within an additional 36 hours.

M03, L03

ACTION B

B. If the inoperability is due to a component in the Residual Heat Removal System and OPERABILITY is not restored within 72 hours, then within 1 hour action shall be initiated to:

- Achieve HOT STANDBY within the next 6 hours.
- Achieve HOT SHUTDOWN within the following 6 hours.
- Achieve and maintain the Reactor Coolant System T_{avg} less than 350°F by use of alternate heat removal methods within an additional 36 hours.

M03

Add proposed ACTION C — L01

ITS A01 ITS 3.5.2

3. The reactor shall not be made critical unless the following conditions are satisfied except for LOW POWER PHYSICS TESTING and as provided by TS 3.3.b.4.

   A. The Refueling Water Storage Tank shall contain at least 272,500 gallons of water.

   B. The Refueling Water Storage Tank has a boron concentration of at least 2500 ppm.

4. During power operation or recovery from an inadvertent trip, the following conditions of inoperability may exist during the time interval specified.

   A. The calculated Refueling Water Storage Tank boron concentration may be < 2500 ppm for 8 hours.

   B. The Refueling Water Storage Tank may be inoperable for a reason other than that stated in TS 3.3.b.4.A for 1 hour. If OPERABILITY is not restored within the time specified, then within 1 hour action shall be initiated to:

      - Achieve HOT STANDBY within the next 6 hours.
      - Achieve HOT SHUTDOWN within the following 6 hours.
      - Achieve COLD SHUTDOWN within an additional 36 hours.

See ITS 3.5.4

LCO Note

5. When the reactor is critical, an OPERABLE SI train may be used to fill one SI Accumulator, for a duration of less than one hour, provided the redundant SI train is also OPERABLE. The provisions of TS 3.7.c are not applicable. A02

Attachment 1, Volume 10, Rev. 1, Page 35 of 132

ITS

A01

ITS 3.5.2

4.5 EMERGENCY CORE COOLING SYSTEM AND CONTAINMENT AIR COOLING SYSTEM TESTS

APPLICABILITY

Applies to testing of the Emergency Core Cooling System and the Containment Air Cooling System.

OBJECTIVE

To verify that the subject systems will respond promptly and perform their design functions, if required.

SPECIFICATION

a. System Tests

1. Safety Injection System

SR 3.5.2.5, SR 3.5.2.6

A. System tests shall be performed once per operating cycle or once every 18 months, whichever occurs first. With the Reactor Coolant System pressure ≤ 350 psig and temperature ≤ 350°F, a test safety injection signal will be applied to initiate operation of the system. A03 L02

B. The test will be considered satisfactory if control board indication or visual observations indicate that all components have received the safety injection signal in the proper sequence and timing. That is, the appropriate pump motor breakers shall have opened and closed, and all valves shall have completed their travel. A04

2. Containment Vessel Internal Spray System

A. System tests shall be performed once every operating cycle or once every 18 months, whichever occurs first. The test shall be performed with the isolation valves in the supply lines at the containment blocked closed.

B. Verify a minimum of 76 spray nozzles per train are functioning properly by using an air or smoke test at a test interval not to exceed 10 years.

C. The test will be considered satisfactory if control board indications or visual observations indicate all components have operated satisfactorily.

See ITS 3.6.6

ITS

A01

ITS 3.5.2

3. Containment Fancoil Units

Each fancoil unit shall be tested once every operating cycle or once every 18 months, whichever occurs first, to verify proper operation of the motor-operated service water outlet valves and the fancoil emergency discharge and associated backdraft dampers. (See ITS 3.6.6)

b. Component Tests

1. Pumps

M04

SR 3.5.2.4 A. The safety injection pumps, residual heat removal pumps, and containment spray pumps shall be started and operated quarterly during power operation and within 1 week after the plant is returned to power operation, if the test was not performed during plant shutdown. (See ITS 3.6.6) (LA03) (L04)

SR 3.5.2.4 B. Acceptable levels of performance are demonstrated by the pumps' ability to start and develop head within an acceptable range. (See ITS 3.6.6)

at the flow test point is greater than or equal to the required developed head (M04)

2. Valves

A. The containment sump outlet valves shall be tested during the pump tests. (LA02)

B. The accumulator check valves shall be checked for OPERABILITY during each major REFUELING outage. The accumulator block valves shall be checked to assure "valve open" requirements during each major REFUELING outage. (See ITS 3.5.1)

C. Deleted

D. Spray additive tank valves shall be tested during each major REFUELING outage. (See ITS 3.6.7)

E. Deleted

F. Residual Heat Removal System valve interlocks shall be tested once per operating cycle. (See ITS 3.4.14)

Add proposed SR 3.5.2.1, SR 3.5.2.2, SR 3.5.2.7, and SR 3.5.2.8 (M05)

Attachment 1, Volume 10, Rev. 1, Page 37 of 132

DISCUSSION OF CHANGES
ITS 3.5.2, ECCS - OPERATING

ADMINISTRATIVE CHANGES

A01 In the conversion of the Kewaunee Power Station (KPS) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1431, Rev. 3.0, "Standard Technical Specifications-Westinghouse Plants" (ISTS).

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

A02 CTS 3.3.b.5 provides a cross reference to CTS 3.7.c. ITS 3.5.2 does not include this reference. This changes the CTS by deleting a cross reference to another Specification.

The ITS does not include any cross references to other Specifications similar to this CTS cross reference. The requirements concerning power sources are covered by the definition of OPERABLE-OPERABILITY in ITS Section 1.1 and in ITS 3.8.1, "AC Sources - Operating." Changes related to power source requirements are discussed in the Discussion of Changes for ITS 1.1 and ITS 3.8.1. Therefore, this deletion is acceptable and is an administrative change.

A03 CTS 4.5.a.1.A states, in part, that system tests for the Safety Injection System shall be performed once per operating cycle or once every 18 months, whichever occurs first and that a test signal may be utilized during those times when the Reactor Coolant System temperature is ≤ 350°F and Reactor Coolant System pressure is ≤ 350 psig. ITS SR 3.5.2.5 verifies that 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 every 18 months. ITS SR 3.5.2.6 verifies that each ECCS pump starts on an actual or simulated actuation signal every 18 months. This changes the CTS by deleting the "once per operating cycle" terminology. The change discussion regarding the use of a simulated test signal is located in DOC L02.

This change is acceptable since the terms "operating cycle" and "18 months" are synonymous. The surveillance frequency remains essentially unchanged since the KPS refueling outage occurs every 18 months. The technical requirements of both the CTS and ITS remain unchanged in that a test is required to initiate the Safety Injection System to ensure the system will perform its intended function. This change is designated as administrative because it does not result in technical changes to the CTS.

A04 CTS 4.5.a.1.B states, in part, the Safety Injection System test will be considered satisfactory if control board indication or visual observations indicate all components have received the safety injection signal in the proper sequence and timing. Inclusive of this, is the travel of affected valves and positioning of pump motor breakers. ITS SR 3.5.2.5 and SR 3.5.2.6 do not include this statement. This changes the CTS by deleting the specific method of verifying Surveillances.

This change is acceptable because this type of information is not needed in the Technical Specifications. This information is found in the individual Surveillance

DISCUSSION OF CHANGES
ITS 3.5.2, ECCS - OPERATING

procedures used to perform the testing. ITS SR 3.5.2.5 and SR 3.5.2.6 continue to require verification of proper pump and valve actuation. Therefore, stating it in the Technical Specifications is unnecessary. Additionally, 10 CFR 50 Appendix B requires "Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished." Thus this CTS requirement is already covered by 10 CFR 50 Appendix B requirements. This change is considered administrative because it does not result in a technical change to the CTS.

MORE RESTRICTIVE CHANGES

M01 The CTS 3.3.b Applicability of the Emergency Core Cooling System (ECCS) is that the reactor shall not be made critical unless two SI/RHR trains are OPERABLE. In the ITS, this is MODES 1 and 2. In addition, CTS 3.3.b.2 provides actions when an ECCS train is inoperable during power operation or recovery from an inadvertent trip. ITS 3.5.2 requires the ECCS to be OPERABLE in MODES 1, 2, and 3. Thus, ITS 3.5.2 ACTION A must be entered if an ECCS train is inoperable in MODE 1, 2, or 3. This changes the CTS by requiring the ECCS to be OPERABLE in MODE 3 and requiring the actions to be taken in MODE 3.

The ECCS is designed to operate under accident conditions. The primary purpose of the ECCS is to automatically deliver cooling water to the reactor core in the event of a loss of coolant accident (LOCA). This limits the fuel-clad temperature and ensures the reactor core will remain substantially intact and in place, with its heat transfer geometry preserved. The addition of the MODE 3 Applicability is acceptable since the ECCS is required to be OPERABLE to perform its primary post accident function of delivery of cooling water to the reactor core. This change is more restrictive because a new Applicability containing MODE 3 has been added.

M02 CTS 3.3.b.1 states, in part, that the ECCS is not required to be OPERABLE during LOW POWER PHYSICS TESTS. ITS 3.5.2 does not include this exception; the ECCS is required during PHYSICS TESTS. This changes the CTS by requiring the ECCS to be OPERABLE during PHYSICS TESTS.

The purpose of CTS 3.3.b is to ensure the ECCS is OPERABLE under accident conditions. Since the KPS Physics Tests do not require the ECCS trains to be inoperable to perform the tests, there is no reason to maintain this current allowance. Therefore, this change is acceptable and is more restrictive because the ECCS is now required to be OPERABLE under more conditions in the ITS than in the CTS.

M03 CTS 3.3.b.2.A requires that if the Safety Injection System is not restored to OPERABLE status within 72 hours, then, within 1 hour, initiate action to achieve HOT STANDBY within 6 hours and achieve HOT SHUTDOWN within the following 6 hours. CTS 3.3.b.2.B requires that if the Residual Heat Removal System is not restored to OPERABLE status within 72 hours, then, within 1 hour, initiate action to achieve HOT STANDBY within 6 hours, achieve HOT

DISCUSSION OF CHANGES
ITS 3.5.2, ECCS - OPERATING

SHUTDOWN within the following 6 hours, and achieve and maintain the RCS Tavg < 350ºF by use of alternate methods within an additional 36 hours. ITS 3.5.2 Required Action B.1 requires that the unit be in MODE 3 (equivalent to CTS HOT SHUTDOWN) within 6 hours and in MODE 4 (equivalent to CTS RCS Tavg < 350ºF) within 12 hours. This change deletes the requirement to be in HOT STANDBY (equivalent to ITS MODE 2) within 6 hours, changes the time required to be in HOT SHUTDOWN (equivalent to ITS MODE 3) from 13 hours to 6 hours, and changes the time to reduce RCS temperature to < 350ºF (equivalent to ITS MODE 4) from 48 hours to 12 hours.

