

**TECHNICAL SPECIFICATIONS  
FOR NORTH ANNA UNITS 1 & 2**

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## 1.0 USE AND APPLICATION

### 1.1 Definitions

#### NOTE

The defined terms of this section appear in capitalized type and are applicable throughout these Technical Specifications and Bases.

<u>Term</u>	<u>Definition</u>
ACTIONS	ACTIONS shall be that part of a Specification that prescribes Required Actions to be taken under designated Conditions within specified Completion Times.
ACTUATION LOGIC TEST	An ACTUATION LOGIC TEST shall be the application of various simulated or actual input combinations in conjunction with each possible interlock logic state required for OPERABILITY of a logic circuit and the verification of the required logic output. The ACTUATION LOGIC TEST, as a minimum, shall include a continuity check of output devices.
AXIAL FLUX DIFFERENCE (AFD)	AFD shall be the difference in normalized flux signals between the top and bottom halves of a two section excore neutron detector.
CHANNEL CALIBRATION	A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds within the necessary range and accuracy to known values of the parameter that the channel monitors. The CHANNEL CALIBRATION shall encompass all devices in the channel required for channel OPERABILITY. Calibration of instrument channels with resistance temperature detector (RTD) or thermocouple sensors may consist of an in-place qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps.

## 1.1 Definitions

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CHANNEL CHECK	A CHANNEL CHECK shall be the qualitative assessment, by observation, of channel behavior during operation. This determination shall include, where possible, comparison of the channel indication and status to other indications or status derived from independent instrument channels measuring the same parameter.
CHANNEL OPERATIONAL TEST (COT)	A COT shall be the injection of a simulated or actual signal into the channel as close to the sensor as practicable to verify OPERABILITY of all devices in the channel required for channel OPERABILITY. The COT shall include adjustments, as necessary, of the required alarm, interlock, and trip setpoints required for channel OPERABILITY such that the setpoints are within the necessary range and accuracy. The COT may be performed by means of any series of sequential, overlapping, or total channel steps.
CORE ALTERATION	CORE ALTERATION shall be the movement of any fuel, sources, or reactivity control components, within the reactor vessel with the vessel head removed and fuel in the vessel. Suspension of CORE ALTERATIONS shall not preclude completion of movement of a component to a safe position.
CORE OPERATING LIMITS REPORT (COLR)	The COLR is the unit specific document that provides cycle specific parameter limits for the current reload cycle. These cycle specific parameter limits shall be determined for each reload cycle in accordance with Specification 5.6.5. Plant operation within these limits is addressed in individual Specifications.
DOSE EQUIVALENT I-131	DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microcuries/gram) that alone would produce the same thyroid dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The thyroid dose conversion factors used for this calculation shall be those listed in Table III of TID-14844, AEC, 1962, "Calculation of Distance Factors for Power and Test Reactor Sites."

## 1.1 Definitions

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### $\bar{E}$ —AVERAGE DISINTEGRATION ENERGY

$\bar{E}$  shall be the average (weighted in proportion to the concentration of each radionuclide in the reactor coolant at the time of sampling) of the sum of the average beta and gamma energies per disintegration (in MeV) for isotopes, other than iodines, with half lives > 15 minutes, making up at least 95% of the total noniodine activity in the coolant.

### ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME

The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC.

### LEAKAGE

LEAKAGE shall be:

#### a. Identified LEAKAGE

1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank;
2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of leakage detection systems or not to be pressure boundary LEAKAGE; or
3. Reactor Coolant System (RCS) LEAKAGE through a steam generator (SG) to the Secondary System;

(continued)



## 1.1 Definitions

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### LEAKAGE (continued)

#### b. Unidentified LEAKAGE

All LEAKAGE (except RCP seal water injection or leakoff) that is not identified LEAKAGE;

#### c. Pressure Boundary LEAKAGE

LEAKAGE (except SG LEAKAGE) through a nonisolable fault in an RCS component body, pipe wall, or vessel wall.

### MASTER RELAY TEST

A MASTER RELAY TEST shall consist of energizing all master relays in the channel required for channel OPERABILITY and verifying the OPERABILITY of each required master relay. The MASTER RELAY TEST shall include a continuity check of each associated required slave relay. The MASTER RELAY TEST may be performed by means of any series of sequential, overlapping, or total steps.

### MODE

A MODE shall correspond to any one inclusive combination of core reactivity condition, power level, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel.

### OPERABLE-OPERABILITY

A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).

### PHYSICS TESTS

PHYSICS TESTS shall be those tests performed to measure the fundamental nuclear characteristics of the reactor core and related instrumentation. These tests are:

- a. Described in Chapter 14, Initial Tests and Operation, of the UFSAR;

(continued)

## 1.1 Definitions

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### PHYSICS TESTS (continued)

- b. Authorized under the provisions of 10 CFR 50.59; or
- c. Otherwise approved by the Nuclear Regulatory Commission.

### QUADRANT POWER TILT RATIO (QPTR)

QPTR shall be the ratio of the maximum upper excore detector calibrated output to the average of the upper excore detector calibrated outputs, or the ratio of the maximum lower excore detector calibrated output to the average of the lower excore detector calibrated outputs, whichever is greater.

### RATED THERMAL POWER (RTP)

RTP shall be a total reactor core heat transfer rate to the reactor coolant of 2893 MWt.

### REACTOR TRIP SYSTEM (RTS) RESPONSE TIME

The RTS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its RTS trip setpoint at the channel sensor until loss of stationary gripper coil voltage. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC.

### SHUTDOWN MARGIN (SDM)

SDM shall be the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming:

- a. All rod cluster control assemblies (RCCAs) are fully inserted except for the single RCCA of highest reactivity worth, which is assumed to be fully withdrawn. With any RCCA not capable of being fully inserted, the reactivity worth of the RCCA must be accounted for in the determination of SDM; and
- b. In MODES 1 and 2, the fuel and moderator temperatures are changed to the nominal zero power design level.

## 1.1 Definitions

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SLAVE RELAY TEST	A SLAVE RELAY TEST shall consist of energizing all slave relays in the channel required for channel OPERABILITY and verifying the OPERABILITY of each required slave relay. The SLAVE RELAY TEST shall include a continuity check of associated required testable actuation devices. The SLAVE RELAY TEST may be performed by means of any series of sequential, overlapping, or total steps.
STAGGERED TEST BASIS	A STAGGERED TEST BASIS shall consist of the testing of one of the systems, subsystems, channels, or other designated components during the interval specified by the Surveillance Frequency, so that all systems, subsystems, channels, or other designated components are tested during $n$ Surveillance Frequency intervals, where $n$ is the total number of systems, subsystems, channels, or other designated components in the associated function.
THERMAL POWER	THERMAL POWER shall be the total reactor core heat transfer rate to the reactor coolant.
TRIP ACTUATING DEVICE OPERATIONAL TEST (TADOT)	A TADOT shall consist of operating the trip actuating device and verifying the OPERABILITY of all devices in the channel required for trip actuating device OPERABILITY. The TADOT shall include adjustment, as necessary, of the trip actuating device so that it actuates at the required setpoint within the necessary accuracy. The TADOT may be performed by means of any series of sequential, overlapping, or total channel steps.

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Table 1.1-1 (page 1 of 1)  
MODES

MODE	TITLE	REACTIVITY CONDITION ( $k_{eff}$ )	% RATED THERMAL POWER(a)	AVERAGE REACTOR COOLANT TEMPERATURE (°F)
1	Power Operation	$\geq 0.99$	$> 5$	NA
2	Startup	$\geq 0.99$	$\leq 5$	NA
3	Hot Standby	$< 0.99$	NA	$\geq 350$
4	Hot Shutdown(b)	$< 0.99$	NA	$350 > T_{avg} > 200$
5	Cold Shutdown(b)	$< 0.99$	NA	$\leq 200$
6	Refueling(c)	NA	NA	NA

(a) Excluding decay heat.

(b) All reactor vessel head closure bolts fully tensioned.

(c) One or more reactor vessel head closure bolts less than fully tensioned.

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## 1.0 USE AND APPLICATION

### 1.2 Logical Connectors

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#### PURPOSE

The purpose of this section is to explain the meaning of logical connectors.

Logical connectors are used in Technical Specifications (TS) to discriminate between, and yet connect, discrete Conditions, Required Actions, Completion Times, Surveillances, and Frequencies. The only logical connectors that appear in TS are AND and OR. The physical arrangement of these connectors constitutes logical conventions with specific meanings.

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#### BACKGROUND

Several levels of logic may be used to state Required Actions. These levels are identified by the placement (or nesting) of the logical connectors and by the number assigned to each Required Action. The first level of logic is identified by the first digit of the number assigned to a Required Action and the placement of the logical connector in the first level of nesting (i.e., left justified with the number of the Required Action). The successive levels of logic are identified by additional digits of the Required Action number and by successive indentations of the logical connectors.

When logical connectors are used to state a Condition, Completion Time, Surveillance, or Frequency, only the first level of logic is used, and the logical connector is left justified with the statement of the Condition, Completion Time, Surveillance, or Frequency.

## 1.2 Logical Connectors

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### EXAMPLES

The following examples illustrate the use of logical connectors.

#### EXAMPLE 1.2-1

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO not met.	A.1     Verify ...	
	<u>AND</u>	
	A.2     Restore ...	

In this example the logical connector AND is used to indicate that when in Condition A, both Required Actions A.1 and A.2 must be completed.

## 1.2 Logical Connectors

### EXAMPLES (continued)

#### EXAMPLE 1.2-2

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO not met.	A.1 Trip ... <u>OR</u> A.2.1 Verify ... <u>AND</u> A.2.2.1 Reduce ... <u>OR</u> A.2.2.2 Perform ... <u>OR</u> A.3 Align ...	

This example represents a more complicated use of logical connectors. Required Actions A.1, A.2, and A.3 are alternative choices, only one of which must be performed as indicated by the use of the logical connector OR and the left justified placement. Any one of these three Actions may be chosen. If A.2 is chosen, then both A.2.1 and A.2.2 must be performed as indicated by the logical connector AND. Required Action A.2.2 is met by performing A.2.2.1 or A.2.2.2. The indented position of the logical connector OR indicates that A.2.2.1 and A.2.2.2 are alternative choices, only one of which must be performed.



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## 1.0 USE AND APPLICATION

### 1.3 Completion Times

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PURPOSE	The purpose of this section is to establish the Completion Time convention and to provide guidance for its use.
BACKGROUND	Limiting Conditions for Operation (LCOs) specify minimum requirements for ensuring safe operation of the unit. The ACTIONS associated with an LCO state Conditions that typically describe the ways in which the requirements of the LCO can fail to be met. Specified with each stated Condition are Required Action(s) and Completion Time(s).
DESCRIPTION	<p>The Completion Time is the amount of time allowed for completing a Required Action. It is referenced to the time of discovery of a situation (e.g., inoperable equipment or variable not within limits) that requires entering an ACTIONS Condition unless otherwise specified, providing the unit is in a MODE or specified condition stated in the Applicability of the LCO. Required Actions must be completed prior to the expiration of the specified Completion Time. An ACTIONS Condition remains in effect and the Required Actions apply until the Condition no longer exists or the unit is not within the LCO Applicability.</p> <p>If situations are discovered that require entry into more than one Condition at a time within a single LCO (multiple Conditions), the Required Actions for each Condition must be performed within the associated Completion Time. When in multiple Conditions, separate Completion Times are tracked for each Condition starting from the time of discovery of the situation that required entry into the Condition.</p> <p>Once a Condition has been entered, subsequent trains, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition, unless specifically stated. The Required Actions of the Condition continue to apply to each additional failure, with Completion Times based on initial entry into the Condition.</p> <p>(continued)</p>

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### 1.3 Completion Times

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DESCRIPTION  
(continued)

However, when a subsequent train, subsystem, component, or variable expressed in the Condition is discovered to be inoperable or not within limits, the Completion Time(s) may be extended. To apply this Completion Time extension, two criteria must first be met. The subsequent inoperability:

- a. Must exist concurrent with the first inoperability; and
- b. Must remain inoperable or not within limits after the first inoperability is resolved.

The total Completion Time allowed for completing a Required Action to address the subsequent inoperability shall be limited to the more restrictive of either:

- a. The stated Completion Time, as measured from the initial entry into the Condition, plus an additional 24 hours; or
- b. The stated Completion Time as measured from discovery of the subsequent inoperability.

The above Completion Time extensions do not apply to those Specifications that have exceptions that allow completely separate re-entry into the Condition (for each train, subsystem, component, or variable expressed in the Condition) and separate tracking of Completion Times based on this re-entry. These exceptions are stated in individual Specifications.

The above Completion Time extension does not apply to a Completion Time with a modified "time zero." This modified "time zero" may be expressed as a repetitive time (i.e., "once per 8 hours," where the Completion Time is referenced from a previous completion of the Required Action versus the time of Condition entry) or as a time modified by the phrase "from discovery . . ." Example 1.3-3 illustrates one use of this type of Completion Time. The 10 day Completion Time specified for Conditions A and B in Example 1.3-3 may not be extended.

### 1.3 Completion Times

#### EXAMPLES

The following examples illustrate the use of Completion Times with different types of Conditions and changing Conditions.

#### EXAMPLE 1.3-1

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
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 5.	36 hours

Condition B has two Required Actions. Each Required Action has its own separate Completion Time. Each Completion Time is referenced to the time that Condition B is entered.

The Required Actions of Condition B are to be in MODE 3 within 6 hours AND in MODE 5 within 36 hours. A total of 6 hours is allowed for reaching MODE 3 and a total of 36 hours (not 42 hours) is allowed for reaching MODE 5 from the time that Condition B was entered. If MODE 3 is reached within 3 hours, the time allowed for reaching MODE 5 is the next 33 hours because the total time allowed for reaching MODE 5 is 36 hours.

If Condition B is entered while in MODE 3, the time allowed for reaching MODE 5 is the next 36 hours.

### 1.3 Completion Times

#### EXAMPLES (continued)

#### EXAMPLE 1.3-2

##### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One pump inoperable.	A.1 Restore pump to OPERABLE status.	7 days
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 5.	36 hours

When a pump is declared inoperable, Condition A is entered. If the pump is not restored to OPERABLE status within 7 days, Condition B is also entered and the Completion Time clocks for Required Actions B.1 and B.2 start. If the inoperable pump is restored to OPERABLE status after Condition B is entered, Condition A and B are exited, and therefore, the Required Actions of Condition B may be terminated.