The purpose of CTS 3.3.b.2.A and 3.3.b.2.B is to place the unit in a condition in which the LCO does not apply. This change is acceptable because the Completion Time is consistent with safe operation under the specified Condition, considering the OPERABLE status of the redundant systems or features. This includes the capacity and capability of remaining systems or features, a reasonable time for repairs or replacement, and the low probability of a DBA occurring during the allowed Completion Time. Allowing 6 hours to be in MODE 3 in lieu of the current 13 hours and 12 hours to be in MODE 4 in lieu of the current 48 hours ensures a unit shutdown is commenced and completed within a reasonable period of time upon failure to restore the ECCS to OPERABLE status within the allowed Completion Time. Additionally, since ITS 3.5.2 Required Action B.1 requires the unit to be in MODE 3 within 6 hours, there is no need to maintain the requirement to be MODE 2 within 7 hours. This change is designated as more restrictive because less time is allowed for the unit to reach MODE 3 and MODE 4 than was allowed in the CTS.

M04 CTS 4.5.b.1.A requires the safety injection and residual heat removal pumps be started and operated quarterly during power operation and within 1 week after the plant is returned to power operation, if the test was not performed during plant shutdown. CTS 4.5.b.1.B states, in part, that an acceptable level of performance is demonstrated by the pump's ability to develop a head within an acceptable range. ITS SR 3.5.2.4 requires verification that each ECCS pump's developed head at the test flow point is greater than or equal to the required developed head. This changes the CTS by requiring that the developed head is greater than or equal to the required developed head. The change in the test Frequency is discussed in DOCs LA03 and L04.

The purpose of CTS 4.5.b.1 is to demonstrate that the ECCS pumps are able to perform their design functions. ITS SR 3.5.2.4 confirms the pump OPERABILITY, trends the performance, and detects incipient failure by indicating abnormal performance. This change is designated as more restrictive because a more specific test of the ECCS pumps will be performed than was required in the CTS.

M05 CTS 4.5 does not provide a Surveillance Requirement to verify the valves listed in CTS 3.3.b.1.B are in the required condition. The ITS adds a Surveillance Requirement (SR 3.5.2.1) to verify the valves are in the proper position with motive power to the valve operator removed once every 12 hours. CTS 4.5 does not provide a Surveillance Requirement to 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. The ITS adds a

DISCUSSION OF CHANGES
ITS 3.5.2, ECCS - OPERATING

Surveillance Requirement (SR 3.5.2.2) to 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 once every 31 days. CTS 4.5 does not provide a Surveillance Requirement to verify each ECCS throttle valve has its position stop in the correct position. The ITS adds a Surveillance Requirement (SR 3.5.2.7) to verify each ECCS throttle valve has its position stop in the correct position once every 18 months. CTS 4.5 does not provide a Surveillance Requirement to verify the containment sump strainer inlet is not restricted by debris and the debris interceptors and strainer show no evidence of structural distress or abnormal corrosion. The ITS adds a Surveillance Requirement (SR 3.5.2.8) to verify, by visual inspection, the containment sump strainer inlet is not restricted by debris and the debris interceptors and strainer show no evidence of structural distress or abnormal corrosion once every 18 months. This changes the CTS by adding new Surveillance Requirements to the Technical Specifications.

This change is acceptable because the added Surveillance Requirements provide additional assurance that the ECCS is capable of automatically delivering cooling water to the reactor core in the event of a LOCA during both the injection and recirculation phases of the accident. This change is designated as more restrictive because new Surveillance Requirements are added.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 3.3.b.1.A requires two SI/RHR trains be OPERABLE with each train consisting of the following: 1) one OPERABLE safety injection pump; 2) one OPERABLE residual heat removal pump; 3) one OPERABLE residual heat removal heat exchanger; and 4) an OPERABLE flow path consisting of all valves, piping, and interlocks associated with the above train of components and required to function during accident conditions. This flow path shall be capable of taking suction from the Refueling Water Storage tank upon a Safety Injection signal and after manual transfer taking suction from the containment sump. ITS LCO 3.5.2 requires two ECCS trains to be OPERABLE, but does not define the components and the associated flow path that comprise an OPERABLE ECCS train. This changes the CTS by moving the description of the ECCS trains to the Bases.

The removal of these details which are related to system design from the Technical Specifications is acceptable because this type of information is not necessary to be included to provide adequate protection of public health and safety. The ITS still retains the requirement for both ECCS trains to 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.

Attachment 1, Volume 10, Rev. 1, Page 41 of 132

DISCUSSION OF CHANGES
ITS 3.5.2, ECCS - OPERATING

This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LA02 *(Type 4 – Removal of LCO, SR, or other TS requirement to the TRM, USAR, ODCM, NFQAPD, CLRT Program, IST Program, ISI Program, or Setpoint Control Program)* CTS 4.5.b.2.A requires the containment sump outlet valves to be tested during the pump tests. ITS 3.5.2 does not contain this requirement. This changes the CTS by relocating this Surveillance Requirement to the IST Program.

The removal of this Surveillance Requirement from the Technical Specifications is acceptable because this type of information is not necessary to be included to provide adequate protection of public health and safety. The containment sump outlet valves (SI-350A, SI-350B, SI-351A, and SI-351B) are normally closed motor operated valves that open, by remote manual switch actuation, when transitioning from the injection phase of a LOCA to the recirculation phase of a LOCA. This change is acceptable because this type of Surveillance Requirement will be adequately controlled in the IST Program, which is controlled under 10 CFR 50.55a. This change is designated a less restrictive removal of detail change because a requirement is being removed from the Technical Specifications.

LA03 *(Type 3 - Removing Procedural Detail for Meeting TS Requirements or Reporting Requirements)* CTS 4.5.b.1.A requires that the safety injection and residual heat removal pumps are demonstrated OPERABLE quarterly during power operation. ITS 3.5.2.4 requires a similar verification in accordance with the Inservice Testing Program. This changes the CTS by moving the specific Frequency for this test (quarterly) to the Inservice Testing (IST) Program.

The removal of this detail, for performing Surveillance Requirements, from the Technical Specifications is acceptable because the Frequency for the verification has not changed. The Kewaunee IST Program requires this verification every quarter (92 days). Therefore, 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 to verify each ECCS pump's developed head at the flow test point is greater than or equal to the required developed head at a Frequency of in accordance with the IST Program. Also, this change is acceptable because these types of details will be adequately controlled in the IST Program, which is controlled by 10 CFR 50.55a. This change is designated as a less restrictive removal of detail change because details for meeting Technical Specification requirements are being removed from the Technical Specifications.

Attachment 1, Volume 10, Rev. 1, Page 42 of 132

DISCUSSION OF CHANGES
ITS 3.5.2, ECCS - OPERATING

LESS RESTRICTIVE CHANGES

L01 *(Category 4 – Relaxation of Required Action)* CTS 3.3.b.2 states that during power operation or recovery from an inadvertent trip, one SI/RHR train may be inoperable for a period of 72 hours. ITS 3.5.2 ACTION A states when one or more trains are inoperable, restore the trains to OPERABLE status within 72 hours. ITS 3.5.2 ACTION C states that with less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available, enter LCO 3.0.3 immediately. This changes the CTS by allowing combinations of equipment from both trains to be credited as meeting the ECCS safety function provided 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is available. For example, under the CTS, an inoperable safety injection pump in one train and an inoperable residual heat removal pump in the other train would require a CTS 3.0.c entry. Under the ITS, the same condition would allow 72 hours before requiring a shutdown because the remaining OPERABLE safety injection pump and residual heat removal pump are capable of producing the flow equivalent to a single OPERABLE train.

The purpose of CTS 3.3.b.2 is to limit the period of time the plant can operate without redundant ECCS trains. This change is acceptable because the Required Actions are used to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering the OPERABILITY status of the redundant systems of required features, the capacity and capability of remaining features, a reasonable time for repairs or replacement of required features, and the low probability of a DBA occurring during the repair period. ITS 3.5.2 ACTIONS A and C continue to require ECCS components equivalent to a complete ECCS train, and limit the time only one equivalent train is OPERABLE to 72 hours. The ECCS can still perform its safety function, assuming no single failure occurs. This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L02 *(Category 6 – Relaxation of Surveillance Requirement Acceptance Criteria)* CTS 4.5.a.1.A states, in part, a test safety injection signal will be applied to initiate operation of the system for the Safety Injection System test. ITS SR 3.5.2.5 and SR 3.5.2.6 require verification of each ECCS valve actuating and pump starting automatically on an actual or simulated (i.e., test signal) actuation signal. This changes the CTS by explicitly allowing the use of either an actual or simulated signal for the test.

The purpose of CTS 4.5.a.1.A is to ensure that the ECCS pumps and valves operate correctly upon receipt of an actuation signal. This change is acceptable because it has been determined that the CTS 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

Attachment 1, Volume 10, Rev. 1, Page 43 of 132

DISCUSSION OF CHANGES
ITS 3.5.2, ECCS - OPERATING

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.

L03 *(Category 4 – Relaxation of Required Action)* CTS 3.3.b.2.A, in part, requires that when an SI train is inoperable and a unit shutdown is required, the unit must be in COLD SHUTDOWN (ITS equivalent MODE 5) within an additional 36 hours (after the time to reach HOT STANDBY and HOT SHUTDOWN). ITS 3.5.2 Required Action C.2 only requires the unit to be in MODE 4 in 12 hours. This deletes the requirement to be in COLD SHUTDOWN (equivalent to ITS MODE 5) within an additional 36 hours and adds a requirement to be in MODE 4 within 12 hours.

The purpose of ITS 3.5.2 ACTION B is to place the unit in a condition in which the LCO does not apply. This change is acceptable because the Applicability of ITS 3.5.2 is MODES 1, 2, and 3. Thus, the proposed ITS ACTION does take the unit outside the Applicability of the LCO. This is acceptable since the MODE 4 ECCS requirements are covered by another LCO (ITS 3.5.3). This change is designated as less restrictive because a requirement to be in COLD SHUTDOWN is being deleted.

L04 *(Category 7 – Relaxation Of Surveillance Frequency)* CTS 4.5.b.1.A requires the ECCS pumps to be started and operated every quarter during power operation and "within 1 week after the plant is returned to power operation, if the test was not performed during plant shutdown." This implies that even if the test were performed just prior to a unit shutdown, that it must be re-performed within one week after the plant startup if not performed during the plant shutdown, even if the test is still current (i.e., has been performed within the previous quarter). ITS SR 3.5.2.4 only requires this test to be performed every 92 days. This changes the CTS by reducing the Frequency for performing the ECCS pump tests by allowing the test to not be performed within 1 week after a unit startup if the Surveillance is still current (i.e., it has been performed within the previous 92 days).

The purpose of CTS 4.5.b.1.A is to ensure that the ECCS pumps are OPERABLE. This change is acceptable because the new Surveillance Frequency provides an acceptable level of equipment reliability. The change is acceptable since the Frequency of 92 days has been determined to be sufficient during power operation, thus it is sufficient if the unit has been shutdown and then restarted within the 92 day Frequency. Shutting down the unit in and of itself does not affect the OPERABILITY of the ECCS pumps. Furthermore, ITS SR 3.0.1 requires the SR to be met during the MODES or other specified conditions in the Applicability and ITS SR 3.0.4 requires the Surveillance to be met within the specified Frequency prior to entering the Applicability of the LCO and prior to changing MODES. Thus, ITS SR 3.5.2.4 for the ECCS pumps must be current prior to restarting the unit (i.e., a MODE change). This change is designated as less restrictive because Surveillances will be performed less frequently under the ITS than under the CTS.