When a second pump is declared inoperable while the first pump is still inoperable, Condition A is not re-entered for the second pump. LCO 3.0.3 is entered, since the ACTIONS do not include a Condition for more than one inoperable pump. The Completion Time clock for Condition A does not stop after LCO 3.0.3 is entered, but continues to be tracked from the time Condition A was initially entered.

While in LCO 3.0.3, if one of the inoperable pumps is restored to OPERABLE status and the Completion Time for Condition A has not expired, LCO 3.0.3 may be exited and operation continued in accordance with Condition A.

While in LCO 3.0.3, if one of the inoperable pumps is restored to OPERABLE status and the Completion Time for Condition A has expired, LCO 3.0.3 may be exited and operation continued in accordance with Condition B. The Completion Time for Condition B is tracked from the time the Condition A Completion Time expired.

(continued)

### 1.3 Completion Times

---

#### EXAMPLES

#### EXAMPLE 1.3-2 (continued)

On restoring one of the pumps to OPERABLE status, the Condition A Completion Time is not reset, but continues from the time the first pump was declared inoperable. This Completion Time may be extended if the pump restored to OPERABLE status was the first inoperable pump. A 24 hour extension to the stated 7 days is allowed, provided this does not result in the second pump being inoperable for > 7 days.

1.3 Completion Times

EXAMPLES  
(continued)

EXAMPLE 1.3-3

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Function X train inoperable.	A.1 Restore Function X train to OPERABLE status.	7 days <u>AND</u> 10 days from discovery of failure to meet the LCO
B. One Function Y train inoperable.	B.1 Restore Function Y train to OPERABLE status.	72 hours <u>AND</u> 10 days from discovery of failure to meet the LCO
C. One Function X train inoperable.  <u>AND</u> One Function Y train inoperable.	C.1 Restore Function X train to OPERABLE status.  <u>OR</u> C.2 Restore Function Y train to OPERABLE status.	72 hours   72 hours

(continued)

### 1.3 Completion Times

---

#### EXAMPLES

#### EXAMPLE 1.3-3 (continued)

When one Function X train and one Function Y train are inoperable, Condition A and Condition B are concurrently applicable. The Completion Times for Condition A and Condition B are tracked separately for each train starting from the time each train was declared inoperable and the Condition was entered. A separate Completion Time is established for Condition C and tracked from the time the second train was declared inoperable (i.e., the time the situation described in Condition C was discovered).

If Required Action C.2 is completed within the specified Completion Time, Conditions B and C are exited. If the Completion Time for Required Action A.1 has not expired, operation may continue in accordance with Condition A. The remaining Completion Time in Condition A is measured from the time the affected train was declared inoperable (i.e., initial entry into Condition A).

The Completion Times of Conditions A and B are modified by a logical connector with a separate 10 day Completion Time measured from the time it was discovered the LCO was not met. In this example, without the separate Completion Time, it would be possible to alternate between Conditions A, B, and C in such a manner that operation could continue indefinitely without ever restoring systems to meet the LCO. The separate Completion Time modified by the phrase "from discovery of failure to meet the LCO" is designed to prevent indefinite continued operation while not meeting the LCO. This Completion Time allows for an exception to the normal "time zero" for beginning the Completion Time "clock". In this instance, the Completion Time "time zero" is specified as commencing at the time the LCO was initially not met, instead of at the time the associated Condition was entered.



### 1.3 Completion Times

#### EXAMPLES (continued)

#### EXAMPLE 1.3-4

##### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more valves inoperable.	A.1 Restore valve(s) to OPERABLE status.	4 hours
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

A single Completion Time is used for any number of valves inoperable at the same time. The Completion Time associated with Condition A is based on the initial entry into Condition A and is not tracked on a per valve basis. Declaring subsequent valves inoperable, while Condition A is still in effect, does not trigger the tracking of separate Completion Times.

Once one of the valves has been restored to OPERABLE status, the Condition A Completion Time is not reset, but continues from the time the first valve was declared inoperable. The Completion Time may be extended if the valve restored to OPERABLE status was the first inoperable valve. The Condition A Completion Time may be extended for up to 4 hours provided this does not result in any subsequent valve being inoperable for > 4 hours.

If the Completion Time of 4 hours (including the extension) expires while one or more valves are still inoperable, Condition B is entered.

### 1.3 Completion Times

#### EXAMPLES (continued)

#### EXAMPLE 1.3-5

#### ACTIONS

-----NOTE-----  
Separate Condition entry is allowed for each inoperable valve.  
-----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more valves inoperable.	A.1 Restore valve to OPERABLE status.	4 hours
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

The Note above the ACTIONS Table is a method of modifying how the Completion Time is tracked. If this method of modifying how the Completion Time is tracked was applicable only to a specific Condition, the Note would appear in that Condition rather than at the top of the ACTIONS Table.

The Note allows Condition A to be entered separately for each inoperable valve, and Completion Times tracked on a per valve basis. When a valve is declared inoperable, Condition A is entered and its Completion Time starts. If subsequent valves are declared inoperable, Condition A is entered for each valve and separate Completion Times start and are tracked for each valve.

If the Completion Time associated with a valve in Condition A expires, Condition B is entered for that valve. If the Completion Times associated with subsequent valves in Condition A expire, Condition B is entered separately for each valve and separate Completion Times start and are

(continued)

## 1.3 Completion Times

### EXAMPLES

#### EXAMPLE 1.3-5 (continued)

tracked for each valve. If a valve that caused entry into Condition B is restored to OPERABLE status, Condition B is exited for that valve.

Since the Note in this example allows multiple Condition entry and tracking of separate Completion Times, Completion Time extensions do not apply.

#### EXAMPLE 1.3-6

##### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One channel inoperable.	A.1 Perform SR 3.x.x.x.	Once per 8 hours
	<u>OR</u> A.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.	8 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

Entry into Condition A offers a choice between Required Action A.1 or A.2. Required Action A.1 has a "once per" Completion Time, which qualifies for the 25% extension, per SR 3.0.2, to each performance after the initial performance. The initial 8 hour interval of Required Action A.1 begins when Condition A is entered and the initial performance of Required Action A.1 must be complete within the first 8 hour interval. If Required Action A.1 is followed, and the Required Action is not met within the Completion Time (plus  
(continued)

### 1.3 Completion Times

#### EXAMPLES

#### EXAMPLE 1.3-6 (continued)

the extension allowed by SR 3.0.2), Condition B is entered. If Required Action A.2 is followed and the Completion Time of 8 hours is not met, Condition B is entered.

If after entry into Condition B, Required Action A.1 or A.2 is met, Condition B is exited and operation may then continue in Condition A.

#### EXAMPLE 1.3-7

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One subsystem inoperable.	A.1 Verify affected subsystem isolated.	1 hour <u>AND</u> Once per 8 hours thereafter
	<u>AND</u> A.2 Restore subsystem to OPERABLE status.	72 hours
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 5.	36 hours

Required Action A.1 has two Completion Times. The 1 hour Completion Time begins at the time the Condition is entered and each "Once per 8 hours thereafter" interval begins upon performance of Required Action A.1.

(continued)

### 1.3 Completion Times

---

#### EXAMPLES

#### EXAMPLE 1.3-7 (continued)

If after Condition A is entered, Required Action A.1 is not met within either the initial 1 hour or any subsequent 8 hour interval from the previous performance (plus the extension allowed by SR 3.0.2), Condition B is entered. The Completion Time clock for Condition A does not stop after Condition B is entered, but continues from the time Condition A was initially entered. If Required Action A.1 is met after Condition B is entered, Condition B is exited and operation may continue in accordance with Condition A, provided the Completion Time for Required Action A.2 has not expired.

---

#### IMMEDIATE COMPLETION TIME

When "Immediately" is used as a Completion Time, the Required Action should be pursued without delay and in a controlled manner.

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## 1.0 USE AND APPLICATION

### 1.4 Frequency

---

PURPOSE	The purpose of this section is to define the proper use and application of Frequency requirements.
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DESCRIPTION	Each Surveillance Requirement (SR) has a specified Frequency in which the Surveillance must be met in order to meet the associated LCO. An understanding of the correct application of the specified Frequency is necessary for compliance with the SR.
-------------	---

The "specified Frequency" is referred to throughout this section and each of the Specifications of Section 3.0, Surveillance Requirement (SR) Applicability. The "specified Frequency" consists of the requirements of the Frequency column of each SR as well as certain Notes in the Surveillance column that modify performance requirements.

Sometimes special situations dictate when the requirements of a Surveillance are to be met. They are "otherwise stated" conditions allowed by SR 3.0.1. They may be stated as clarifying Notes in the Surveillance, as part of the Surveillance, or both.

Situations where a Surveillance could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after the associated LCO is within its Applicability, represent potential SR 3.0.4 conflicts. To avoid these conflicts, the SR (i.e., the Surveillance or the Frequency) is stated such that it is only "required" when it can be and should be performed. With an SR satisfied, SR 3.0.4 imposes no restriction.

The use of "met" or "performed" in these instances conveys specific meanings. A Surveillance is "met" only when the acceptance criteria are satisfied. Known failure of the requirements of a Surveillance, even without a Surveillance specifically being "performed," constitutes a Surveillance not "met." "Performance" refers only to the requirement to specifically determine the ability to meet the acceptance criteria.

(continued)

## 1.4 Frequency

### DESCRIPTION (continued)

Some Surveillances contain notes that modify the Frequency of performance or the conditions during which the acceptance criteria must be satisfied. For these Surveillances, the MODE-entry restrictions of SR 3.0.4 may not apply. Such a Surveillance is not required to be performed prior to entering a MODE or other specified condition in the Applicability of the associated LCO if any of the following three conditions are satisfied:

- a. The Surveillance is not required to be met in the MODE or other specified condition to be entered; or
- b. The Surveillance is required to be met in the MODE or other specified condition to be entered, but has been performed within the specified Frequency (i.e., it is current) and is known not to be failed; or
- c. The Surveillance is required to be met, but not performed, in the MODE or other specified condition to be entered, and is known not to be failed.

Examples 1.4-3, 1.4-4, 1.4-5, and 1.4-6 discusses these special situations.

### EXAMPLES

The following examples illustrate the various ways that Frequencies are specified. In these examples, the Applicability of the LCO (LCO not shown) is MODES 1, 2, and 3.

#### EXAMPLE 1.4-1

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Perform CHANNEL CHECK.	12 hours

Example 1.4-1 contains the type of SR most often encountered in the Technical Specifications (TS). The Frequency specifies an interval (12 hours) during which the associated Surveillance must be performed at least one time. Performance of the Surveillance initiates the subsequent interval. Although the Frequency is stated as 12 hours, an  
(continued)

## 1.4 Frequency

### EXAMPLES

#### EXAMPLE 1.4-1 (continued)

extension of the time interval to 1.25 times the stated Frequency is allowed by SR 3.0.2 for operational flexibility. The measurement of this interval continues at all times, even when the SR is not required to be met per SR 3.0.1 (such as when the equipment is inoperable, a variable is outside specified limits, or the unit is outside the Applicability of the LCO). If the interval specified by SR 3.0.2 is exceeded while the unit is in a MODE or other specified condition in the Applicability of the LCO, and the performance of the Surveillance is not otherwise modified (refer to Example 1.4-3), then SR 3.0.3 becomes applicable.

If the interval as specified by SR 3.0.2 is exceeded while the unit is not in a MODE or other specified condition in the Applicability of the LCO for which performance of the SR is required, the Surveillance must be performed within the Frequency requirements of SR 3.0.2 prior to entry into the MODE or other specified condition. Failure to do so would result in a violation of SR 3.0.4.

#### EXAMPLE 1.4-2

##### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Verify flow is within limits.	Once within 12 hours after ≥ 25% RTP  <u>AND</u>  24 hours thereafter

Example 1.4-2 has two Frequencies. The first is a one time performance Frequency, and the second is of the type shown in Example 1.4-1. The logical connector "AND" indicates that both Frequency requirements must be met. Each time reactor power is increased from a power level < 25% RTP to ≥ 25% RTP, the Surveillance must be performed within 12 hours.

(continued)



## 1.4 Frequency

### EXAMPLES

#### EXAMPLE 1.4-2 (continued)

The use of "once" indicates a single performance will satisfy the specified Frequency (assuming no other Frequencies are connected by "AND"). This type of Frequency does not qualify for the 25% extension allowed by SR 3.0.2. "Thereafter" indicates future performances must be established per SR 3.0.2, but only after a specified condition is first met (i.e., the "once" performance in this example). If reactor power decreases to < 25% RTP, the measurement of both intervals stops. New intervals start upon reactor power reaching 25% RTP.

#### EXAMPLE 1.4-3

##### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>-----NOTE-----            Not required to be performed until            12 hours after <math>\geq</math> 25% RTP.            -----</p>	
Perform channel adjustment.	7 days

The interval continues, whether or not the unit operation is < 25% RTP between performances.

As the Note modifies the required performance of the Surveillance, it is construed to be part of the "specified Frequency." Should the 7 day interval be exceeded while operation is < 25% RTP, this Note allows 12 hours after power reaches  $\geq$  25% RTP to perform the Surveillance. The Surveillance is still considered to be performed within the "specified Frequency." Therefore, if the Surveillance were not performed within the 7 day (plus the extension allowed by SR 3.0.2) interval, but operation was < 25% RTP, it would not constitute a failure of the SR or failure to meet the LCO. Also, no violation of SR 3.0.4 occurs when changing MODES, even with the 7 day Frequency not met, provided operation does not exceed 12 hours with power  $\geq$  25% RTP.

(continued)

## 1.4 Frequency

### EXAMPLES

#### EXAMPLE 1.4-3 (continued)

Once the unit reaches 25% RTP, 12 hours would be allowed for completing the Surveillance. If the Surveillance were not performed within this 12 hour interval, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of SR 3.0.3 would apply.

#### EXAMPLE 1.4-4

##### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>-----NOTE----- Only required to be met in MODE 1. -----</p> <p>Verify leakage rates are within limits.</p>	24 hours

Example 1.4-4 specifies that the requirements of this Surveillance do not have to be met until the unit is in MODE 1. The interval measurement for the Frequency of this Surveillance continues at all times, as described in Example 1.4-1. However, the Note constitutes an "otherwise stated" exception to the Applicability of the Surveillance. Therefore, if the Surveillance were not performed within the 24 hour interval (plus the extension allowed by SR 3.0.2), but the unit was not in MODE 1, there would be no failure of the SR nor failure to meet the LCO. Therefore, no violation of SR 3.0.2 occurs when changing MODES, even with the 24 hour Frequency exceeded, provided the MODE change was not made into MODE 1. Prior to entering MODE 1 (assuming again that the 24 hour Frequency were not met), SR 3.0.4 would require satisfying the SR.

1.4 Frequency

EXAMPLES  
(continued)

EXAMPLE 1.4-5

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>-----NOTE----- Only required to be performed in MODE 1. -----</p> <p>Perform complete cycle of the valve.</p>	7 days

The interval continues, whether or not the unit operation is in MODE 1, 2, or 3 (the assumed Applicability of the associated LCO) between performances.

As the Note modifies the required performance of the Surveillance, the Note is construed to be part of the "specified Frequency." Should the 7 day interval be exceeded while operation is not in MODE 1, this Note allows entry into and operation in MODES 2 and 3 to perform the Surveillance. The Surveillance is still considered to be performed within the "specified Frequency" if completed prior to entering MODE 1. Therefore, if the Surveillance were not performed within the 7 day (plus the extension allowed by SR 3.0.2) interval, but operation was not in MODE 1, it would not constitute a failure of the SR or failure to meet the LCO. Also, no violation of SR 3.0.4 occurs when changing MODES, even with the 7 day Frequency not met, provided operation does not result in entry into MODE 1.

Once the unit reaches MODE 1, the requirement for the Surveillance to be performed within its specified Frequency applies and would require that the Surveillance had been performed. If the Surveillance were not performed prior to entering MODE 1, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of SR 3.0.3 would apply.

## 1.4 Frequency

EXAMPLES  
(continued)

## EXAMPLE 1.4-6

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
-----NOTE----- Not required to be met in MODE 3. -----	
Verify parameter is within limits.	24 hours

Example 1.4-6 specifies that the requirements of this Surveillance do not have to be met while the unit is in MODE 3 (the assumed Applicability of the associated LCO is MODES 1, 2, and 3). The interval measurement for the Frequency of this Surveillance continues at all times, as described in Example 1.4-1. However, the Note constitutes an "otherwise stated" exception to the Applicability of this Surveillance. Therefore, if the Surveillance were not performed within the 24 hour interval (plus the extension allowed by SR 3.0.2), and the unit was in MODE 3, there would be no failure of the SR nor failure to meet the LCO. Therefore, no violation of SR 3.0.4 occurs when changing MODES to enter MODE 3, even with the 24 hour Frequency exceeded, provided the MODE change does not result in entry into MODE 2. Prior to entering MODE 2 (assuming again that the 24 hour Frequency were not met), SR 3.0.4 would require satisfying the SR.

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## 2.0 SAFETY LIMITS (SLs)

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### 2.1 SLs

#### 2.1.1 Reactor Core SLs

In MODES 1 and 2, the combination of THERMAL POWER, Reactor Coolant System (RCS) highest loop average temperature, and pressurizer pressure shall not exceed the limits specified in the COLR; and the following SLs shall not be exceeded.

2.1.1.1 The departure from nucleate boiling ratio (DNBR) shall be maintained greater than or equal to the 95/95 DNBR criterion for the DNB correlations and methodologies specified in Section 5.6.5.

2.1.1.2 The peak fuel centerline temperature shall be maintained < 4700°F.

#### 2.1.2 RCS Pressure SL

In MODES 1, 2, 3, 4, and 5, the RCS pressure shall be maintained ≤ 2735 psig.

---

### 2.2 SL Violations

2.2.1 If SL 2.1.1 is violated, restore compliance and be in MODE 3 within 1 hour.

2.2.2 If SL 2.1.2 is violated:

2.2.2.1 In MODE 1 or 2, restore compliance and be in MODE 3 within 1 hour.

2.2.2.2 In MODE 3, 4, or 5, restore compliance within 5 minutes.

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### 3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY

---

LCO 3.0.1 LCOs shall be met during the MODES or other specified conditions in the Applicability, except as provided in LCO 3.0.2 and LCO 3.0.7.

---

LCO 3.0.2 Upon discovery of a failure to meet an LCO, the Required Actions of the associated Conditions shall be met, except as provided in LCO 3.0.5 and LCO 3.0.6.

If the LCO is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required unless otherwise stated.

---

LCO 3.0.3 When an LCO is not met and the associated ACTIONS are not met, an associated ACTION is not provided, or if directed by the associated ACTIONS, the unit shall be placed in a MODE or other specified condition in which the LCO is not applicable. Action shall be initiated within 1 hour to place the unit, as applicable, in:

- a. MODE 3 within 7 hours;
- b. MODE 4 within 13 hours; and
- c. MODE 5 within 37 hours.

Exceptions to this Specification are stated in the individual Specifications.

Where corrective measures are completed that permit operation in accordance with the LCO or ACTIONS, completion of the actions required by LCO 3.0.3 is not required.

LCO 3.0.3 is only applicable in MODES 1, 2, 3, and 4.

---

LCO 3.0.4 When an LCO is not met, entry into a MODE or other specified condition in the Applicability shall only be made:

- a. When the associated ACTIONS to be entered permit continued operation in the MODE or other specific condition in the Applicability for an unlimited period of time,

(continued)

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### 3.0 LCO APPLICABILITY

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LCO 3.0.4  
(continued)

- b. After performance of a risk evaluation, consideration of the results, determination of the acceptability of the MODE change, and establishment of risk management actions, if appropriate, or
- c. When a specific value or parameter allowance has been approved by the NRC.

This Specification shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.

LCO 3.0.4 is only applicable for entry into a MODE or other specified condition in the Applicability in MODES 1, 2, 3, and 4.

---

LCO 3.0.5

Equipment removed from service or declared inoperable to comply with ACTIONS may be returned to service under administrative control solely to perform testing required to demonstrate its OPERABILITY or the OPERABILITY of other equipment. This is an exception to LCO 3.0.2 for the system returned to service under administrative control to perform the testing required to demonstrate OPERABILITY.

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LCO 3.0.6

When a supported system LCO is not met solely due to a support system LCO not being met, the Conditions and Required Actions associated with this supported system are not required to be entered. Only the support system LCO ACTIONS are required to be entered. This is an exception to LCO 3.0.2 for the supported system. In this event, an evaluation shall be performed in accordance with Specification 5.5.14, "Safety Function Determination Program (SFDP)." If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.

When a support system's Required Action directs a supported system to be declared inoperable or directs entry into Conditions and Required Actions for a supported system, the applicable Conditions and Required Actions shall be entered in accordance with LCO 3.0.2.

### 3.0 LCO APPLICABILITY

---

LCO 3.0.7      Test Exception LCOs 3.1.9 and 3.4.19 allow specified Technical Specification (TS) requirements to be changed to permit performance of special tests and operations. Unless otherwise specified, all other TS requirements remain unchanged. Compliance with Test Exception LCOs is optional. When a Test Exception LCO is desired to be met but is not met, the ACTIONS of the Test Exception LCO shall be met. When a Test Exception LCO is not desired to be met, entry into a MODE or other specified condition in the Applicability shall be made in accordance with the other applicable Specifications.

---

### 3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

---

SR 3.0.1        SRs shall be met during the MODES or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR. Failure to meet a Surveillance, whether such failure is experienced during the performance of the Surveillance or between performances of the Surveillance, shall be failure to meet the LCO. Failure to perform a Surveillance within the specified Frequency shall be failure to meet the LCO except as provided in SR 3.0.3. Surveillances do not have to be performed on inoperable equipment or variables outside specified limits. Surveillances may be performed by any series of sequential, overlapping, or total steps.

---

SR 3.0.2        The specified Frequency for each SR is met if the Surveillance is performed within 1.25 times the interval specified in the Frequency, as measured from the previous performance or as measured from the time a specified condition of the Frequency is met.

For Frequencies specified as "once," the above interval extension does not apply.

If a Completion Time requires periodic performance on a "once per . . ." basis, the above Frequency extension applies to each performance after the initial performance.

Exceptions to this Specification are stated in the individual Specifications.

---

SR 3.0.3        If it is discovered that a Surveillance was not performed within its specified Frequency, then compliance with the requirement to declare the LCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, whichever is greater. This delay period is permitted to allow performance of the Surveillance. A risk evaluation shall be performed for any Surveillance delayed greater than 24 hours and the risk impact shall be managed.

If the Surveillance is not performed within the delay period, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered.

(continued)

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### 3.0 SR APPLICABILITY

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SR 3.0.3  
(continued)      When the Surveillance is performed within the delay period and the Surveillance is not met, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered.

---

SR 3.0.4      Entry into a MODE or other specified condition in the Applicability of an LCO shall only be made when the LCO's Surveillances have been met within their specified Frequency. When an LCO is not met, entry into a MODE or other specific condition in the Applicability shall only be made:

- a. When the associated ACTIONS to be entered permit continued operation in the MODE or other specific condition in the Applicability for an unlimited period of time,
- b. After performance of a risk evaluation, consideration of the results, determination of the acceptability of the MODE change, and establishment of risk management actions, if appropriate, or
- c. When a specific value or parameter allowance has been approved by the NRC.

This provision shall not prevent entry into MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.

SR 3.0.4 is only applicable for entry into a MODE or other specified condition in the Applicability in MODES 1, 2, 3 and 4.

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### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.1 SHUTDOWN MARGIN (SDM)

LC0 3.1.1 SDM shall be within the limits provided in the COLR.

APPLICABILITY: MODE 2 with  $k_{eff} < 1.0$ ,  
MODES 3, 4, and 5.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit.	15 minutes

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.1.1 Verify SDM to be within limits.	24 hours

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### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.2 Core Reactivity

LC0 3.1.2 The measured core reactivity shall be within  $\pm 1\% \Delta k/k$  of predicted values.

APPLICABILITY: MODES 1 and 2.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Measured core reactivity not within limit.	A.1 Re-evaluate core design and safety analysis, and determine that the reactor core is acceptable for continued operation.	7 days
	<u>AND</u> A.2 Establish appropriate operating restrictions and SRs.	7 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours



SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.1.2.1 -----NOTE-----  The predicted reactivity values may be adjusted (normalized) to correspond to the measured core reactivity prior to exceeding a fuel burnup of 60 effective full power days (EFPD) after each fuel loading.  -----  Verify measured core reactivity is within <math>\pm 1\% \Delta k/k</math> of predicted values.</p>	<p>Once prior to entering MODE 1 after each refueling    <u>AND</u>    -----NOTE-----  Only required after 60 EFPD  -----  31 EFPD thereafter</p>

## 3.1 REACTIVITY CONTROL SYSTEMS

## 3.1.3 Moderator Temperature Coefficient (MTC)

LC0 3.1.3 The MTC shall be maintained within the limits specified in the COLR. The upper limit specified in the COLR shall be  $\leq 0.6 \times 10^{-4} \Delta k/k/^{\circ}F$  when  $< 70\%$  RTP, and  $\leq 0.0 \Delta k/k/^{\circ}F$  when  $\geq 70\%$  RTP.

APPLICABILITY: MODE 1 and MODE 2 with  $k_{eff} \geq 1.0$  for the upper MTC limit, MODES 1, 2, and 3 for the lower MTC limit.

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. MTC not within upper limit.	A.1 Establish administrative withdrawal limits for control banks to maintain MTC within limit.	24 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 2 with $k_{eff} < 1.0$ .	6 hours
C. MTC not within lower limit.	C.1 Be in MODE 4.	12 hours

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.3.1 Verify MTC is within upper limit.	Once prior to entering MODE 1 after each refueling

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.1.3.2 -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. Not required to be performed until 7 effective full power days (EFPD) after reaching the equivalent of an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm</li> <li>2. If the MTC is more negative than the 300 ppm Surveillance limit (not LCO limit) specified in the COLR, SR 3.1.3.2 shall be repeated once per 14 EFPD during the remainder of the fuel cycle.</li> <li>3. SR 3.1.3.2 need not be repeated if the MTC measured at the equivalent of equilibrium RTP-ARO boron concentration of <math>\leq 60</math> ppm is less negative than the 60 ppm Surveillance limit specified in the COLR.</li> </ol> <p>-----</p> <p>Verify MTC is within lower limit.</p>	<p>Once each cycle</p>

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.4 Rod Group Alignment Limits

LCO 3.1.4 All shutdown and control rods shall be OPERABLE.

AND

Individual indicated rod positions shall be within 12 steps of their group step counter demand position.

----- NOTE -----  
When THERMAL POWER is  $\leq 50\%$  RTP, the indicated position of each rod as determined by its individual rod position indicator may be within 24 steps from its group step counter demand position for up to 1 hour per 24 hours. This NOTE is not applicable for control rods known to be greater than 12 steps from the rod group step counter demand position.  
-----

APPLICABILITY: MODES 1 and 2.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more rod(s) inoperable.	A.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.2 Be in MODE 3.	6 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One rod not within alignment limits.	B.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour <u>AND</u> Once per 12 hours thereafter
	<u>OR</u>	
	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	B.2.1 Reduce THERMAL POWER to $\leq 75\%$ RTP.	2 hours
	<u>OR</u>	
	B.2.2.1 Perform SR 3.2.1.1.	72 hours
	<u>AND</u>	
	B.2.2.2 Perform SR 3.2.2.1.	72 hours
	<u>AND</u>	
	B.3 Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	5 days
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3.	6 hours

# ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. More than one rod not within alignment limit.	D.1.1 Verify SDM to be within the limit provided in the COLR.	1 hour
	<u>OR</u>	
	D.1.2 Initiate boration to restore required SDM to within limit.	1 hour
	<u>AND</u>	
	D.2 Be in MODE 3.	6 hours

# SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.4.1	Verify individual rod positions within alignment limit.	12 hours
SR 3.1.4.2	Verify rod freedom of movement (trippability) by moving each rod not fully inserted in the core $\geq 10$ steps in either direction.	92 days
SR 3.1.4.3	Verify rod drop time of each rod, from the fully withdrawn position, is $\leq 2.7$ seconds from the beginning of decay of stationary gripper coil voltage to dashpot entry, with:  a. $T_{avg} \geq 500^{\circ}\text{F}$ ; and  b. All reactor coolant pumps operating.	Prior to reactor criticality after each removal of the reactor head

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### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.5 Shutdown Bank Insertion Limits

LCO 3.1.5      Each shutdown bank shall be within insertion limits specified in the COLR.