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

CTS

All changes are (1) unless otherwise noted

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS - Operating

3.3.b.1.A LCO 3.5.2 Two ECCS trains shall be OPERABLE.

---NOTES---

3.3.b.5 [1. In MODE 3, both safety injection (SI) pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve testing per SR 3.4.14.1.

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

A safety injection (SI) train may be considered OPERABLE for up to 1 hour when being used to fill an SI accumulator, provided the other SI train is OPERABLE.

3.3.b.1 APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.3.b.2	A. One or more trains inoperable.	A.1 Restore train(s) to OPERABLE status.	72 hours
3.3.b.2.A, 3.3.b.2.B, DOC M01	B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
		<u>AND</u>	
		B.2 Be in MODE 4.	12 hours
DOC L01	C. Less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.	C.1 Enter LCO 3.0.3.	Immediately

Attachment 1, Volume 10, Rev. 1, Page 46 of 132

CTS

All changes are (1) unless otherwise noted

SURVEILLANCE REQUIREMENTS

CTS	SURVEILLANCE		FREQUENCY	
3.3.b.1.B, DOC M05	SR 3.5.2.1	[Verify the following valves are in the listed position with motive power to the valve operator removed. Number / Position / Function [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] INSERT 1	12 hours]	4
DOC M05	SR 3.5.2.2	Verify each ECCS manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days	
	SR 3.5.2.3	Not used. [Verify ECCS piping is full of water.	31 days]	6
4.5.b.1.A, 4.5.b.1.B	SR 3.5.2.4	Verify each ECCS pump's developed head at the test flow point is greater than or equal to the required developed head.	In accordance with the Inservice Testing Program	
4.5.a.1.A	SR 3.5.2.5	Verify each ECCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	[18] months	
4.5.a.1.A	SR 3.5.2.6	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	[18] months	
DOC M05	SR 3.5.2.7	[Verify, for each ECCS throttle valve listed below, each position stop is in the correct position. Valve Number [ ] [ ] [ ] SI-10A SI-10B	[18] months]	

1

INSERT 1

SI-9A	Open	Safety Injection to RCS Cold Legs
SI-11A	Open	Safety Injection to Loop A Cold Leg
SI-11B	Open	Safety Injection to Loop B Cold Leg
SI-4A OR SI-4B	Open	RWST Supply to Safety Injection Pumps

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY	
DOC M05 SR 3.5.2.8	Verify, by visual inspection, each ECCS train [the] containment sump suction [strainer] inlet is not restricted by debris and the suction inlet trash racks [debris interceptors] and screens [strainer] show no evidence of structural distress or abnormal corrosion.	[18] months	1 5

Attachment 1, Volume 10, Rev. 1, Page 49 of 132

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.2, ECCS - OPERATING

1. The ISTS contains bracketed information and/or values that are generic to all Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is provided. This is acceptable since the generic specific information/value is revised to reflect the current plant design.

2. ISTS 3.5.2 LCO NOTE 1 states that in MODE 3, both SI pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve (PIV) testing per SR 3.4.14.1. KPS does not need this allowance to perform PIV testing required by SR 3.4.14.1. Both SI flow paths are not simultaneously isolated during PIV testing. Therefore, this NOTE is not applicable to KPS and has been deleted. ISTS 3.5.2 LCO NOTE 2 states, in part, that in MODE 3 the ECCS pumps may be incapable of injection in order to support a transition into or out of the Applicability for the Low Temperature Overpressure Protection (LTOP) System for up to 4 hours or until the temperature of the RCS cold legs exceed the LTOP arming temperature. Per the information in USAR 9.3.3.8, the Kewaunee Power Station (KPS) LTOP system is to be operable at or below the RCS temperature of 200°F. This temperature is outside of the ECCS Applicability temperature range of MODES 1 through 3 (≥ 350°F) thus the operation of the ECCS pumps will not be affected by LTOP system restrictions. Therefore, this NOTE is not applicable to KPS and has been deleted.

3. An ITS 3.5.2 LCO Note has been added consistent with the allowance in CTS 3.3.b.5. The Note was added to allow an SI train to be considered OPERABLE for up to 1 hour when it is being used to refill an SI accumulator. This allowance was approved by the NRC in License Amendment 143, dated February 23, 1999 (ADAMS Accession No. ML020770343).

4. The KPS design is such that the valve operator still has AC power when the power breaker is locked out. This AC power is only provided so that valve position indication is available in the control room. However, locking out of the breaker does ensure that the motor operator cannot move the valve, since there is no motive power. Therefore, the word "motive" has been added to ISTS SR 3.5.2.1 to clarify that while the motor operator has power, there is no motive power. This still accomplishes the intent of the ISTS SR.

5. Changes made to be consistent with the KPS design of the containment sump strainers and debris interceptors.

6. ISTS SR 3.5.2.3 is a bracketed Surveillance Requirement that requires verifying the ECCS piping is full of water every 31 days. This SR has not been included in the KPS ITS submittal. The KPS CTS does not include this SR. This specific requirement is currently being controlled outside of the CTS in the KPS Technical Requirements Manual. This method of controlling this SR was provided to the NRC in the KPS response to Generic Letter 2008-01 (letter dated October 14, 2008, ADAMS Accession No. ML082880707). KPS is aware that this issue (maintaining ECCS piping full of water) is a generic industry issue currently being discussed with the NRC. KPS is also aware that the TSTF group will be proposing a generic change to the ISTS to adequately control the issue in a manner that is acceptable to both the industry and the NRC. As part of the KPS response to the Generic Letter, KPS committed to following the industry effort and reviewing any Technical Specification changes recommended.

Attachment 1, Volume 10, Rev. 1, Page 50 of 132

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.2, ECCS - OPERATING

KPS believes that this is an acceptable approach to this issue, since it has yet to be fully resolved by the NRC. As stated, the KPS current licensing basis does not include a specific Technical Specification Surveillance Requirement. In the NRC's attachment to the second NRC MEH-002 question, the NRC stated, with respect to this issue, that "NRC has in effect determined that operability of the subject systems is reasonably ensured in the short term and the longer term determination will be addressed by the regional inspection. Further, significant industry research and NRC review of issues is continuing and new information may change previous conclusions regarding what is necessary to support a reasonable assurance of operability." These words are in reference to the NRC response to the KPS response to Generic Letter 2008-01. Thus, KPS believes that the ECCS OPERABILITY is being maintained using our current requirements controlled outside of Technical Specifications, and that maintaining this approach until the generic issue is resolved is acceptable. Note that if KPS was not performing an ITS conversion, then this approach is the approach accepted by the NRC (maintaining requirements outside of Technical Specifications until the issue is resolved).

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

All changes are 1 unless otherwise noted

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.2 ECCS - Operating

BASES

BACKGROUND

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

a. Loss of coolant accident (LOCA), coolant leakage greater than the capability of the normal charging system, ;

b. Rod RCCA ejection accident, ; Steam Line Break accident;

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

d. Steam generator tube rupture (SGTR). 2

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

There are three two phases of ECCS operation: injection, cold leg recirculation, and hot leg recirculation. In the injection phase, water is taken from the refueling water storage tank (RWST) and injected into the Reactor Coolant System (RCS) through the cold legs and vessel injection nozzles. When sufficient water is removed from the RWST to ensure that enough boron has been added to maintain the reactor subcritical and the containment sumps has have enough water to supply the required net positive suction head to the ECCS pumps, suction is switched to the containment sump for the cold leg recirculation phase. After approximately 24 hours, the ECCS flow is shifted to the hot leg recirculation phase to provide a backflush, which would reduce the boiling in the top of the core and any resulting boron precipitation. When RCS pressure drops below the Residual Heat Removal (RHR) pump shutoff head, the RHR flow is directed into the reactor vessel upper plenum to reduce the boiling in the top of the core and any resulting boron precipitation. 4

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

All changes are (1) unless otherwise noted

BASES

BACKGROUND (continued)

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

INSERT 1

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

~~For LOCAs that are too small to depressurize the RCS below the shutoff head of the SI pumps, the centrifugal charging pumps supply water until the RCS pressure decreases below the SI pump shutoff head. During this period, the steam generators are used to provide part of the core cooling function.~~ (6)

INSERT 2

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

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

1 **INSERT 1**

The RHR pumps deliver through two nozzles that penetrate the reactor vessel and core barrel. The SI pumps deliver into two separate headers which are cross connected so that either pump is capable of providing flow to the RCS cold legs or reactor vessel injection nozzles. One header supplies the cold legs and the other header supplies the reactor vessel. The header to the reactor vessel (normally isolated) divides into two separate injection lines which connect to the lines from the RHR pumps and supply the two reactor vessel nozzles. These lines are normally isolated. The header to the cold legs divides into two injection lines connected to the cold legs of the RCS. Manual valves (SI-10A and SI-10B) in the safety injection lines to the RCS cold legs are positioned and locked to the correct throttle position to ensure proper flow and balance of flow of each loop.

1 **INSERT 2**

The recirculation flow goes from the discharge of the RHR pump through the RHR heat exchanger and then into the reactor via either a low-head injection path or a high-head injection path via a safety injection pump. The high-head injection paths are provided in the event of a small break in which the pressure in the RCS is higher than the shutoff head of the RHR pump.

All changes are (1) unless otherwise noted

BASES

BACKGROUND (continued)

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. (5)

The ECCS subsystems are actuated upon receipt of an SI signal. The actuation of safeguard loads is accomplished in a programmed time sequence. If offsite power is available, the safeguard loads start immediately in the programmed sequence. If offsite power is not available, the Engineered Safety Feature (ESF) buses shed normal operating loads and are connected to the emergency diesel generators (EDGs). Safeguard loads are then actuated in the programmed time sequence. The time delay associated with diesel starting, sequenced loading, and pump starting determines the time required before pumped flow is available to the core following a LOCA.

The active ECCS components, along with the passive accumulators and the RWST covered in LCO 3.5.1, "Accumulators," and LCO 3.5.4, "Refueling Water Storage Tank (RWST)," provide the cooling water necessary to meet GDC 35 [USAR, General Design Criteria (GDC) 44] (Ref. 1). (13)

APPLICABLE SAFETY ANALYSES

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

a. Maximum fuel element cladding temperature is ≤ 2200°F, [;] (2)

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

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

d. Core is maintained in a coolable geometry, [;] and (2)

e. Adequate long term core cooling capability is maintained.

The LCO also limits the potential for a post trip return to power following an MSLB event and [helps] ensures that containment temperature limits are met.