APPLICABILITY:    MODES 1 and 2.

----- NOTE -----  
This LCO is not applicable while performing SR 3.1.4.2.  
-----

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more shutdown banks not within limits for reasons other than Condition B.	A.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.2 Restore shutdown banks to within limits.	2 hours



### Shutdown Bank Insertion Limits

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. One shutdown bank inserted <math>\leq 18</math> steps below the insertion limit and immovable.</p> <p><u>AND</u></p> <p>Each control and shutdown rod within limits of LCO 3.1.4.</p> <p><u>AND</u></p> <p>Each control bank within the insertion limits of LCO 3.1.6.</p>	<p>B.1 Verify SDM to be within the limits provided in the COLR.</p> <p><u>AND</u></p> <p>B.2 Restore the shutdown bank to within insertion limit.</p>	<p>Once per 12 hours</p>    <p>72 hours</p>
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	6 hours

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.5.1	Verify each shutdown bank is within the insertion limits specified in the COLR.	12 hours

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.6 Control Bank Insertion Limits

LCO 3.1.6 Control banks shall be within the insertion, sequence, and overlap limits specified in the COLR.

APPLICABILITY: MODE 1,  
MODE 2 with  $k_{eff} \geq 1.0$ .

----- NOTE -----  
This LCO is not applicable while performing SR 3.1.4.2.  
-----

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Control bank sequence or overlap limits not met.	A.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.2 Restore control bank sequence and overlap to within limits.	2 hours
B. Control bank insertion limits not met for reasons other than Condition C.	B.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
		(continued)

Control Bank Insertion Limits  
3.1.6

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.2 Restore control bank(s) to within limits.	2 hours
C. Control bank A, B, or C inserted $\leq 18$ steps below the insertion limit and immovable.  <u>AND</u>  Each control and shutdown rod within limits of LCO 3.1.4.  <u>AND</u>  Each shutdown bank within the insertion limits of LCO 3.1.5.	C.1 Verify SDM to be within the limits provided in the COLR.  <u>AND</u>  C.2 Restore the control bank to within insertion limit.	Once per 12 hours       72 hours
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 2 with $K_{eff} < 1.0$ .	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.6.1 Verify estimated critical control bank position is within the insertion limits specified in the COLR.	Within 4 hours prior to achieving criticality

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.6.2	Verify each control bank is within the insertion limits specified in the COLR.	12 hours
SR 3.1.6.3	Verify each control bank not fully withdrawn from the core is within the sequence and overlap limits specified in the COLR.	12 hours

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### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.7 Rod Position Indication

LCO 3.1.7 The Rod Position Indication (RPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

#### ACTIONS

----- NOTE -----  
Separate Condition entry is allowed for each inoperable rod position indicator and each demand position indicator.  
-----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RPI per group inoperable for one or more groups.	A.1 Verify the position indirectly of the rods with inoperable position indicators by using movable incore detectors.	Once per 8 hours
	<u>OR</u> A.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.	8 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. More than one RPI per group inoperable.	B.1 Place the control rods under manual control.	Immediately
	<u>AND</u>	
	B.2 Monitor and record RCS $T_{avg}$ .	Once per 1 hour
	<u>AND</u>	
	B.3 Verify the position of the rods with inoperable position indicators indirectly by using the movable incore detectors.	Once per 8 hours
	<u>AND</u>	
	B.4 Restore inoperable position indicator to OPERABLE status such that a maximum of one RPI per group is inoperable.	24 hours
C. One or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction since the last determination of the rod's position.	C.1 Verify the position indirectly of the rods with inoperable position indicators by using movable incore detectors.	4 hours
	<u>OR</u>	
	C.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.	8 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One demand position indicator per bank inoperable for one or more banks.	D.1.1 Verify by administrative means all RPIs for the affected banks are OPERABLE.	Once per 8 hours
	<u>AND</u>	
	D.1.2 Verify the most withdrawn rod and the least withdrawn rod of the affected banks are $\leq 12$ steps apart.	Once per 8 hours
	<u>OR</u>	
	D.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.	8 hours
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.7.1 Perform CHANNEL CALIBRATION of each RPI.	18 months



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### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.8 Primary Grade Water Flow Path Isolation Valves

LC0 3.1.8 Each valve used to isolate primary grade water flow paths shall be secured in the closed position.

----- NOTE -----  
Primary grade water flow path isolation valves may be opened under administrative control for planned boron dilution or makeup activities.  
-----

APPLICABILITY: MODES 3, 4, and 5.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. -----NOTE----- Required Action A.3 must be completed whenever Condition A is entered. ----- One or more valves not secured in closed position.	A.1 Suspend positive reactivity additions.	Immediately
	<u>AND</u>	
	A.2 Secure valves in closed position.	15 minutes
	<u>AND</u>	
	A.3 Perform SR 3.1.1.1.	4 hours

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.8.1 Verify each valve in the affected flow path that isolates primary grade water flow paths is locked, sealed, or otherwise secured in the closed position.	Within 15 minutes following a boron dilution or makeup activity

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### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.9 PHYSICS TESTS Exceptions—MODE 2

LCO 3.1.9 During the performance of PHYSICS TESTS, the requirements of

LCO 3.1.3, "Moderator Temperature Coefficient (MTC)";  
LCO 3.1.4, "Rod Group Alignment Limits";  
LCO 3.1.5, "Shutdown Bank Insertion Limits";  
LCO 3.1.6, "Control Bank Insertion Limits"; and  
LCO 3.4.2, "RCS Minimum Temperature for Criticality"

may be suspended and the number of required channels for  
LCO 3.3.1, "RTS Instrumentation," Functions 2, 3, and 18.d,  
may be reduced to "3" required channels, provided:

- a. RCS lowest loop average temperature is  $\geq 531^{\circ}\text{F}$ ;
- b. SDM is within the limits provided in the COLR; and
- c. THERMAL POWER is  $\leq 5\%$  RTP.

APPLICABILITY: During PHYSICS TESTS initiated in MODE 2.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit.	15 minutes
	<u>AND</u> A.2 Suspend PHYSICS TESTS exceptions.	1 hour
B. THERMAL POWER not within limit.	B.1 Open reactor trip breakers.	Immediately
C. RCS lowest loop average temperature not within limit.	C.1 Restore RCS lowest loop average temperature to within limit.	15 minutes

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition C not met.	D.1 Be in MODE 3.	15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.9.1	Perform a CHANNEL OPERATIONAL TEST on power range and intermediate range channels per SR 3.3.1.7, SR 3.3.1.8, and Table 3.3.1-1.	Prior to initiation of PHYSICS TESTS
SR 3.1.9.2	Verify the RCS lowest loop average temperature is $\geq 531^{\circ}\text{F}$ .	30 minutes
SR 3.1.9.3	Verify THERMAL POWER is $\leq 5\%$ RTP.	30 minutes
SR 3.1.9.4	Verify SDM to be within the limits provided in the COLR.	24 hours

### 3.2 POWER DISTRIBUTION LIMITS

#### 3.2.1 Heat Flux Hot Channel Factor ( $F_Q(Z)$ )

LC0 3.2.1  $F_Q(Z)$ , as approximated by  $F_Q^M(Z)$ , shall be within the limits specified in the COLR.

APPLICABILITY: MODE 1.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. $F_Q^M(Z)$ not within limit.	A.1 Reduce AFD limits $\geq 1\%$ for each $1\% F_Q^M(Z)$ exceeds limit.	15 minutes after each $F_Q^M(Z)$ determination
	<u>OR</u>	
	A.2.1 Reduce THERMAL POWER $\geq 1\%$ RTP for each $1\% F_Q^M(Z)$ exceeds limit.	15 minutes after each $F_Q^M(Z)$ determination
	<u>AND</u>	
	A.2.2 Reduce Power Range Neutron Flux-High trip setpoints $\geq 1\%$ for each $1\% F_Q^M(Z)$ exceeds limit.	72 hours after each $F_Q^M(Z)$ determination
	<u>AND</u>	
	A.2.3 Reduce Overpower $\Delta T$ trip setpoints $\geq 1\%$ for each $1\% F_Q^M(Z)$ exceeds limit.	72 hours after each $F_Q^M(Z)$ determination
	<u>AND</u>	
	A.2.4 Perform SR 3.2.1.1.	Prior to increasing THERMAL POWER above the limit of Required Action A.2.1

# ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 2.	6 hours

## SURVEILLANCE REQUIREMENTS

----- NOTE -----  
 During power escalation, THERMAL POWER may be increased until a power level for extended operation has been achieved, at which a power distribution map is obtained.  
 -----

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.2.1.1 -----NOTE-----            If <math>F_Q^M(Z)</math> measurements indicate            maximum over <math>z \left[ \frac{F_Q^M(Z)}{K(Z)} \right]</math>            has increased since the previous evaluation            of <math>F_Q^M(Z)</math>:            a. Increase <math>F_Q^M(Z)</math> by the appropriate            factor and verify <math>F_Q^M(Z)</math> is still within            limits; or            b. Repeat SR 3.2.1.1 once per 7 EFPD until            two successive flux maps indicate            maximum over <math>z \left[ \frac{F_Q^M(Z)}{K(Z)} \right]</math>            has not increased.            -----            Verify <math>F_Q^M(Z)</math> is within limit.</p>	<p>Once after each            refueling prior            to THERMAL POWER            exceeding            75% RTP    <u>AND</u>              Once within            12 hours after            achieving            equilibrium            conditions after            exceeding, by  <math>\geq 10\%</math> RTP, the            THERMAL POWER at            which <math>F_Q^M(Z)</math> was            last verified    <u>AND</u>              31 EFPD            thereafter</p>



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## 3.2 POWER DISTRIBUTION LIMITS

### 3.2.2 Nuclear Enthalpy Rise Hot Channel Factor ( $F_{\Delta H}^N$ )

LC0 3.2.2  $F_{\Delta H}^N$  shall be within the limits specified in the COLR.

APPLICABILITY: MODE 1.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. -----NOTE----- Required Actions A.3 and A.4 must be completed whenever Condition A is entered. ----- $F_{\Delta H}^N$ not within limit.	A.1 Reduce THERMAL POWER to < 50% RTP.	4 hours
	<u>AND</u>	
	A.2 Reduce Power Range Neutron Flux-High trip setpoints to ≤ 55% RTP.	72 hours
	<u>AND</u>	
	A.3 Perform SR 3.2.2.1.	24 hours
	<u>AND</u>	
		(continued)

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.4 -----NOTE----- THERMAL POWER does not have to be reduced to comply with this Required Action. -----  Perform SR 3.2.2.1.	Prior to THERMAL POWER exceeding 50% RTP  <u>AND</u>  Prior to THERMAL POWER exceeding 75% RTP  <u>AND</u>  24 hours after THERMAL POWER reaching $\geq 95\%$ RTP
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 2.	6 hours

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.2.2.1 Verify $F_{\Delta H}^N$ is within limits specified in the COLR.	Once after each refueling prior to THERMAL POWER exceeding 75% RTP  <u>AND</u>  31 EFPD thereafter

## 3.2 POWER DISTRIBUTION LIMITS

### 3.2.3 AXIAL FLUX DIFFERENCE (AFD)

LCO 3.2.3 The AFD in % flux difference units shall be maintained within the limits specified in the COLR.

----- NOTE -----  
The AFD shall be considered outside limits when two or more OPERABLE excore channels indicate AFD to be outside limits.  
-----

APPLICABILITY: MODE 1 with THERMAL POWER  $\geq$  50% RTP.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. AFD not within limits.	A.1 Reduce THERMAL POWER to < 50% RTP.	30 minutes

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.2.3.1 Verify AFD within limits for each OPERABLE excore channel.	7 days

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### 3.2 POWER DISTRIBUTION LIMITS

#### 3.2.4 QUADRANT POWER TILT RATIO (QPTR)

LCO 3.2.4 The QPTR shall be  $\leq 1.02$ .

APPLICABILITY: MODE 1 with THERMAL POWER > 50% RTP.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. QPTR not within limit.	A.1 Reduce THERMAL POWER $\geq 3\%$ from RTP for each 1% of QPTR > 1.00.	2 hours after each QPTR determination
	<u>AND</u>	
	A.2 Determine QPTR.	Once per 12 hours
	<u>AND</u>	
	A.3 Perform SR 3.2.1.1 and SR 3.2.2.1.	24 hours after achieving equilibrium Conditions from a THERMAL POWER reduction per Required Action A.1
	<u>AND</u>	Once per 7 days thereafter
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.4    Reevaluate safety analyses and confirm results remain valid for duration of operation under this condition.	Prior to increasing THERMAL POWER above the limit of Required Action A.1
	<u>AND</u>	
	A.5    -----NOTES----- 1. Perform Required Action A.5 only after Required Action A.4 is completed.  2. Required Action A.6 shall be completed whenever Required Action A.5 is performed. -----	Prior to increasing THERMAL POWER above the limit of Required Action A.1
	Normalize excore detectors to restore QPTR to within limits.	
	<u>AND</u>	(continued)

# ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	<p>A.6 -----NOTE----- Perform Required Action A.6 only after Required Action A.5 is completed. -----</p> <p>Perform SR 3.2.1.1 and SR 3.2.2.1.</p>	Within 24 hours after achieving equilibrium Conditions at RTP not to exceed 48 hours after increasing THERMAL POWER above the limit of Required Action A.1
B. Required Action and associated Completion Time not met.	B.1 Reduce THERMAL POWER to $\leq 50\%$ RTP.	4 hours

# SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.2.4.1 -----NOTES-----</p> <p>1. With input from one Power Range Neutron Flux channel inoperable and THERMAL POWER <math>\leq 75\%</math> RTP, the remaining three power range channels can be used for calculating QPTR.</p> <p>2. SR 3.2.4.2 may be performed in lieu of this Surveillance.</p> <p>-----</p> <p>Verify QPTR is within limit by calculation.</p>	7 days



SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.2.4.2 -----NOTE-----            Not required to be performed until 12 hours            after input from one or more Power Range            Neutron Flux channels are inoperable with            THERMAL POWER &gt; 75% RTP.            -----            Verify QPTR is within limit using the            movable incore detectors.</p>	<p>12 hours</p>

### 3.3 INSTRUMENTATION

#### 3.3.1 Reactor Trip System (RTS) Instrumentation

LCO 3.3.1 The RTS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1-1.

#### ACTIONS

----- NOTE -----  
Separate Condition entry is allowed for each Function.  
-----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s).	Immediately
B. One Manual Reactor Trip channel inoperable.	B.1 Restore channel to OPERABLE status.	48 hours
	<u>OR</u> B.2 Be in MODE 3.	54 hours
C. One channel or train inoperable.	C.1 Restore channel or train to OPERABLE status.	48 hours
	<u>OR</u> C.2.1 Initiate action to fully insert all rods. <u>AND</u>	48 hours  (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
D. One Power Range Neutron Flux-High channel inoperable.	<p>-----NOTE----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels. -----</p> <p>D.1.1 Place channel in trip.  <u>AND</u> D.1.2 Reduce THERMAL POWER to <math>\leq 75\%</math> RTP.  <u>OR</u> D.2.1 Place channel in trip.  <u>AND</u>  -----NOTE----- Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable. -----</p> <p>D.2.2 Perform SR 3.2.4.2.  <u>OR</u> D.3 Be in MODE 3.</p>	<p>72 hours</p> <p>78 hours</p> <p>72 hours</p> <p>Once per 12 hours</p> <p>78 hours</p>

ACTIONS		
CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One channel inoperable.	-----NOTE----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. -----	
	E.1 Place channel in trip.	72 hours
	<u>OR</u> E.2 Be in MODE 3.	78 hours
F. One Intermediate Range Neutron Flux channel inoperable.	F.1 Reduce THERMAL POWER to < P-6.	24 hours
	<u>OR</u> F.2 Increase THERMAL POWER to > P-10.	24 hours
G. Two Intermediate Range Neutron Flux channels inoperable.	-----NOTE----- Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM. -----	
	G.1 Suspend operations involving positive reactivity additions.	Immediately
	<u>AND</u> G.2 Reduce THERMAL POWER to < P-6.	2 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. One Source Range Neutron Flux channel inoperable.	<p>-----NOTE-----  Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM.  -----</p> <p>H.1 Suspend operations involving positive reactivity additions.</p>	Immediately
I. Two Source Range Neutron Flux channels inoperable.	I.1 Open Reactor Trip Breakers (RTBs).	Immediately
J. One Source Range Neutron Flux channel inoperable.	<p>J.1 Restore channel to OPERABLE status.</p> <p><u>OR</u></p> <p>J.2.1 Initiate action to fully insert all rods.</p> <p><u>AND</u></p> <p>J.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.</p>	<p>48 hours</p> <p>48 hours</p> <p>49 hours</p>

## ACTIONS

[illegible]

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
M. One Reactor Coolant Pump Breaker Position channel inoperable.	-----NOTE----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. -----	
	M.1 Restore channel to OPERABLE status.	72 hours
	<u>OR</u> M.2 Reduce THERMAL POWER to < P-7.	78 hours
N. One Turbine Trip channel inoperable.	-----NOTE----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. -----	
	N.1 Place channel in trip.	72 hours
	<u>OR</u> N.2 Reduce THERMAL POWER to < P-8.	76 hours
O. One train inoperable.	-----NOTE----- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. -----	
	O.1 Restore train to OPERABLE status.	24 hours
	<u>OR</u> O.2 Be in MODE 3.	30 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
P. One RTB train inoperable.	-----NOTES----- 1. One train may be bypassed for up to 2 hours for surveillance testing, provided the other train is OPERABLE.  2. One RTB may be bypassed for up to 2 hours for maintenance on undervoltage or shunt trip mechanisms, provided the other train is OPERABLE.  3. One RTB train may be bypassed for up to 4 hours for concurrent surveillance testing of the RTB and automatic trip logic, provided the other train is OPERABLE. -----	
	P.1 Restore train to OPERABLE status.	1 hour
	<u>OR</u>	
	P.2 Be in MODE 3.	7 hours
Q. One or more channels inoperable.	Q.1 Verify interlock is in required state for existing unit conditions.	1 hour
	<u>OR</u> Q.2 Be in MODE 3.	7 hours



# ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
R. One or more channels inoperable.	R.1 Verify interlock is in required state for existing unit conditions.	1 hour
	<u>OR</u> R.2 Be in MODE 2.	7 hours
S. One trip mechanism inoperable for one RTB.	S.1 Restore inoperable trip mechanism to OPERABLE status.	48 hours
	<u>OR</u> S.2 Be in MODE 3.	54 hours

# SURVEILLANCE REQUIREMENTS

----- NOTE -----  
Refer to Table 3.3.1-1 to determine which SRs apply for each RTS Function.  
-----

SURVEILLANCE	FREQUENCY
SR 3.3.1.1 Perform CHANNEL CHECK.	12 hours
SR 3.3.1.2 -----NOTE----- Not required to be performed until 12 hours after THERMAL POWER is $\geq 15\%$ RTP. ----- Compare results of calorimetric heat balance calculation to power range channel output. Adjust power range output if calorimetric heat balance calculation result exceeds power range channel output by more than +2% RTP.	24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.3.1.3 -----NOTE----- Not required to be performed until 72 hours after THERMAL POWER is <math>\geq 15\%</math> RTP. -----</p> <p>Compare results of the incore detector measurements to Nuclear Instrumentation System (NIS) AFD. Adjust NIS channel if absolute difference is <math>\geq 3\%</math>.</p>	<p>31 effective full power days (EFPD)</p>
<p>SR 3.3.1.4 -----NOTE----- This Surveillance must be performed on the reactor trip bypass breaker immediately after placing the bypass breaker in service. -----</p> <p>Perform TADOT.</p>	<p>31 days on a STAGGERED TEST BASIS</p>
<p>SR 3.3.1.5 Perform ACTUATION LOGIC TEST.</p>	<p>31 days on a STAGGERED TEST BASIS</p>
<p>SR 3.3.1.6 -----NOTE----- Verification of setpoint is not required. -----</p> <p>Perform TADOT.</p>	<p>92 days</p>
<p>SR 3.3.1.7 -----NOTE----- Not required to be performed for source range instrumentation prior to entering MODE 3 from MODE 2 until 4 hours after entry into MODE 3. -----</p> <p>Perform COT.</p>	<p>92 days</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.3.1.8 -----NOTE-----  This Surveillance shall include verification that interlocks P-6 and P-10 are in their required state for existing unit conditions.  -----  Perform COT.</p>	<p>-----NOTE-----  Only required when not performed within previous 92 days  -----  Prior to reactor startup    <u>AND</u>  Four hours after reducing power below P-6 for source range instrumentation    <u>AND</u>  Twelve hours after reducing power below P-10 for power and intermediate range instrumentation    <u>AND</u>  Once per 92 days thereafter</p>
<p>SR 3.3.1.9 -----NOTES-----  1. Adjust NIS channel if absolute difference <math>\geq 3\%</math>.    2. Not required to be performed until 72 hours after THERMAL POWER is <math>\geq 50\%</math> RTP.  -----  Compare results of the excore channels to incore detector measurements.</p>	<p>92 EFPD</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.1.10	<p>-----NOTE-----  This Surveillance shall include verification that the time constants are adjusted to the prescribed values.  -----</p> <p>Perform CHANNEL CALIBRATION.</p>	18 months
SR 3.3.1.11	<p>-----NOTE-----  Neutron detectors are excluded from CHANNEL CALIBRATION.  -----</p> <p>Perform CHANNEL CALIBRATION.</p>	18 months
SR 3.3.1.12	Perform CHANNEL CALIBRATION.	18 months
SR 3.3.1.13	Perform COT.	18 months
SR 3.3.1.14	<p>-----NOTE-----  Verification of setpoint is not required.  -----</p> <p>Perform TADOT.</p>	18 months
SR 3.3.1.15	<p>-----NOTE-----  Verification of setpoint is not required.  -----</p> <p>Perform TADOT.</p>	Prior to exceeding the P-8 interlock whenever the unit has been in MODE 3, if not performed within the previous 31 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.3.1.16 -----NOTE-----  Neutron detectors are excluded from  response time testing.  -----    Verify RTS RESPONSE TIME is within limits.</p>	<p>18 months on a  STAGGERED TEST  BASIS</p>

Table 3.3.1-1 (page 1 of 5)  
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Manual Reactor Trip	1, 2	2	B	SR 3.3.1.14	NA
	3 <sup>(a)</sup> , 4 <sup>(a)</sup> , 5 <sup>(a)</sup>	2	C	SR 3.3.1.14	NA
2. Power Range Neutron Flux					
a. High	1, 2	4	D	SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.3 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ 110% RTP
b. Low	1 <sup>(b)</sup> , 2	4	E	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.16	≤ 26% RTP
3. Power Range Neutron Flux Rate					
a. High Positive Rate	1, 2	4	E	SR 3.3.1.7 SR 3.3.1.11	≤ 5.5% RTP with time constant ≥ 2 sec
b. High Negative Rate	1, 2	4	E	SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ 5.5% RTP with time constant ≥ 2 sec
4. Intermediate Range Neutron Flux	1 <sup>(b)</sup> , 2 <sup>(c)</sup>	2	F, G	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 40% RTP
5. Source Range Neutron Flux	2 <sup>(d)</sup>	2	H, I	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.16	≤ 1.3 E5 cps
	3 <sup>(a)</sup> , 4 <sup>(a)</sup> , 5 <sup>(a)</sup>	2	I, J	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ 1.3 E5 cps
	3 <sup>(e)</sup> , 4 <sup>(e)</sup> , 5 <sup>(e)</sup>	1	K	SR 3.3.1.1 SR 3.3.1.11	NA

(a) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.

(b) Below the P-10 (Power Range Neutron Flux) interlocks.

(c) Above the P-6 (Intermediate Range Neutron Flux) interlocks.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(e) With the Rod Control System incapable of rod withdrawal. In this condition, source range Function does not provide reactor trip but does provide indication.

Table 3.3.1-1 (page 2 of 5)  
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
6. Overtemperature $\Delta T$	1, 2	3	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.12 SR 3.3.1.16	Refer to Note 1 (Page 3.3.1-16)
7. Overpower $\Delta T$	1, 2	3	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.12	Refer to Note 2 (Page 3.3.1-17)
8. Pressurizer Pressure					
a. Low	1 <sup>(f)</sup>	3	L	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	$\geq 1860$ psig
b. High	1, 2	3	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	$\leq 2370$ psig
9. Pressurizer Water Level-High	1 <sup>(f)</sup>	3	L	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	$\leq 93\%$
10. Reactor Coolant Flow-Low	1 <sup>(f)</sup>	3 per loop	L	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	$\geq 89\%$
11. Reactor Coolant Pump (RCP) Breaker Position	1 <sup>(f)</sup>	1 per RCP	M	SR 3.3.1.14	NA
12. Undervoltage RCPs	1 <sup>(f)</sup>	1 per bus	L	SR 3.3.1.6 SR 3.3.1.10 SR 3.3.1.16	$\geq 2870$ V
13. Underfrequency RCPs	1 <sup>(f)</sup>	1 per bus	L	SR 3.3.1.6 <sup>(g)</sup> SR 3.3.1.10 SR 3.3.1.16	$\geq 56$ Hz
14. Steam Generator (SG) Water Level-Low Low	1, 2	3 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	$\geq 17\%$

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

(g) Required to be performed for Unit 2 only.

Table 3.3.1-1 (page 3 of 5)  
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
15. SG Water Level-Low	1, 2	2 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≥ 24%
Coincident with Steam Flow/Feedwater Flow Mismatch	1, 2	2 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 42.5% full steam flow at RTP
16. Turbine Trip					
a. Low Auto Stop Oil Pressure	1 <sup>(h)</sup>	3	N	SR 3.3.1.10 SR 3.3.1.15	≥ 40 psig
b. Turbine Stop Valve Closure	1 <sup>(h)</sup>	4	N	SR 3.3.1.10 SR 3.3.1.15	≥ 0% open
17. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1, 2	2 trains	O	SR 3.3.1.14	NA
18. Reactor Trip System Interlocks					
a. Intermediate Range Neutron Flux, P-6	2 <sup>(d)</sup>	2	Q	SR 3.3.1.11 SR 3.3.1.13	≥ 3E-11 amp
b. Low Power Reactor Trips Block, P-7	1	1 per train	R	SR 3.3.1.5	NA
c. Power Range Neutron Flux, P-8	1	4	R	SR 3.3.1.11 SR 3.3.1.13	≤ 31% RTP
d. Power Range Neutron Flux, P-10	1, 2	4	Q	SR 3.3.1.11 SR 3.3.1.13	≥ 7% RTP ≤ 11% RTP
e. Turbine Impulse Pressure, P-13	1	2	R	SR 3.3.1.10 SR 3.3.1.13	≤ 11% turbine power
19. Reactor Trip Breakers <sup>(i)</sup>	1, 2	2 trains	P	SR 3.3.1.4	NA
	3 <sup>(a)</sup> , 4 <sup>(a)</sup> , 5 <sup>(a)</sup>	2 trains	C	SR 3.3.1.4	NA
20. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms	1, 2	1 each per RTB	S	SR 3.3.1.4	NA
	3 <sup>(a)</sup> , 4 <sup>(a)</sup> , 5 <sup>(a)</sup>	1 each per RTB	C	SR 3.3.1.4	NA
21. Automatic Trip Logic	1, 2	2 trains	O	SR 3.3.1.5	NA
	3 <sup>(a)</sup> , 4 <sup>(a)</sup> , 5 <sup>(a)</sup>	2 trains	C	SR 3.3.1.5	NA

(a) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(h) Above the P-8 (Power Range Neutron Flux) interlock.

(i) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.



Table 3.3.1-1 (page 4 of 5)  
Reactor Trip System Instrumentation

Note 1: Overtemperature  $\Delta T$

The Overtemperature  $\Delta T$  Function Allowable Value shall not exceed the following nominal trip setpoint by more than 2.0% of  $\Delta T$  span.

$$\Delta T \leq \Delta T_0 \left\{ K_1 - K_2 \frac{(1 + \tau_1 s)}{(1 + \tau_2 s)} [T - T'] + K_3 (P - P') - f_1(\Delta I) \right\}$$

Where:  $\Delta T$  is measured RCS  $\Delta T$ , °F.  
 $\Delta T_0$  is the indicated  $\Delta T$  at RTP, °F.  
 $s$  is the Laplace transform operator, sec<sup>-1</sup>.  
 $T$  is the measured RCS average temperature, °F.  
 $T'$  is the nominal  $T_{avg}$  at RTP,  $\leq [^*]^{\circ}\text{F}$ .