All changes are (1) unless otherwise noted

BASES

APPLICABLE SAFETY ANALYSES (continued)

Each ECCS subsystem is taken credit for in a large break LOCA event at full power (Refs. 3 and 4). This event establishes the requirement for runout flow for the ECCS pumps, as well as the maximum response time for their actuation. The centrifugal charging pumps and SI pumps are credited in a small break LOCA event. This event establishes the flow and discharge head at the design point for the centrifugal charging pumps. The SGTR and MSLB events also credit the centrifugal charging pumps. The OPERABILITY requirements for the ECCS are based on the following LOCA analysis assumptions: (6) safety injection

a. A large break LOCA event, with loss of offsite power and a single failure disabling one RHR pump (both EDG trains are assumed to operate due to requirements for modeling full active containment heat removal system operation) and ; (2)

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

During the blowdown stage of a LOCA, the RCS depressurizes as primary coolant is ejected through the break into the containment. The nuclear reaction is terminated either by moderator voiding during large breaks or control rod insertion for small breaks. Following depressurization, emergency cooling water from the SI pumps is injected into the cold legs, flows into the downcomer, fills the lower plenum, and refloods the core and emergency cooling water from the RHR pumps is injected into the reactor vessel upper plenum.

The effects on containment mass and energy releases are accounted for in appropriate analyses (Refs. 3 and 4). The LCO ensures that an ECCS train will deliver sufficient water to match boiloff rates soon enough to minimize the consequences of the core being uncovered following a large break LOCA. It also ensures that the centrifugal charging and SI pumps will deliver sufficient water and boron during a small break LOCA to maintain core subcriticality RCS inventory. For smaller break LOCAs, the centrifugal charging SI pump delivers sufficient fluid to maintain RCS inventory. For a small break LOCA, the steam generators continue to serve as the heat sink, providing part of the required core cooling. (6) (6)

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

LCO

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

All changes are (1) unless otherwise noted

BASES

LCO (continued)

In MODES 1, 2, and 3, an ECCS train consists of a centrifugal charging subsystem, an SI subsystem, and an RHR subsystem. Each train includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWST upon an SI signal and automatically transferring suction to the containment sump.

manually

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

two

(SI pumps) and RCS vessel injection nozzles (RHR pumps)

or vessel

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

active

the

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

an SI train may be considered OPERABLE for up to 1 hour when being used to fill an SI accumulator, provided the other SI train is OPERABLE.

As indicated in Note 2, operation in MODE 3 with ECCS trains made incapable of injecting in order to facilitate entry into or exit from the Applicability of LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," is necessary for plants with an LTOP arming temperature at or near the MODE 3 boundary temperature of 350°F. LCO 3.4.12 requires that certain pumps be rendered incapable of injecting at and below the LTOP arming temperature. When this temperature is at or near the MODE 3 boundary temperature, time is needed to make pumps incapable of injecting prior to entering the LTOP Applicability, and provide time to restore the inoperable pumps to OPERABLE status on exiting the LTOP Applicability. (5)

APPLICABILITY

In MODES 1, 2, and 3, the ECCS OPERABILITY requirements for the limiting Design Basis Accident, a large break LOCA, are based on full power operation. Although reduced power would not require the same level of performance, the accident analysis does not provide for reduced cooling requirements in the lower MODES. The centrifugal charging pump performance is based on a small break LOCA, which establishes the pump performance curve and has less dependence on power. The SI pump performance requirements are based on a small break LOCA. (7) MODE 2 and MODE 3 requirements are bounded by the MODE 1 analysis.

All changes are (1) unless otherwise noted

BASES

APPLICABILITY (continued)

are

s

certain

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

In MODES 5 and 6, plant conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation - High Water Level," and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level." (8)

ACTIONS

A.1

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

An ECCS train is inoperable if it is not capable of delivering design flow to the RCS. Individual components are inoperable if they are not capable of performing their design function or supporting systems are not available. (12)

safety

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.

active

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

All changes are (1) unless otherwise noted

BASES

ACTIONS (continued)

Reference 6 describes situations in which one component, such as an RHR crossover valve, can disable both ECCS trains. With one or more component(s) inoperable such that 100% of the flow equivalent to a single OPERABLE ECCS train is not available, the facility is in a condition outside the accident analysis. Therefore, LCO 3.0.3 must be immediately entered. (9)

B.1 and B.2

If the inoperable trains cannot be returned to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

C.1

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

SURVEILLANCE REQUIREMENTS

SR 3.5.2.1

Verification of proper valve position ensures that the flow path from the ECCS pumps to the RCS is maintained. Misalignment of these valves could render both ECCS trains inoperable. Securing these valves in position by removal of power or by key locking the control in the correct position [with their respective power breaker locked out] ensures that they cannot change position as a result of an active failure or be inadvertently misaligned. These valves are of the type, described in Reference 6, that can disable the function of both ECCS trains and invalidate the accident analyses. A 12 hour Frequency is considered reasonable in view of other administrative controls that will ensure a mispositioned valve is unlikely.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these 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 improper valve position would only affect a single train. This Frequency has been shown to be acceptable through operating experience.

SR 3.5.2.3

Not used.

With the exception of the operating centrifugal charging pump, the ECCS pumps are normally in a standby, nonoperating mode. As such, flow path piping has the potential to develop voids and pockets of entrained gases. Maintaining the piping from the ECCS pumps to the RCS full of water ensures that the system will perform properly, injecting its full capacity into the RCS upon demand. This will also prevent water hammer, pump cavitation, and pumping of noncondensible gas (e.g., air, nitrogen, or hydrogen) into the reactor vessel following an SI signal or during shutdown cooling. The 31 day Frequency takes into consideration the gradual nature of gas accumulation in the ECCS piping and the procedural controls governing system operation. 14

SR 3.5.2.4

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

All changes are 1 unless otherwise noted

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.5 and SR 3.5.2.6

These Surveillances demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SI signal and that each ECCS pump starts on receipt of an actual or simulated SI signal. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The 18 month Frequency is based on the need to perform these Surveillances under the conditions that apply during a plant outage and the potential for unplanned plant transients if the Surveillances were performed with the reactor at power. The 18 month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment. The actuation logic is tested as part of ESF Actuation System testing, and equipment performance is monitored as part of the Inservice Testing Program. 10

SR 3.5.2.7

Proper throttle valve position

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

are throttled and locked

s

SR 3.5.2.8

strainer

Periodic inspections of the containment sump suction inlet ensure that it is unrestricted and stays in proper operating condition. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage, on the need to have access to the location, and because of the potential for an unplanned transient if the Surveillance were performed with the reactor at power. This Frequency has been found to be sufficient to detect abnormal degradation and is confirmed by operating experience. 11

and

All changes are (1) unless otherwise noted

BASES

REFERENCES

1. ~~10 CFR 50, Appendix A, GDC 35.~~ USAR, Section 6.2.1.1, GDC 44, "Emergency Core Cooling System Capability." (13)

2. 10 CFR 50.46.

3. ~~F~~ U SAR, Section ~~[ ]~~ 6.2, Safety Injection System. (3)

4. ~~F~~ U SAR, Chapter ~~[15]~~ 14, "~~Accident~~ Safety Analysis." (3)

5. NRC Memorandum to V. Stello, Jr., from R.L. Baer, "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.

6. IE Information Notice No. 87-01.

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.2 BASES, ECCS - OPERATING

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

2. The 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 ISTS contains bracketed information and/or values that are generic to all Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is provided. This is acceptable since the generic specific information/value is revised to reflect the current plant design.

4. The ISTS Bases states, in part, that the ECCS flow is shifted to the RCS hot leg recirculation phase after 24 hours to provide a backflush. Kewaunee Power Station (KPS) design does not provide for this type of operation during the recirculation phase of the ECCS operation following a Loss of Coolant Accident (LOCA).

5. The ISTS Bases states, in part, that during low temperature conditions in the RCS, limitations may be placed on the maximum number of ECCS pumps that may be OPERABLE due to Low Temperature Overpressure Protection (LTOP) System operation. Per the information in USAR 9.3.3.8, the KPS LTOP System is to be operable at or below the RCS temperature of 200°F. This temperature is outside of the ECCS Applicability temperature range of MODES 1 through 3 (≥ 350°F) thus the operation of the ECCS pumps will not be affected by LTOP system restrictions. Therefore, this information is not applicable to KPS and has been deleted.

6. The charging pumps are not assumed in the accident analysis. Therefore, references to the charging pumps have been deleted.

7. The Applicability Section of the ISTS B 3.5.2 states, "The centrifugal charging pump performance is based on a small leak LOCA, which establishes the pump performance curve and has less dependence on power. The SI pump performance requirements are based on a small break LOCA." These statements are irrelevant to why the ECCS requirements are applicable in MODES 1, 2, and 3. In addition, similar statements exist in the Applicable Safety Analysis section of the ISTS B 3.5.2. Therefore, these statements are not included in the Applicability Section of KPS ITS B 3.5.2.

8. The ISTS B 3.5.2 Applicability Section states, "In MODES 5 and 6, plant conditions are such that the probability of an event requiring ECCS injection is extremely low." In support of the aforementioned statement, the Applicability contains specific ISTS LCOs which address core cooling requirements in MODES 5 and 6. The LCOs listed are relative to the shutdown cooling function of the RHR System and not the ECCS function. The Applicability Section has adequately described why ECCS is not needed in MODES 5 and 6, and it is not necessary to describe why normal shutdown cooling is required. Therefore, the inappropriate information has been deleted.

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.2 BASES, ECCS - OPERATING

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

10. The ISTS SR 3.5.2.5 and SR 3.5.2.6 Section states, "The actuation logic is tested as part of ESF Actuation System testing, and equipment performance is monitored as part of the Inservice Testing Program." This statement is not necessary since this type of cross reference information is included in the appropriate Specifications and does not need to be referenced in the SR Bases. Therefore, this statement has been deleted.

11. Changed to be consistent with changes to the Surveillance.

12. The term "design function" has been changed to "safety function" to be consistent with the terminology in the definition of OPERABLE – OPERABILITY.

13. ISTS 3.5.2 Bases Background references General Design Criteria. Kewaunee Power Station (KPS) was designed prior to promulgation of 10 CFR 50, Appendix A. Therefore, ITS 3.5.2 Bases Background has been revised to discuss the design standards used by KPS. Additionally, bases references to 10 CFR 50, Appendix A have been replaced with references to the appropriate section of the USAR.

14. Change made due to deletion of the Surveillance Requirement.

Specific No Significant Hazards Considerations (NSHCs)

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

There are no specific NSHC discussions for this Specification.

ATTACHMENT 3

ITS 3.5.3, ECCS - SHUTDOWN

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

Add Proposed ITS 3.5.3

M01

DISCUSSION OF CHANGES
ITS 3.5.3, ECCS - SHUTDOWN

ADMINISTRATIVE CHANGES

None

MORE RESTRICTIVE CHANGES

M01 The CTS does not have any requirements for the Emergency Core Cooling Systems (ECCS) - Shutdown to be OPERABLE. ITS 3.5.3 requires one ECCS train to be OPERABLE in MODE 4. This changes the CTS by incorporating the requirements of ISTS 3.5.3. The ITS also provides Actions when one or both ECCS subsystems (Safety Injection and Residual Heat Removal) are inoperable (ACTIONS A, B, and C) and a Surveillance Requirement (SR 3.5.3.1).

The primary function of the ECCS is to automatically provide core cooling and negative reactivity to ensure that the reactor core is protected following a loss of coolant accident (LOCA), rod ejection accident, steam line break accident, and steam generator tube rupture. This change is acceptable because the ECCS is now required to be OPERABLE and capable of automatically providing core cooling in MODE 4. This change is designated as more restrictive because it adds new requirements to the CTS.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

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

CTS

All changes are (1) unless otherwise noted

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.3 ECCS - Shutdown

DOC M01

LCO 3.5.3 One ECCS train shall be OPERABLE.

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

DOC M01

APPLICABILITY: MODE 4.

ACTIONS

DOC M01

---NOTE---
LCO 3.0.4.b is not applicable to ECCS ~~high head~~ safety injection subsystem.

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
DOC M01	A. [Required ECCS residual heat removal (RHR) subsystem inoperable.	A.1 Initiate action to restore required ECCS RHR subsystem to OPERABLE status.	Immediately]	(2)
DOC M01	B. Required ECCS ~~[high head~~ safety injection (SI) subsystem] inoperable.	B.1 Restore required ECCS ~~[high head~~ SI subsystem] to OPERABLE status.	1 hour	(2)
DOC M01	C. Required Action and associated Completion Time [of Condition B] not met.	C.1 Be in MODE 5.	24 hours	(2)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
DOC M01 SR 3.5.3.1	The following SRs are applicable for all equipment required to be OPERABLE: [SR 3.5.2.1] [SR 3.5.2.7] [SR 3.5.2.3] SR 3.5.2.8 SR 3.5.2.4	In accordance with applicable SRs (2)

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.3, ECCS - SHUTDOWN

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

2. The ISTS contains bracketed information and/or values that are generic to all Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is provided. This is acceptable since the generic specific information/value is revised to reflect the current plant design.

Attachment 1, Volume 10, Rev. 1, Page 75 of 132

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

All changes are 1 unless otherwise noted

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.3 ECCS - Shutdown

BASES

BACKGROUND

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

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

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

APPLICABLE SAFETY ANALYSES

The Applicable Safety Analyses section of Bases 3.5.2 also applies to this Bases section. INSERT 1

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

Only one train of ECCS is required for MODE 4. This requirement dictates that single failures are not considered during this MODE of operation. ¶ The ECCS trains satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii). 8

LCO

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

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

During an event requiring ECCS actuation, a flow path is required to provide an abundant supply of water from the RWST to the RCS via the ECCS pumps and their respective supply headers to each of the four two cold leg injection nozzles (SI pumps) and RCS vessel injection nozzles (RHR pumps). In the long term, this flow path may be switched to take its supply from the containment sump and to deliver its flow to the RCS hot and cold legs or vessel.

1

INSERT 1

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

Attachment 1, Volume 10, Rev. 1, Page 78 of 132

All changes are (1) unless otherwise noted

BASES

LCO (continued)

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

APPLICABILITY

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

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

In MODES 5 and 6, plant conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation - High Water Level," and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level." (2)

ACTIONS

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

A.1

With no ECCS RHR subsystem OPERABLE, the plant is not prepared to respond to a loss of coolant accident [RCS inventory] or to continue a cooldown using the RHR pumps and heat exchangers. The Completion Time of immediately to initiate actions that would restore at least one ECCS RHR subsystem to OPERABLE status ensures that prompt action is taken to restore the required cooling capacity. Normally, in MODE 4, reactor decay heat is removed from the RCS by an RHR loop. If no RHR loop is OPERABLE for this function, reactor decay heat must be removed by some alternate method, such as use of the steam generators. The alternate means of heat removal must continue until the inoperable RHR loop components can be restored to operation so that decay heat removal is continuous. (3)

All changes are (1) unless otherwise noted

BASES

ACTIONS (continued)

subsystems (4)

With both RHR pumps and heat exchangers inoperable, it would be unwise to require the plant to go to MODE 5, where the only available heat removal system is the RHR. Therefore, the appropriate action is to initiate measures to restore one ECCS RHR subsystem and to continue the actions until the subsystem is restored to OPERABLE status.

B.1

safety injection (5)

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

C.1

the plant should be placed in MODE 5 (7)

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

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 that reflect the plant specific nomenclature, number, reference, system description, analysis or licensing basis description.

2. The MODE 5 and MODE 6 core cooling LCOs listed are relative to the shutdown cooling function of the RHR System and not the ECCS function. The Applicability Section has adequately described why ECCS is not needed in MODES 5 and 6, and it is not necessary to address the requirements of the shutdown cooling function. Therefore, this inappropriate information has been deleted.

3. The statement in ACTION A.1 Bases concerning how decay heat is removed is not appropriate for this Specification since ITS 3.5.3 is relative to ECCS and not decay heat removal. Normal decay heat removal in MODE 4 is addressed in ITS LCO 3.4.6. In addition, Required Action A.1 of the Specification addresses the requirements to restore the ECCS RHR subsystem for ECCS purposes and not normal decay heat removal. Therefore, the statements discussing decay heat removal have been deleted.

4. ISTS 3.5.3 ACTION A.1 Bases states "With both RHR pumps and heat exchangers inoperable..." ITS 3.5.3 ACTION A.1 Bases states "With both RHR subsystems inoperable..." This changes the ISTS 3.5.3 ACTION A.1 Bases by expanding the reasons that a RHR subsystem may be inoperable beyond a pump and/or heat exchanger being inoperable. This is acceptable, since there may be other reasons that both RHR subsystems are inoperable, and the statement that both RHR subsystems are inoperable is sufficient and is consistent with the actual wording of ITS Required Action A.1. In addition, the required components of an OPERABLE RHR subsystem, including pumps and heat exchangers, are defined in other sections of the ITS 3.5.3 Bases, including the third paragraph of the Background section, and the second paragraph of the LCO section.

5. ISTS 3.5.3 ACTION B.1 Bases states "With no ECCS high head subsystem OPERABLE, due to the inoperability of the centrifugal charging pump or flow path of the RWST..." ITS 3.5.3 ACTION B.1 Bases states "With no ECCS safety injection subsystem OPERABLE..." This changes the ISTS 3.5.3 ACTION B.1 Bases by deleting the statement concerning how a centrifugal charging (safety injection in the case of KPS) subsystem is determined to be inoperable. This is acceptable, since there may be other reasons that the ECCS safety injection subsystem is inoperable, and the statement that the ECCS safety injection subsystem is inoperable is sufficient and is consistent with the actual wording of ITS Required Action B.1. In addition, the required components of an OPERABLE safety injection subsystem, including pumps and suction source, are defined in other sections of the ITS 3.5.3 Bases, including the third paragraph of the Background section, and the second paragraph of the LCO section.

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

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.3 BASES, ECCS - SHUTDOWN

7. ISTS ACTION C.1 states, in part, that a controlled shutdown should be initiated when the Required Actions of Condition B cannot be completed within the required Completion Time. ITS ACTION C.1, states, in part, that the plant should be placed in MODE 5 if the Required Actions of Condition B cannot be completed within the required Completion Time. This change is acceptable since the statement is consistent with the actual wording of ITS Required Action C.1 and is a more accurate action statement than the ISTS Bases statement that a controlled shutdown should be initiated.

8. Editorial change for consistency with other ISTS Bases Sections.

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.

ATTACHMENT 4

ITS 3.5.4, Refueling Water Storage Tank (RWST)

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

ITS | A01 | ITS 3.5.4

Applicability | Add proposed MODES 3 and 4 Applicability | M01

3. The reactor shall not be made critical unless the following conditions are satisfied except for LOW POWER PHYSICS TESTING and as provided by TS 3.3.b.4. | M02

LCO 3.5.4, SR 3.5.4.1

A. The Refueling Water Storage Tank shall contain at least 272,500 gallons of water.

LCO 3.5.4, SR 3.5.4.2

B. The Refueling Water Storage Tank has a boron concentration of at least 2500 ppm. | and ≤ 2625 ppm | M06

4. During power operation or recovery from an inadvertent trip, the following conditions of inoperability may exist during the time interval specified. | M01

ACTION A

A. The calculated Refueling Water Storage Tank boron concentration may be < 2500 ppm for 8 hours. | or > 2625 ppm | M06

ACTION B

B. The Refueling Water Storage Tank may be inoperable for a reason other than that stated in TS 3.3.b.4.A for 1 hour. If OPERABILITY is not restored within the time specified, then within 1 hour action shall be initiated to:

ACTION C | M04

- Achieve HOT STANDBY within the next 6 hours.
- Achieve HOT SHUTDOWN within the following 6 hours.
- Achieve COLD SHUTDOWN within an additional 36 hours.

5. When the reactor is critical, an OPERABLE SI train may be used to fill one SI Accumulator, for a duration of less than one hour, provided the redundant SI train is also OPERABLE. The provisions of TS 3.7.c are not applicable. | See ITS 3.5.2

Add proposed SR 3.5.4.1 | M03

Attachment 1, Volume 10, Rev. 1, Page 87 of 132

CTS

A01

ITS 3.5.4

4.1 OPERATIONAL SAFETY REVIEW

APPLICABILITY

Applies to items directly related to safety limits and LIMITING CONDITIONS FOR OPERATION.

OBJECTIVE

To assure that instrumentation shall be checked, tested, and calibrated, and that equipment and sampling tests shall be conducted at sufficiently frequent intervals to ensure safe operation.

SPECIFICATION

a. Calibration, testing, and checking of protective instrumentation channels and testing of logic channels shall be performed as specified in Table TS 4.1-1. See other ITS

SR 3.5.4.2 b. Equipment and sampling tests shall be conducted as specified in Table TS 4.1-2 and TS 4.1-3.

c. Deleted

d. Deleted

e. Deleted

CTS A01 ITS 3.5.4

TABLE TS 4.1-2

MINIMUM FREQUENCIES FOR SAMPLING TESTS

SR 3.5.4.2

SAMPLING TESTS	TEST	FREQUENCY
3. Refueling Water Storage Tank Water Sample[7]	Boron Concentration	Monthly[8] (7 days) M05
4. Deleted		
5. Accumulator	Boron Concentration	Monthly
6. Spent Fuel Pool	Boron Concentration	Monthly[9]
7. Secondary Coolant	a. Gross Beta or Gamma Activity b. Iodine Concentration	Weekly Weekly when gross beta or gamma activity ≥ 0.1 μCi/gram

See ITS 3.7.16

See ITS 3.7.14

See ITS 3.5.1

A02

[7] A refueling water storage tank (RWST) boron concentration sample does not have to be taken when the RWST is empty during REFUELING outages.