P is the measured pressurizer pressure, psig  
P' is the nominal RCS operating pressure,  $\geq$  [\*] psig

$$K_1 \leq [*] \qquad K_2 \geq [*]/^{\circ}\text{F} \qquad K_3 \geq [*]/\text{psig}$$

$$\tau_1 \geq [*] \text{ sec} \qquad \tau_2 \leq [*] \text{ sec}$$

$$f_1(\Delta I) = \begin{cases} [*]\{[*]\% - (q_t - q_b)\} & \text{when } q_t - q_b < [*]\% \text{ RTP} \\ 0\% \text{ of RTP} & \text{when } [*]\% \text{ RTP} \leq q_t - q_b \leq [*]\% \text{ RTP} \\ [*]\{(q_t - q_b) - [*]\} & \text{when } q_t - q_b > [*]\% \text{ RTP} \end{cases}$$

Where  $q_t$  and  $q_b$  are percent RTP in the upper and lower halves of the core, respectively, and  $q_t + q_b$  is the total THERMAL POWER in percent RTP.

The values denoted with [\*] are specified in the COLR.

Table 3.3.1-1 (page 5 of 5)  
Reactor Trip System Instrumentation

Note 2: Overpower  $\Delta T$

The Overpower  $\Delta T$  Function Allowable Value shall not exceed the following nominal trip setpoint by more than 2% of  $\Delta T$  span.

$$\Delta T \leq \Delta T_0 \left\{ K_4 - K_5 \left[ \frac{\tau_3 s}{1 + \tau_3 s} \right] T - K_6 [T - T'] - f_2(\Delta I) \right\}$$

Where:  $\Delta T$  is measured RCS  $\Delta T$ , °F.

$\Delta T_0$  is the indicated  $\Delta T$  at RTP, °F.

$s$  is the Laplace transform operator,  $\text{sec}^{-1}$ .

$T$  is the measured RCS average temperature, °F.

$T'$  is the nominal  $T_{\text{avg}}$  at RTP,  $\leq [^{\circ}\text{F}]$ .

$$K_4 \leq [^{\circ}\text{F}]$$

$$K_5 \geq [^{\circ}\text{F}] / ^{\circ}\text{F} \text{ for increasing } T_{\text{avg}} \\ [^{\circ}\text{F}] / ^{\circ}\text{F} \text{ for decreasing } T_{\text{avg}}$$

$$K_6 \geq [^{\circ}\text{F}] / ^{\circ}\text{F} \text{ when } T > T' \\ [^{\circ}\text{F}] / ^{\circ}\text{F} \text{ when } T \leq T'$$

$$\tau_3 \leq [^{\circ}\text{F}] \text{ sec}$$

$$f_2(\Delta I) = [^{\circ}\text{F}]$$

The values denoted with  $[^{\circ}\text{F}]$  are specified in the COLR.

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### 3.3 INSTRUMENTATION

#### 3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation

LC0 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.2-1.

#### ACTIONS

----- NOTE -----  
Separate Condition entry is allowed for each Function.  
-----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s).	Immediately
B. One channel or train inoperable.	B.1 Restore channel or train to OPERABLE status.	48 hours
	<u>OR</u>	
	B.2.1 Be in MODE 3.	54 hours
	<u>AND</u>	
	B.2.2 Be in MODE 5.	84 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One train inoperable.	C.1 -----NOTE----- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. -----  Restore train to OPERABLE status.	24 hours
	<u>OR</u>	
	C.2.1 Be in MODE 3.	30 hours
	<u>AND</u> C.2.2 Be in MODE 5.	60 hours
D. One channel inoperable.	D.1 -----NOTE----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. -----  Place channel in trip.	72 hours
	<u>OR</u>	
	D.2.1 Be in MODE 3.	78 hours
	<u>AND</u> D.2.2 Be in MODE 4.	84 hours

ACTIONS		
CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One Containment Pressure channel inoperable.	E.1 -----NOTE----- One additional channel may be bypassed for up to 12 hours for surveillance testing. -----	
	Place channel in bypass.	72 hours
	<u>OR</u>	
	E.2.1 Be in MODE 3.	78 hours
F. One channel or train inoperable.	<u>AND</u>	
	E.2.2 Be in MODE 4.	84 hours
	F.1 Restore channel or train to OPERABLE status.	48 hours
	<u>OR</u>	
	F.2.1 Be in MODE 3.	54 hours
	<u>AND</u>	
	F.2.2 Be in MODE 4.	60 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. One train inoperable.	G.1 -----NOTE----- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. -----	
	Restore train to OPERABLE status.	24 hours
	<u>OR</u>	
	G.2.1 Be in MODE 3.	30 hours
H. One Main Feedwater Pumps trip channel inoperable.	<u>AND</u>	
	G.2.2 Be in MODE 4.	36 hours
	H.1 Restore channel to OPERABLE status.	48 hours
	<u>OR</u>	
I. One channel inoperable.	H.2 Be in MODE 3.	54 hours
	I.1 -----NOTE----- One additional channel may be bypassed for up to 12 hours for surveillance testing. -----	
	Place channel in bypass.	72 hours
	<u>OR</u>	
	I.2.1 Be in MODE 3.	78 hours
	<u>AND</u>	
	I.2.2 Be in MODE 5.	108 hours

ACTIONS		
CONDITION	REQUIRED ACTION	COMPLETION TIME
J. One or more channels inoperable.	J.1 Verify interlock is in required state for existing unit condition.	1 hour
	<u>OR</u>	
	J.2.1 Be in MODE 3.	7 hours
	<u>AND</u>	
	J.2.2 Be in MODE 4.	13 hours

#### SURVEILLANCE REQUIREMENTS

----- NOTE -----  
Refer to Table 3.3.2-1 to determine which SRs apply for each ESFAS Function.  
-----

SURVEILLANCE		FREQUENCY
SR 3.3.2.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.2.2	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.2.3	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.2.4	Perform COT	92 days



SURVEILLANCE	FREQUENCY
<p>SR 3.3.2.5 -----NOTE----- Not required to be performed for SLAVE RELAYS if testing would:</p> <ol style="list-style-type: none"> <li>1. Result in an inadvertent Reactor Trip System or ESFAS Actuation if accompanied by a single failure in the Safeguard Test Cabinet;</li> <li>2. Adversely affect two or more components in one or more ESFAS system(s); or</li> <li>3. Create a reactivity, thermal, or hydraulic transient condition in the Reactor Coolant System.</li> </ol> <p>-----</p> <p>Perform SLAVE RELAY TEST.</p>	<p>92 days</p>
<p>SR 3.3.2.6 -----NOTE----- Verification of relay setpoints not required.</p> <p>-----</p> <p>Perform TADOT.</p>	<p>92 days</p>
<p>SR 3.3.2.7 -----NOTE----- Verification of setpoint not required for manual initiation functions.</p> <p>-----</p> <p>Perform TADOT.</p>	<p>18 months</p>
<p>SR 3.3.2.8 -----NOTE----- This Surveillance shall include verification that the time constants are adjusted to the prescribed values.</p> <p>-----</p> <p>Perform CHANNEL CALIBRATION.</p>	<p>18 months</p>

SURVEILLANCE	FREQUENCY
<p>SR 3.3.2.9 -----NOTE-----            Not required to be performed for the turbine driven AFW pump until 24 hours after SG pressure is <math>\geq 1005</math> psig.            -----</p> <p>Verify ESFAS RESPONSE TIMES are within limit.</p>	<p>18 months on a STAGGERED TEST BASIS</p>
<p>SR 3.3.2.10 -----NOTE-----            Verification of setpoint not required.            -----</p> <p>Perform TADOT.</p>	<p>Once per reactor trip breaker cycle</p>

Table 3.3.2-1 (page 1 of 4)  
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
<b>1. Safety Injection</b>					
a. Manual Initiation	1, 2, 3, 4	2	B	SR 3.3.2.7	NA
b. Automatic Actuation Logic and Actuation Relays	1, 2, 3, 4	2 trains	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA
c. Containment Pressure-High	1, 2, 3	3	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	≤ 17.7 psia
d. Pressurizer Pressure-Low-Low	1, 2, 3 <sup>(a)</sup>	3	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	≥ 1770 psig
e. High Differential Pressure Between Steam Lines	1, 2, 3	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	≤ 112 psid
f. High Steam Flow in Two Steam Lines	1, 2, 3 <sup>(b)</sup>	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	(c)
Coincident with T <sub>avg</sub> -Low Low	1, 2, 3 <sup>(b)</sup>	1 per loop	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	≥ 542°F
g. High Steam Flow in Two Steam Lines	1, 2, 3 <sup>(b)</sup>	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	(c)
Coincident with Steam Line Pressure-Low	1, 2, 3 <sup>(b)</sup>	1 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	≥ 585 psig

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Above the P-12 (T<sub>avg</sub>-Low Low) interlock.

(c) Less than or equal to a function defined as ΔP corresponding to 42% full steam flow below 20% load, and ΔP increasing linearly from 42% full steam flow at 20% load to 111% full steam flow at 100% load, and ΔP corresponding to 111% full steam flow above 100% load.

Table 3.3.2-1 (page 2 of 4)  
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. Containment Spray					
a. Manual Initiation	1, 2, 3, 4	2 per train, 2 trains	B	SR 3.3.2.7	NA
b. Automatic Actuation Logic and Actuation Relays	1, 2, 3, 4	2 trains	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA
c. Containment Pressure					
High High	1, 2, 3	4	E	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	≤ 28.45 psia
3. Containment Isolation					
a. Phase A Isolation					
(1) Manual Initiation	1, 2, 3, 4	2	B	SR 3.3.2.7	NA
(2) Automatic Actuation Logic and Actuation Relays	1, 2, 3, 4	2 trains	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
b. Phase B Isolation					
(1) Manual Initiation	Refer to Function 2.a (Containment Spray-Manual Initiation) for all functions and requirements.				
(2) Automatic Actuation Logic and Actuation Relays	1, 2, 3, 4	2 trains	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA
(3) Containment Pressure					
High High	Refer to Function 2.c (Containment Spray-Containment Pressure High High) for all functions and requirements.				

Table 3.3.2-1 (page 3 of 4)  
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
<b>4. Steam Line Isolation</b>					
a. Manual Initiation	1, 2 <sup>(d)</sup> , 3 <sup>(d)</sup>	2 per steam line	F	SR 3.3.2.7	NA
b. Automatic Actuation Logic and Actuation Relays	1, 2 <sup>(d)</sup> , 3 <sup>(d)</sup>	2 trains	G	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA
c. Containment Pressure— Intermediate High High	1, 2 <sup>(d)</sup> , 3 <sup>(d)</sup>	3	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	≤ 18.5 psia
d. High Steam Flow in Two Steam Lines	1, 2 <sup>(d)</sup> , 3 <sup>(d)</sup>	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	(c)
Coincident with T <sub>avg</sub> —Low Low	1, 2 <sup>(d)</sup> , 3 <sup>(b)(d)</sup>	1 per loop	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	≥ 542°F
e. High Steam Flow in Two Steam Lines	1, 2 <sup>(d)</sup> , 3 <sup>(d)</sup>	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	(c)
Coincident with Steam Line Pressure—Low	1, 2, <sup>(d)</sup> 3 <sup>(d)</sup>	1 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	≥ 585 psig
<b>5. Turbine Trip and Feedwater Isolation</b>					
a. Automatic Actuation Logic and Actuation Relays	1, 2 <sup>(e)</sup> , 3 <sup>(e)</sup>	2 trains	G	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA
b. SG Water Level—High High (P-14)	1, 2 <sup>(e)</sup> , 3 <sup>(e)</sup>	3 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	≤ 76%
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				

(b) Above the P-12 (T<sub>avg</sub>—Low Low) interlock.

(c) Less than or equal to a function defined as ΔP corresponding to 42% full steam flow below 20% load, and ΔP increasing linearly from 42% full steam flow at 20% load to 111% full steam flow at 100% load, and ΔP corresponding to 111% full steam flow above 100% load.

(d) Except when all MSTVs are closed and de-activated.

(e) Except when all Main Feedwater Pump Discharge Valves or all MFIVs, MFRVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve.

Table 3.3.2-1 (page 4 of 4)  
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
6. Auxiliary Feedwater					
a. Automatic Actuation Logic and Actuation Relays	1, 2, 3	2 trains	G	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA
b. SG Water Level—Low Low	1, 2, 3	3 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	≥ 17%
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
d. Loss of Offsite Power	1, 2, 3	1 per bus, 2 buses	F	SR 3.3.2.6 SR 3.3.2.8 SR 3.3.2.9	≥ 2184 V
e. Trip of all Main Feedwater Pumps	1, 2	2 per pump	H	SR 3.3.2.7 SR 3.3.2.9	NA
7. Automatic Switchover to Containment Sump					
a. Automatic Actuation Logic and Actuation Relays	1, 2, 3, 4	2 trains	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA
b. Refueling Water Storage Tank (RWST) Level—Low Low	1, 2, 3, 4	4	I	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.8 SR 3.3.2.9	≥ 18.4% and ≤ 20.4%
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
8. ESFAS Interlocks					
a. Reactor Trip, P-4	1, 2, 3	1 per train, 2 trains	F	SR 3.3.2.10	NA
b. Pressurizer Pressure, P-11	1, 2, 3	3	J	SR 3.3.2.1 SR 3.3.2.8	≤ 2010 psig
c. T <sub>avg</sub> —Low Low, P-12	1, 2, 3	1 per loop	J	SR 3.3.2.1 SR 3.3.2.8	≥ 542°F and ≤ 545°F

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### 3.3 INSTRUMENTATION

#### 3.3.3 Post Accident Monitoring (PAM) Instrumentation

LC0 3.3.3 The PAM instrumentation for each Function in Table 3.3.3-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

----- NOTE -----  
Separate Condition entry is allowed for each Function.  
-----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action in accordance with Specification 5.6.6.	Immediately
C. One or more Functions with two required channels inoperable.	C.1 Restore one channel to OPERABLE status.	7 days
D. Required Action and associated Completion Time of Condition C not met.	D.1 Be in MODE 3.	6 hours
	<u>AND</u> D.2 Be in MODE 4.	12 hours



# SURVEILLANCE REQUIREMENTS

----- NOTE -----  
SR 3.3.3.1 and SR 3.3.3.3 apply to each PAM instrumentation Function in Table 3.3.3-1 except SR 3.3.3.3 does not apply to Items 10 and 12. SR 3.3.3.2 applies only to Item 12. SR 3.3.3.4 applies only to Item 10.  
-----

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
SR 3.3.3.2	Perform CHANNEL CALIBRATION.	92 days
SR 3.3.3.3	-----NOTE----- Neutron detectors are excluded from CHANNEL CALIBRATION. ----- Perform CHANNEL CALIBRATION.	18 months
SR 3.3.3.4	Perform TADOT.	18 months

Table 3.3.3-1 (page 1 of 1)  
Post Accident Monitoring Instrumentation

FUNCTION	REQUIRED CHANNELS
1. Power Range Neutron Flux	2
2. Source Range Neutron Flux	2
3. Reactor Coolant System (RCS) Hot Leg Temperature (Wide Range)	2
4. RCS Cold Leg Temperature (Wide Range)	2
5. RCS Pressure (Wide Range)	2
6. Inadequate Core Cooling Monitoring (ICCM) System	
6.a. Reactor Vessel Level Instrumentation System (RVLIS)	2
6.b. RCS Subcooling Margin Monitor	2
6.c.1 Core Exit Temperature-Quadrant 1	2 <sup>(c)</sup>
6.c.2 Core Exit Temperature-Quadrant 2	2 <sup>(c)</sup>
6.c.3 Core Exit Temperature-Quadrant 3	2 <sup>(c)</sup>
6.c.4 Core Exit Temperature-Quadrant 4	2 <sup>(c)</sup>
7. Containment Sump Water Level (Wide Range)	2
8. Containment Pressure	2
9. Containment Pressure (Wide Range)	2
10. Penetration Flow Path Containment Isolation Valve Position	2 per penetration flow path <sup>(a)(b)</sup>
11. Containment Area Radiation (High Range)	2
12. Containment Hydrogen Analyzers	2
13. Pressurizer Level	2
14. Steam Generator (SG) Water Level (Wide Range)	2
15. SG Water Level (Narrow Range)	2 per SG
16. Emergency Condensate Storage Tank Level	2
17. SG Pressure	2 per SG
18. High Head Safety Injection Flow	2

(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(b) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.

(c) A channel consists of two core exit thermocouples (CETs).

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### 3.3 INSTRUMENTATION

#### 3.3.4 Remote Shutdown System

LCO 3.3.4 The Remote Shutdown System Functions shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

----- NOTE -----  
Separate Condition entry is allowed for each Function.  
-----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required Functions inoperable.	A.1 Restore required Function to OPERABLE status.	30 days
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

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.4.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
SR 3.3.4.2	Verify each required control circuit and transfer switch is capable of performing the intended function.	18 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.4.3	Perform CHANNEL CALIBRATION for each required instrumentation channel.	18 months

### 3.3 INSTRUMENTATION

#### 3.3.5 Loss of Power (LOP) Emergency Diesel Generator (EDG) Start Instrumentation

LC0 3.3.5 Three channels per bus of the loss of voltage Function and three channels per bus of the degraded voltage Function for the following 4160 VAC buses shall be OPERABLE:

- a. The Train H and Train J buses; and
- b. One bus on the other unit for each required shared component.

APPLICABILITY: MODES 1, 2, 3, and 4,  
When associated EDG is required to be OPERABLE by LC0 3.8.2,  
"AC Sources-Shutdown."

#### ACTIONS

----- NOTE -----  
Separate Condition entry is allowed for each Function.  
-----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one channel per bus inoperable.	A.1 -----NOTE----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----- Place channel in trip.	72 hours
B. One or more Functions with two or more channels per bus inoperable.	B.1 Restore all but one channel to OPERABLE status.	1 hour

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time not met.	C.1 Enter applicable Condition(s) and Required Action(s) for the associated EDG made inoperable by LOP EDG start instrumentation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.5.1	<p>-----NOTE----- Verification of setpoint is not required. -----</p> <p>Perform TADOT for LCO 3.3.5.a and LCO 3.3.5.b Functions.</p>	92 days
SR 3.3.5.2	<p>Perform CHANNEL CALIBRATION with Allowable Values as follows:</p> <p>a. Loss of voltage Allowable Values <math>\geq 2935</math> V and <math>\leq 3225</math> V with a time delay of <math>2 \pm 1</math> seconds for LCO 3.3.5.a and LCO 3.3.5.b Functions.</p> <p>b. Degraded voltage Allowable Values <math>\geq 3720</math> V and <math>\leq 3772</math> V with:</p> <ol style="list-style-type: none"> <li>1. A time delay of <math>7.5 \pm 1.5</math> seconds with a Safety Injection (SI) signal for LCO 3.3.5.a Function; and</li> <li>2. A time delay of <math>56 \pm 7</math> seconds without an SI signal for LCO 3.3.5.a and LCO 3.3.5.b Functions.</li> </ol>	18 months
SR 3.3.5.3	Verify ESF RESPONSE TIMES are within limit for LCO 3.3.5.a and LCO 3.3.5.b Functions.	18 months on a STAGGERED TEST BASIS

### 3.4 REACTOR COOLANT SYSTEM (RCS)

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

- LCO 3.4.1      RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified below:
- a. Pressurizer pressure is greater than or equal to the limit specified in the COLR;
  - b. RCS average temperature is less than or equal to the limit specified in the COLR; and
  - c. RCS total flow rate  $\geq 295,000$  gpm and is greater than or equal to the limit specified in the COLR.

APPLICABILITY:    MODE 1.

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

- a. THERMAL POWER ramp > 5% RTP per minute; or
- b. THERMAL POWER step > 10% RTP.

-----

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more RCS DNB parameters not within limits.	A.1    Restore RCS DNB parameter(s) to within limit.	2 hours
B. Required Action and associated Completion Time not met.	B.1    Be in MODE 2.	6 hours



RCS Pressure, Temperature, and Flow DNB Limits  
3.4.1

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.1.1	Verify pressurizer pressure is greater than or equal to the limit specified in the COLR.	12 hours
SR 3.4.1.2	Verify RCS average temperature is less than or equal to the limit specified in the COLR.	12 hours
SR 3.4.1.3	Verify RCS total flow rate is $\geq 295,000$ gpm and is greater than or equal to the limit specified in the COLR.	12 hours
SR 3.4.1.4	<p>-----NOTE-----  Not required to be performed until 30 days after <math>\geq 90\%</math> RTP.  -----</p> <p>Verify by precision heat balance that RCS total flow rate is <math>\geq 295,000</math> gpm and is greater than or equal to the limit specified in the COLR.</p>	18 months

RCS Minimum Temperature for Criticality  
3.4.2

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.2 RCS Minimum Temperature for Criticality

LCO 3.4.2 Each RCS loop average temperature ( $T_{avg}$ ) shall be  $\geq 541^{\circ}\text{F}$ .

APPLICABILITY: MODE 1,  
MODE 2 with  $k_{eff} \geq 1.0$ .

ACTIONS

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.2.1 Verify RCS $T_{avg}$ in each loop $\geq 541^{\circ}\text{F}$ .	12 hours

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### 3.4 REACTOR COOLANT SYSTEM (RCS)

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

- LCO 3.4.3 RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in Figures 3.4.3-1 and 3.4.3-2 (Unit 1) and Figures 3.4.3-3 and 3.4.3-4 (Unit 2) with:
- a. A maximum heatup of 60°F in any one hour period;
  - b. A maximum cooldown of 100°F in any one hour period; and
  - c. A maximum temperature change of 10°F in any one hour period during inservice hydrostatic and leak testing operations above the heatup and cooldown limit curves.

APPLICABILITY: At all times.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. -----NOTE----- Required Action A.2 shall be completed whenever this Condition is entered. ----- Requirements of LCO not met in MODE 1, 2, 3, or 4.</p>	A.1 Restore parameter(s) to within limits.	30 minutes
	<p><u>AND</u></p> <p>A.2 Determine RCS is acceptable for continued operation.</p>	72 hours
<p>B. Required Action and associated Completion Time of Condition A not met.</p>	B.1 Be in MODE 3.	6 hours
	<p><u>AND</u></p> <p>B.2 Be in MODE 5 with RCS pressure &lt; 500 psig.</p>	36 hours

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. -----NOTE----- Required Action C.2 shall be completed whenever this Condition is entered. -----	C.1 Initiate action to restore parameter(s) to within limits.	Immediately
	<u>AND</u>	
Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4.	C.2 Determine RCS is acceptable for continued operation.	Prior to entering MODE 4

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.3.1	<p>-----NOTE-----</p> <p>Only required to be performed during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing.</p> <p>-----</p> <p>Verify RCS pressure, RCS temperature, and RCS heatup and cooldown rates are within limits.</p>	30 minutes

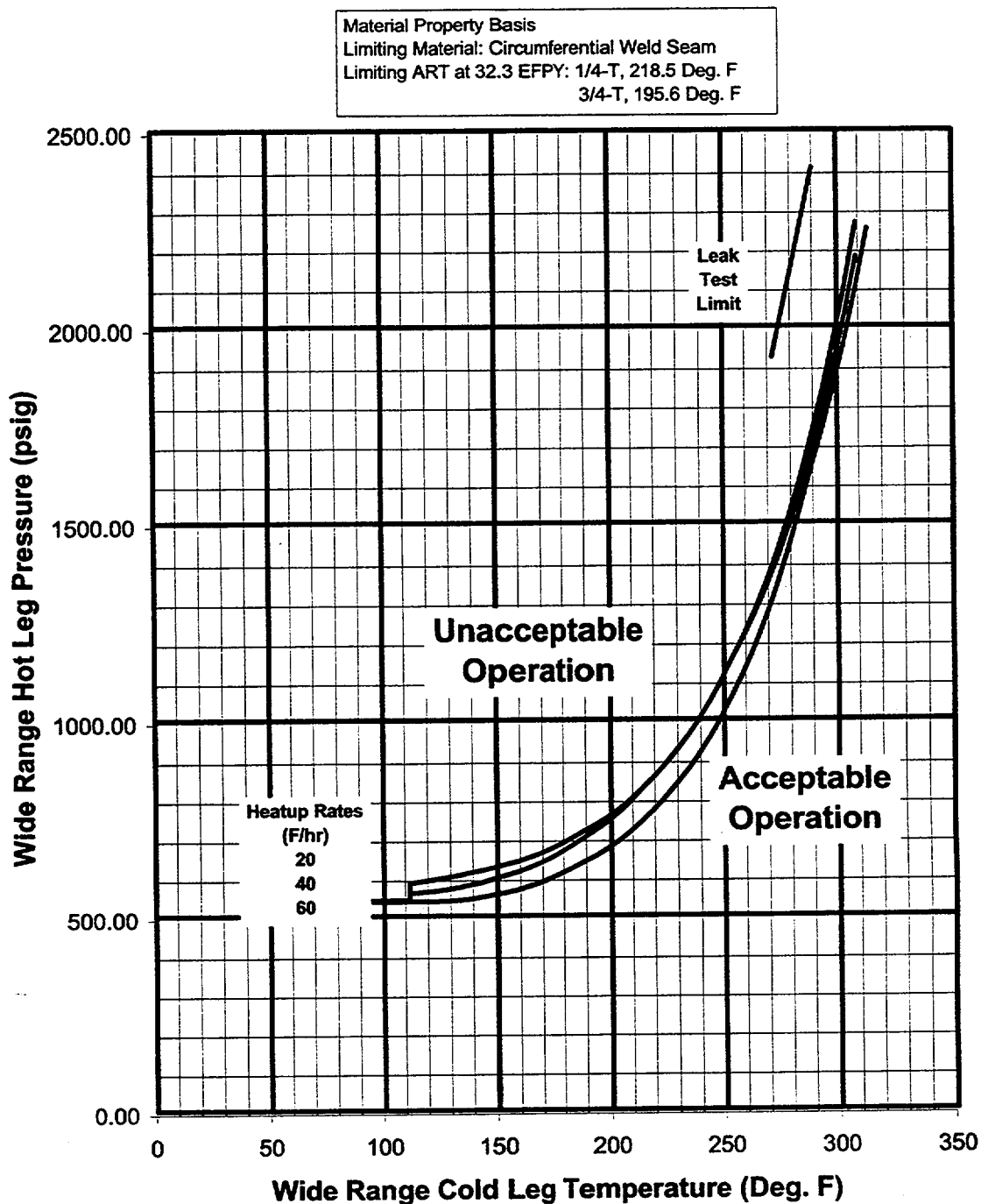


Figure 3.4.3-1 (page 1 of 1)  
Unit 1 RCS Heatup Limitations  
Heatup Rates up to 60°F/hr, Applicable for the first 32.3 EFPY,  
Including Margins for Instrumentation Errors