[8] And after adjusting tank contents. A03

[9] Sample will be taken monthly when fuel is in the pool. See ITS 3.7.14

Amendment No. 172
02/27/2004

Attachment 1, Volume 10, Rev. 1, Page 89 of 132

DISCUSSION OF CHANGES
ITS 3.5.4, REFUELING WATER STORAGE TANK (RWST)

ADMINISTRATIVE CHANGES

A01 In the conversion of the Kewaunee Power Station (KPS) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1431, Rev. 3.0, "Standard Technical Specifications-Westinghouse Plants" (ISTS).

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

A02 CTS Table 4.1-2 Sampling Tests 3 contains an exception (Note 7) that states, in part, that refueling water storage tank (RWST) boron concentration sample does not have to be taken when the RWST is empty during REFUELING outages. ITS 3.5.4 does not contain this exception. This changes the CTS by not stating that the RWST boron concentration sample does not have to be taken when the RWST is empty during REFUELING outages.

The purpose of CTS Table 4.1-2 Sampling Tests 3 Note 7 is to allow suspension of testing when the RWST is empty during refueling. ITS SR 3.5.4.2 does not require this Note because in the ITS this surveillance is not required to be performed in MODE 6 (since the LCO is not required to be met). This change is designated as administrative because it does not result in a technical change to the CTS.

A03 CTS Table 4.1-2 Sampling Tests 3 Note 8 states, in part, that RWST boron concentration sample is required after adjusting tank contents. ITS SR 3.5.4.2 does not retain this requirement. This changes the CTS by not stating that the boron concentration sample is required after adjusting tank contents.

The purpose of CTS Table 4.1-2 Sampling Test 3 Note 8 is to verify that the tanks contents are within the required limits after additions to the RWST. ITS SR 3.5.4.2 does not contain this specific requirement because in the ITS, anytime the tank's contents are changed, it is required that the Surveillance Requirement be performed. Additionally, the frequency of this Surveillance is being changed from monthly to every 7 days by Discussion of Change (DOC) M06. This change is designated as administrative because it does not result in a technical change to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 3.3.b.3 requires the refueling water storage tank (RWST) to be OPERABLE when the reactor is critical (ITS MODES 1 and 2). In addition, CTS 3.3.b.4 provides actions when the RWST is inoperable during power operation or recovery from an inadvertent trip. ITS 3.5.4 requires the RWST to be OPERABLE in MODES 1, 2, 3, and 4. Thus, ITS 3.5.4 ACTIONS A and B must be entered if the RWST is inoperable in MODE 1, 2, 3, or 4. This changes the CTS by requiring the RWST to be OPERABLE in MODES 3 and 4 and requiring the actions to be taken in MODES 3 and 4.

Attachment 1, Volume 10, Rev. 1, Page 90 of 132

DISCUSSION OF CHANGES
ITS 3.5.4, REFUELING WATER STORAGE TANK (RWST)

This change is acceptable because the RWST is required to be OPERABLE when the Emergency Core Cooling System (ECCS) or the Containment Spray System is required. In the ITS, both of these systems are required to be OPERABLE in MODES 1, 2, 3, and 4. This change is designated as more restrictive because the RWST is required to be OPERABLE in more MODES than was required in the CTS.

M02 CTS 3.3.b.3 states, in part, that the RWST is not required to be OPERABLE during LOW POWER PHYSICS TESTING. ITS 3.5.4 does not include this exception; the RWST is required during PHYSICS TESTS. This changes the CTS by requiring the RWST to be OPERABLE during PHYSICS TESTS.

The purpose of CTS 3.3.b.3 is to ensure that the RWST is OPERABLE under both normal operating and accident conditions. Since the KPS Physics Test do not require the RWST to be inoperable to perform the tests, there is no reason to maintain this current allowance. Therefore, this change is acceptable and is more restrictive because the RWST is now required to be OPERABLE under more conditions in the ITS than in the CTS.

M03 CTS 3.3.b.3.A requires that the RWST contain at least 272,500 gallons of water, but does not provide a Surveillance Requirement to periodically verify this requirement is met. ITS SR 3.5.4.1 requires verification that the RWST water volume is $\geq$ 272,500 gallons of water every 7 days. This changes the CTS by adding a Surveillance to periodically verify this requirement is met.

The purpose of SR 3.5.4.1 is to ensure that the RWST is capable of performing its safety function. This change is acceptable because a specific Surveillance has been added to verify that the LCO will be met. This change is designated as more restrictive because a Surveillance has been added to the ITS that is not required by the CTS.

M04 CTS 3.3.b.4.B, in part, requires that if the RWST is not restored to OPERABILITY within the time specified, then within 1 hour initiate action to achieve HOT STANDBY within the next 6 hours, HOT SHUTDOWN within the following 6 hours and COLD SHUTDOWN within an additional 36 hours. ITS 3.5.4 Required Actions C.1 and C.2 requires the unit to be in MODE 3 (equivalent to CTS HOT SHUTDOWN) within 6 hours and MODE 5 (equivalent to CTS COLD SHUTDOWN) within 36 hours. This deletes the requirement to be in HOT STANDBY (equivalent to MODE 2) within 6 hours, and changes the time to be in MODE 3 from 12 hours to 6 hours and the time to be in COLD SHUTDOWN from 48 hours to 36 hours.

The purpose of CTS 3.3.b.4.B is to place the unit in a condition in which the LCO does not apply. This change is acceptable because the Completion Time is consistent with safe operation under the specific Condition, considering the OPERABLE status of the redundant systems or features. This includes the capacity and capability of remaining systems or features, a reasonable time for repairs or replacement, and the low probability of a DBA occurring during the allowed Completion Time. Allowing 6 hours to be in MODE 3 in lieu of the current 12 hours and 36 hours to be in MODE 5 in lieu of the current 48 hours ensures a unit shutdown is commenced and completed within a reasonable

Attachment 1, Volume 10, Rev. 1, Page 91 of 132

DISCUSSION OF CHANGES
ITS 3.5.4, REFUELING WATER STORAGE TANK (RWST)

period of time upon failure to meet the inoperable RWST compensatory measures. Additionally, since ITS 3.5.4 Required Action C.1 requires the unit to be in MODE 3 within 6 hours, there is no need to maintain the requirement to be in MODE 2 within 6 hours. This change is designated as more restrictive because less time is allowed for the unit to reach MODE 3 and MODE 5 than was allowed in the CTS.

M05 CTS Table 4.1-2 Sampling Test 3 requires verification of the boron concentration in the RWST once a month. ITS SR 3.5.4.2 requires verification of the boron concentration of the RWST every 7 days. This changes the CTS by requiring that the boron concentration of the RWST is verified every 7 days instead of once per month.

The purpose of CTS Table 4.1-2 Sampling Test 3 is to ensure that the boron concentration is sufficient to maintain the reactor subcritical following a LOCA. This change is acceptable because the 7 day sampling Frequency has been shown to be acceptable through operating experience. This change is designated as more restrictive because less time is allowed for performing a Surveillance Requirement than was allowed in the CTS.

M06 CTS 3.3.b.3.B provides a minimum boron concentration requirement for the RWST, but does not provide a maximum limit. Furthermore, CTS 3.3.b.4.A provides the action when the minimum boron concentration limit is not met. ITS SR 3.5.4.2 provides a new maximum boron concentration limit of 2625 ppm for the RWST. In addition, ITS 3.5.4 ACTION A provides an 8 hour time to restore the boron concentration to within limits, and applies when the maximum boron concentration is not met. This changes the CTS by adding a new maximum boron concentration limit (including an ACTION) for the RWST.

The purpose of the maximum boron concentration limit is to ensure the minimum ph in the sump is maintained and that excessive boron precipitation does not occur. The proposed maximum boron limit is consistent with the values assumed in the USAR analysis. The proposed 8 hour restoration time is consistent with the time provided for restoration when the minimum boron concentration limit is not met. Therefore these changes are acceptable and are more restrictive since a new maximum boron concentration limit is being added to the CTS.

<u>RELOCATED SPECIFICATIONS</u>

None

<u>REMOVED DETAIL CHANGES</u>

None

<u>LESS RESTRICTIVE CHANGES</u>

None

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

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.4 Refueling Water Storage Tank (RWST)

3.3.b.3 LCO 3.5.4 The RWST shall be OPERABLE.

3.3.b.3, DOC M01 APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.3.b.4.A	A. RWST boron concentration not within limits. [OR RWST borated water temperature not within limits.]	A.1 Restore RWST to OPERABLE status.	8 hours
3.3.b.4.B	B. RWST inoperable for reasons other than Condition A.	B.1 Restore RWST to OPERABLE status.	1 hour
3.3.b.4.B, DOC M01, DOC M04	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

2

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
	SR 3.5.4.1	--------------------------------NOTE------------------------------ [Only required to be performed when ambient air temperature is < [35]°F or > [100]°F.] -- Verify RWST borated water temperature is ≥ [35]°F and ≤ [100]°F.	24 hours	2
3.3.b.3.A, DOC M03	SR 3.5.4.2 1	Verify RWST borated water volume is ≥ [466,200 gallons ( )%]. 272,500	7 days	1
3.3.b.3.B, Table 4.1-2 Sampling Test 3	SR 3.5.4.3 2	Verify RWST boron concentration is ≥ [2000] ppm and ≤ [2200] ppm. 2500 2625	7 days	1

Attachment 1, Volume 10, Rev. 1, Page 95 of 132

JUSTIFICATION FOR DEVIATIONS
ITS 3.5.4, REFUELING WATER STORAGE TANK (RWST)

1. The ITS contains bracketed information and/or values that are generic to all Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is provided. This acceptable since the generic specific information/value is revised to reflect the current plant design.

2. ISTS SR 3.5.4.1 requires the RWST borated water temperature to be verified within the limits every 24 hours. The Kewaunee RWST does not have an installed temperature indicator. Thus, there is no way for KPS to measure water temperature without opening the tank and using a portable thermometer dipped into the water. Furthermore, the KPS RWST is not an outdoor tank; it is located inside the Auxiliary Building. Thus, the water temperature of the RWST is normally at the ambient air temperature of the Auxiliary Building. As described in USAR, Section 9.6.3, the Auxiliary Building ambient air temperature is maintained using the Auxiliary Building Ventilation System. The system was designed to maintain a minimum air temperature of 60ºF with an outside air temperature of -20°F and a maximum air temperature not to exceed 10ºF above the outside air temperature. During cold weather operation, the design for each Auxiliary Building Ventilation train has a preheat coil capable of increasing -20°F air to 35°F followed by a reheat coil capable of increasing 35°F air to 75°F. During hot weather operation, non-safeguards fan coil units in the Auxiliary Building cycle on at 105°F and their associated service water supply valves open at 105°F and close at 85°F. This is adequate to ensure the RWST minimum and maximum water temperature limits assumed in the accident analysis (40ºF and 120ºF) are not exceeded. Therefore, this Surveillance has not been included in the KPS ITS.

Attachment 1, Volume 10, Rev. 1, Page 96 of 132

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

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.4 Refueling Water Storage Tank (RWST)

BASES

BACKGROUND

The RWST supplies borated water to the Chemical and Volume Control System (CVCS) during abnormal operating conditions, to the refueling pool during refueling, and to the ECCS and the Containment Spray System during accident conditions. (1)

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

The switchover from normal operation to the injection phase of ECCS operation requires changing centrifugal charging pump suction from the CVCS volume control tank (VCT) to the RWST through the use of isolation valves. Each set of isolation valves is interlocked so that the VCT isolation valves will begin to close once the RWST isolation valves are fully open. Since the VCT is under pressure, the preferred pump suction will be from the VCT until the tank is isolated. This will result in a delay in obtaining the RWST borated water. The effects of this delay are discussed in the Applicable Safety Analyses section of these Bases. (1)

[happens when the Safety Injection (SI) signal is sent to the SI isolation valves, the SI pumps, and the RHR pumps. The SI pumps and the RHR pumps take suction from the RWST.]

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

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

When the suction for the ECCS and Containment Spray System pumps is transferred to the containment sump, the RWST flow paths must be isolated to prevent a [an unacceptable] release of the containment sump contents to the RWST, which could result in a [an excessive] release of contaminants to the atmosphere and the eventual loss of suction head for the ECCS pumps. (5)

BASES

BACKGROUND (continued)

This LCO ensures that:

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

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

c. The reactor remains subcritical following a LOCA.

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

APPLICABLE SAFETY ANALYSES

During accident conditions, the RWST provides a source of borated water to the ECCS and Containment Spray System pumps. As such, it provides containment cooling and depressurization, core cooling, and replacement inventory and is a source of negative reactivity for reactor shutdown (Ref. 1). The design basis transients and applicable safety analyses concerning each of these systems are discussed in the Applicable Safety Analyses section of B 3.5.2, "ECCS - Operating," B 3.5.3, "ECCS - Shutdown," and B 3.6.6, "Containment Spray and Cooling Systems." These analyses are used to assess changes to the RWST in order to evaluate their effects in relation to the acceptance limits in the analyses.

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

Attachment 1, Volume 10, Rev. 1, Page 99 of 132

BASES

APPLICABLE SAFETY ANALYSES (continued)

capability. The maximum boron concentration is an explicit assumption in the inadvertent ECCS actuation analysis, although it is typically a nonlimiting event and the results are very insensitive to boron concentrations. The maximum temperature ensures that the amount of cooling provided from the RWST during the heatup phase of a feedline break is consistent with safety analysis assumptions; the minimum is an assumption in both the MSLB and inadvertent ECCS actuation analyses, although the inadvertent ECCS actuation event is typically nonlimiting. 1 8

The MSLB analysis has considered a delay associated with the interlock between the VCT and RWST isolation valves, and the results show that the departure from nucleate boiling design basis is met. The delay has been established as [27] seconds, with offsite power available, or [37] seconds without offsite power. This response time includes [2] seconds for electronics delay, a [15] second stroke time for the RWST valves, and a [10] second stroke time for the VCT valves. Plants with a BIT need not be concerned with the delay since the BIT will supply highly borated water prior to RWST switchover, provided the BIT is between the pumps and the core. 1

For a large break LOCA analysis, the minimum water volume limit of 272,500 [466,200] gallons and the lower boron concentration limit of 2500 [2000] ppm are used to compute the post LOCA sump boron concentration necessary to assure subcriticality. The large break LOCA is the limiting case since the safety analysis assumes that all control rods are out of the core. 3

The upper limit on boron concentration of 2625 [2200] ppm is used to considered in the evaluation of boron precipitation in the core determine the maximum allowable time to switch to hot leg recirculation following a LOCA. The purpose of switching from cold leg to hot leg injection is to avoid boron precipitation in the core following the accident. 1

In the ECCS analysis, the containment spray temperature is assumed to be equal to the RWST lower temperature limit of 40 [35]°F. If the lower temperature limit is violated, the containment spray further reduces containment pressure, which decreases the rate at which steam can be vented out the break and increases peak clad temperature. The upper temperature limit of 120 [100]°F is used in the large small break LOCA analysis and containment OPERABILITY analysis and bounds the value used in the small break LOCA analysis. Exceeding this temperature will result in a higher peak clad temperature, because there is less heat 3 1 3 1

Attachment 1, Volume 10, Rev. 1, Page 100 of 132

BASES

APPLICABLE SAFETY ANALYSES (continued)

transfer from the core to the injected water for the small break LOCA and higher containment pressures due to reduced containment spray cooling capacity. For the containment response following an MSLB, the lower limit on boron concentration and the upper limit on RWST water temperature are used to maximize the total energy release to containment. 1

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

LCO

The RWST ensures that an adequate supply of borated water is available to cool and depressurize the containment in the event of a Design Basis Accident (DBA), to cool and cover the core in the event of a LOCA, to maintain the reactor subcritical following a DBA, and to ensure adequate level in the containment sump to support ECCS and Containment Spray System pump operation in the recirculation mode.

To be considered OPERABLE, the RWST must meet the water volume, boron concentration, and temperature limits established in the SRs. and 7 and the RWST temperature must be ≥ 40ºF and ≤ 120ºF

APPLICABILITY

In MODES 1, 2, 3, and 4, RWST OPERABILITY requirements are dictated by ECCS and Containment Spray System OPERABILITY requirements. Since both the ECCS and the Containment Spray System must be OPERABLE in MODES 1, 2, 3, and 4, the RWST must also be OPERABLE to support their operation. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.5, 4 9 "Residual Heat Removal (RHR) and Coolant Circulation - High Water Level," and LCO 3.9.6, 5 "Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level." 9

ACTIONS

A.1

With RWST boron concentration or borated water temperature not within limits, they it must be returned to within limits within 8 hours. Under these conditions neither the ECCS nor the Containment Spray System can perform its design safety function. Therefore, prompt action must be taken to restore the tank to OPERABLE condition. The 8 hour limit to restore the RWST temperature or boron concentration to within limits was developed considering the time required to change either the boron concentration or temperature and the fact that the contents of the tank are still available for injection. 7 6

BASES

ACTIONS (continued)

B.1

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

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

C.1 and C.2

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

SURVEILLANCE REQUIREMENTS

SR 3.5.4.1

The RWST borated water temperature should be verified every 24 hours to be within the limits assumed in the accident analyses band. This Frequency is sufficient to identify a temperature change that would approach either limit and has been shown to be acceptable through operating experience. 7

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.4.2 1

The RWST water volume should be verified every 7 days to be above the required minimum level in order to ensure that a sufficient initial supply is available for injection and to support continued ECCS and Containment Spray System pump operation on recirculation. Since the RWST volume is normally stable ~~and is protected by an alarm~~, a 7 day Frequency is appropriate and has been shown to be acceptable through operating experience. 4

SR 3.5.4.3 2

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

REFERENCES U 1. FSAR, Chapter [6] and Chapter [15]. 14 1 3

Attachment 1, Volume 10, Rev. 1, Page 103 of 132

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

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 ISTS contains bracketed information and/or values that are generic to all Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is provided. This is acceptable since the generic specific information/value is revised to reflect the current plant design.

4. The KPS design does not include an alarm for informing operators the ITS level limit is being approached.

5. KPS analysis assumes a small amount of leakage from the containment sump to the RWST. This is controlled via the System Integrity Program (ITS 5.5.2). Therefore, the words have been modified to be consistent with the safety analysis.

6. The term "design function" has been changed to "safety function" to be consistent with the terminology in the definition of OPERABLE – OPERABILITY.

7. Changes made to be consistent with changes made to ISTS.

8. The reasons for the minimum and maximum temperatures are identified in the last paragraph on page B 3.5.4-3. Therefore, this redundant information is not included.

9. The correct LCO numbers have been provided.

Attachment 1, Volume 10, Rev. 1, Page 104 of 132

Specific No Significant Hazards Considerations (NSHCs)

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

There are no specific NSHC discussions for this Specification.

Attachment 1, Volume 10, Rev. 1, Page 106 of 132

ATTACHMENT 5

Improved Standard Technical Specifications (ISTS) not used in the Kewaunee Power Station ITS

ISTS 3.5.5, SEAL INJECTION FLOW

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

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.5 Seal Injection Flow

LCO 3.5.5 Reactor coolant pump seal injection flow [resistance] shall be [≤ [40] gpm with [centrifugal charging pump discharge header] pressure ≥ [2480] psig and the [charging flow] control valve full open or ≥ [0.2117] ft/gpm^2 or within the limits of Figure 3.5.5-1].

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Seal injection flow [resistance] not within limit.	A.1 Adjust manual seal injection throttle valves to give a flow [resistance] within limit.	4 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 12 hours

1

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.5.1	-------------------------------NOTE------------------------------ Not required to be performed until 4 hours after the Reactor Coolant System pressure stabilizes at ≥ [2215 psig and ≤ 2255 psig]. --- Verify manual seal injection throttle valves are adjusted to give a flow [resistance] [of ≤ [40 gpm] with [centrifugal charging pump discharge header] pressure ≥ [2480] psig and the [charging flow] control valve full open or ≥ [0.2117] ft/gpm^2 or within the limit of Figure 3.5.5-1.]	31 days

1

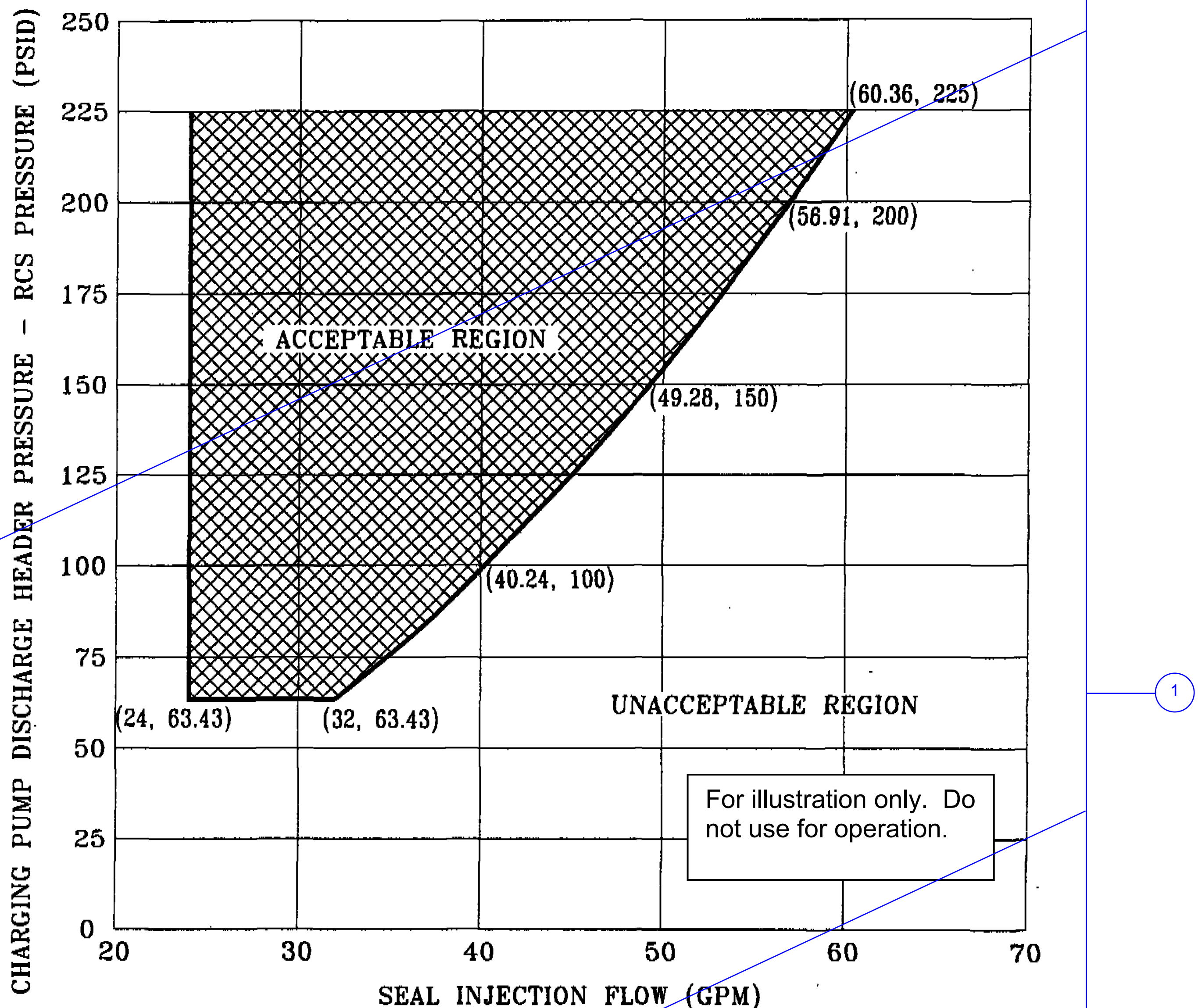

Figure 3.5.5-1 (page 1 of 1)
Seal Injection Flow Limits

JUSTIFICATION FOR DEVIATIONS
ISTS 3.5.5, SEAL INJECTION FLOW

1. ISTS 3.5.5, "Seal Injection Flow" is not being adopted because the charging pumps are not used for safety injection at Kewaunee Power Station (KPS). They are not part of the Emergency Core Cooling System, as described in USAR Section 6.2.2.1.

Attachment 1, Volume 10, Rev. 1, Page 113 of 132

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

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.5 Seal Injection Flow

BASES

BACKGROUND

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

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

The RCP seal injection flow is restricted by the seal injection line flow [resistance] which is adjusted through positioning of the manual RCP seal injection throttle valves. The RCP seal injection flow [resistance] is determined by measuring the pressurizer pressure, the centrifugal charging pump discharge header pressure, and the RCP seal injection flow rate. 1

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

APPLICABLE SAFETY ANALYSES

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

BASES

APPLICABLE SAFETY ANALYSES (continued)

This LCO ensures that seal injection flow [resistance] will be sufficient for RCP seal integrity but limited so that the ECCS trains will be capable of delivering sufficient water to match boiloff rates soon enough to minimize uncovering of the core following a large LOCA. It also ensures that the centrifugal charging pumps will deliver sufficient water for a small LOCA and sufficient boron to maintain the core subcritical. For smaller LOCAs, the charging pumps alone deliver sufficient fluid to overcome the loss and maintain RCS inventory. Seal injection flow satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

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

[The LCO is not strictly a flow limit, but rather a flow limit based on a flow line resistance. In order to establish the proper flow line resistance, a pressure and flow must be known. The flow line resistance is determined by assuming that the RCS pressure is at normal operating pressure and that the centrifugal charging pump discharge pressure is greater than or equal to the value specified in this LCO. The centrifugal charging pump discharge header pressure remains essentially constant through all the applicable MODES of this LCO. A reduction in RCS pressure would result in more flow being diverted to the RCP seal injection line than at normal operating pressure. The valve settings established at the prescribed centrifugal charging pump discharge header pressure result in a conservative valve position should RCS pressure decrease. The additional modifier of this LCO, the control valve (charging flow for four loop units and air operated seal injection for three loop units) being full open, is required since the valve is designed to fail open for the accident condition. With the discharge pressure and control valve position as specified by the LCO, a flow limit is established. It is this flow limit that is used in the accident analyses. 1

OR

This is accomplished by limiting the seal injection line resistance to a value consistent with the assumptions in the accident analysis. The limit on RCP seal injection flow resistance must be met to assure that the ECCS is OPERABLE. If this limit is not met, the ECCS flow may not be as assumed in the accident analysis. The restriction on seal injection flow is accomplished by maintaining the seal water injection flow resistance ≥ [0.2117] ft/gpm^2. With the seal injection flow resistances within limit, the resulting total seal injection flow will be within the assumptions made for seal flow during accident conditions.

BASES

LCO (continued)

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

OR

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

The limit on seal injection flow [resistance] must be met to render the ECCS OPERABLE. If these conditions are not met, the ECCS flow will not be as assumed in the accident analyses.

APPLICABILITY

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

BASES

ACTIONS

A.1

With the seal injection flow [resistance] not within its limit, the amount of charging flow available to the RCS may be reduced. Under this Condition, action must be taken to restore the flow [resistance] to within its limit. The operator has 4 hours from the time the flow [resistance] is known to not be within the limit to correctly position the manual valves and thus be in compliance with the accident analysis. The Completion Time minimizes the potential exposure of the plant to a LOCA with insufficient injection flow and provides a reasonable time to restore seal injection flow [resistance] within limits. This time is conservative with respect to the Completion Times of other ECCS LCOs; it is based on operating experience and is sufficient for taking corrective actions by operations personnel.

B.1 and B.2

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

SURVEILLANCE REQUIREMENTS

SR 3.5.5.1

Verification every 31 days that the manual seal injection throttle valves are adjusted to give a flow [resistance] within the limit ensures that the ECCS injection flows stay within the safety analysis. A differential pressure is established between the charging header and the RCS, and the total seal injection flow is verified to within the limit determined in accordance with the ECCS safety analysis. [The flow [resistance] shall be verified by confirming seal injection flow ≤ [40] gpm with the RCS at normal operating pressure, the charging flow control valve full open, and the charging header pressure ≥ [2480].

OR

The flow [resistance] shall be verified by confirming seal injection flow and differential pressure within the acceptable region of Figure 3.5.5-1.

BASES

SURVEILLANCE REQUIREMENTS (continued)

OR

The flow resistance shall be ≥ [0.2117] ft/gpm^2.] Control valves in the flow path between the charging header and the RCS pressure sensing points must be in their post accident position (e.g., charging flow control valve open) during this Surveillance to correlate with the acceptance criteria.

The Frequency of 31 days is based on engineering judgment and is consistent with other ECCS valve Surveillance Frequencies. The Frequency has proven to be acceptable through operating experience.

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

REFERENCES

1. FSAR, Chapter [6] and Chapter [15].

2. 10 CFR 50.46.

1

JUSTIFICATION FOR DEVIATIONS
ISTS 3.5.5 BASES, SEAL INJECTION FLOW

1. ISTS 3.5.5 Bases, "Seal Injection Flow" is not being adopted because the charging pumps are not used for safety injection at Kewaunee Power Station (KPS). They are not part of the Emergency Core Cooling System, as described in USAR Section 6.2.2.1.

Attachment 1, Volume 10, Rev. 1, Page 120 of 132

ISTS 3.5.6, BORON INJECTION TANK (BIT)

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

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.6 Boron Injection Tank (BIT)

LCO 3.5.6 The BIT shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. BIT inoperable.	A.1 Restore BIT to OPERABLE status.	1 hour
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Borate to SDM specified in COLR. AND B.3 Restore BIT to OPERABLE status.	6 hours 6 hours 7 days
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 4.	12 hours

1

SURVEILLANCE REQUIREMENTS

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

SURVEILLANCE REQUIREMENTS (continued)

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

1

JUSTIFICATION FOR DEVIATIONS
ISTS 3.5.6, BORON INJECTION TANK (BIT)

1. ISTS 3.5.6, "Boron Injection Tank (BIT)" is not being adopted because high concentration boron injection from the boric acid storage tank on active SI initiation has been eliminated by Technical Specification Amendment 116, dated March 28, 1995.

Attachment 1, Volume 10, Rev. 1, Page 125 of 132

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

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.6 Boron Injection Tank (BIT)

BASES

BACKGROUND

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

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

The BIT is a stainless steel tank containing concentrated boric acid. Two trains of strip heaters are mounted on the tank to keep the temperature of the boric acid solution above the precipitation point. The strip heaters are controlled by temperature elements located near the bottom of the BIT. The temperature elements also activate High and Low alarms on the main control board. In addition to the strip heaters on the BIT, there is a recirculation system with a heat tracing system, including the piping section between the motor operated isolation valves, which further ensures that the boric acid stays in solution. The BIT is also equipped with a High Pressure alarm on the main control board. The entire contents of the BIT are injected when required; thus, the contained and deliverable volumes are the same. 1

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

APPLICABLE SAFETY ANALYSES

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

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

BASES

APPLICABLE SAFETY ANALYSES (continued)

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

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

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

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

The BIT minimum water volume limit of [1100] gallons is used to ensure that the appropriate quantity of highly borated water with sufficient negative reactivity is injected into the RCS to shut down the core following an MSLB, to determine the hot leg recirculation switchover time, and to safeguard against boron precipitation. 1

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

LCO

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

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

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

Attachment 1, Volume 10, Rev. 1, Page 128 of 132

BASES

APPLICABILITY

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

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

ACTIONS

A.1

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

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

1

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

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

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

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

BASES

ACTIONS (continued)

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

C.1

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

SURVEILLANCE REQUIREMENTS

SR 3.5.6.1

Verification every 24 hours that the BIT water temperature is at or above the specified minimum temperature is frequent enough to identify a temperature change that would approach the acceptable limit. The solution temperature is also monitored by an alarm that provides further assurance of protection against low temperature. This Frequency has been shown to be acceptable through operating experience. 1

SR 3.5.6.2

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

Attachment 1, Volume 10, Rev. 1, Page 130 of 132

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.6.3

Verification every 7 days that the boron concentration of the BIT is within the required band ensures that the reactor remains subcritical following a LOCA; it limits return to power following an MSLB, and maintains the resulting sump pH in an acceptable range so that boron precipitation will not occur in the core. In addition, the effect of chloride and caustic stress corrosion on mechanical systems and components will be minimized.

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

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

1

REFERENCES

1. FSAR, Chapter [6] and Chapter [15].

2. 10 CFR 50.46.

JUSTIFICATION FOR DEVIATIONS
ISTS 3.5.6 BASES, BORON INJECTION TANK (BIT)

1. ISTS 3.5.6 Bases, "Boron Injection Tank (BIT)" is not being adopted because high concentration boron injection from the boric acid storage tank on active SI initiation has been eliminated by Technical Specification Amendment 116, dated March 28, 1995.