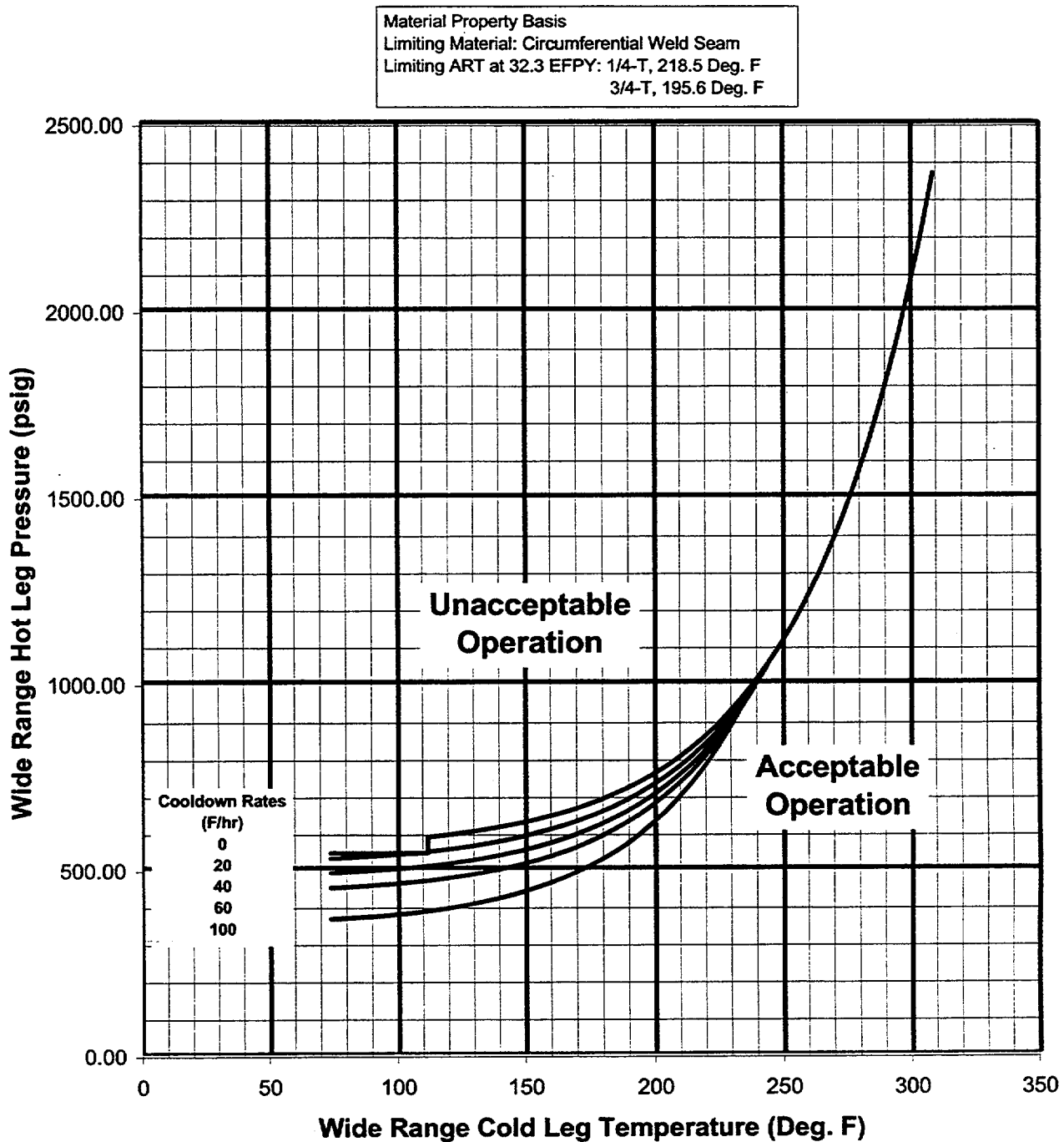


Figure 3.4.3-2 (page 1 of 1)  
Unit 1 RCS Cooldown Limitations  
Cooldown Rates up to 100°F/hr, Applicable for the first 32.3 EFPY,  
Including Margins for Instrumentation Errors

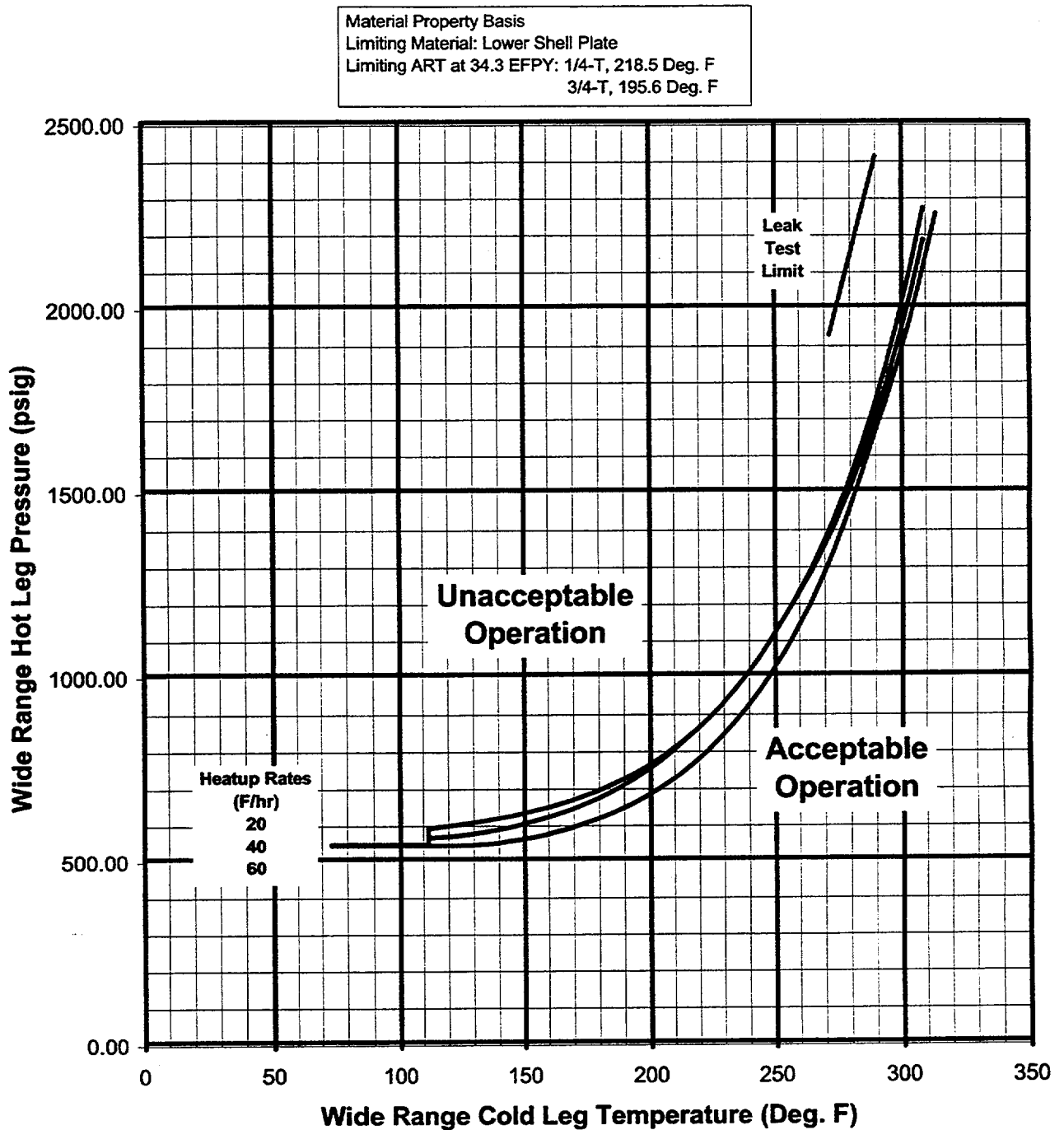


Figure 3.4.3-3 (page 1 of 1)  
 Unit 2 RCS Heatup Limitations  
 Heatup Rates up to 60°F/hr, Applicable for the first 34.3 EFPY,  
 Including Margins for Instrumentation Errors



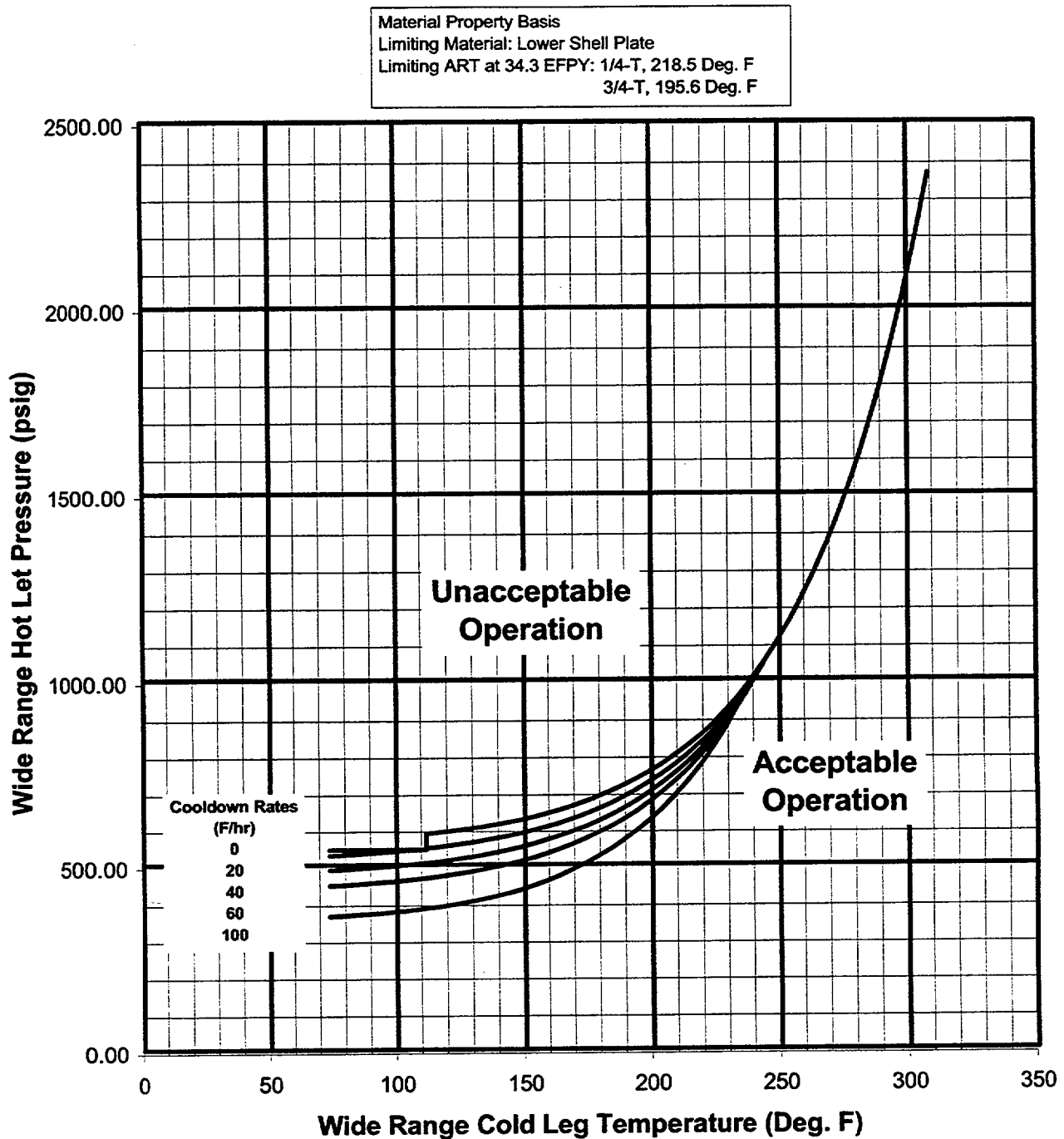


Figure 3.4.3-4 (page 1 of 1)  
Unit 2 RCS Cooldown Limitations  
Cooldown Rates up to 100°F/hr, Applicable for the first 34.3 EFPY,  
Including Margins for Instrumentation Errors

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.4 RCS Loops—MODES 1 and 2

LCO 3.4.4 Three RCS loops shall be OPERABLE and in operation.

APPLICABILITY: MODES 1 and 2.

#### ACTIONS

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

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.4.1 Verify each RCS loop is in operation.	12 hours

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### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.5 RCS Loops—MODE 3

LC0 3.4.5 Two RCS loops shall be OPERABLE, and one RCS loop shall be in operation.

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

- a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LC0 3.1.1; and
  - b. Core outlet temperature is maintained at least 10°F below saturation temperature.
- 

APPLICABILITY: MODE 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required RCS loop inoperable.	A.1 Restore required RCS loop to OPERABLE status.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 4.	12 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Two required RCS loops inoperable.  <u>OR</u>  Required RCS loop not in operation.	C.1 Place the Rod Control System in a condition incapable of rod withdrawal.	Immediately
	<u>AND</u>  C.2 Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1.	Immediately
	<u>AND</u>  C.3 Initiate action to restore one RCS loop to OPERABLE status and operation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.5.1	Verify required RCS loops are in operation.	12 hours
SR 3.4.5.2	Verify steam generator secondary side water levels are $\geq 17\%$ for required RCS loops.	12 hours
SR 3.4.5.3	-----NOTE----- Not required to be performed until 24 hours after a required pump is not in operation. ----- Verify correct breaker alignment and indicated power are available to the required pump not in operation.	7 days

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.6 RCS Loops—MODE 4

LCO 3.4.6 Two loops consisting of any combination of RCS loops and residual heat removal (RHR) loops shall be OPERABLE, and one loop shall be in operation.

----- NOTE -----

1. All reactor coolant pumps (RCPs) and RHR pumps may be removed from operation for  $\leq 1$  hour per 8 hour period provided:
    - a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1; and
    - b. Core outlet temperature is maintained at least 10°F below saturation temperature.
  2. No RCP shall be started with any RCS cold leg temperature  $\leq 235^\circ\text{F}$  (Unit 1),  $270^\circ\text{F}$  (Unit 2) unless the secondary side water temperature of each steam generator (SG) is  $\leq 50^\circ\text{F}$  above each of the RCS cold leg temperatures.
- 

APPLICABILITY: MODE 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required loop inoperable.	A.1 Initiate action to restore a second loop to OPERABLE status.	Immediately
	<p><u>AND</u></p> <p>A.2 -----NOTE----- Only required if RHR loop is OPERABLE. ----- Be in MODE 5.</p>	24 hours

ACTIONS

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.6.1	Verify required RHR or RCS loop is in operation.	12 hours
SR 3.4.6.2	Verify SG secondary side water levels are $\geq 17\%$ for required RCS loops.	12 hours
SR 3.4.6.3	-----NOTE----- Not required to be performed until 24 hours after a required pump is not in operation. ----- Verify correct breaker alignment and indicated power are available to the required pump not in operation.	7 days

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.7 RCS Loops—MODE 5, Loops Filled

LCO 3.4.7 One residual heat removal (RHR) loop shall be OPERABLE and in operation, and either:

- a. One additional RHR loop shall be OPERABLE; or
- b. The secondary side water level of one steam generator (SG) shall be  $\geq 17\%$ .

----- NOTE -----

1. The RHR pump of the loop in operation may be removed from operation for  $\leq 1$  hour per 8 hour period provided:
  - a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1; and
  - b. Core outlet temperature is maintained at least  $10^{\circ}\text{F}$  below saturation temperature.
2. One required RHR loop may be inoperable for up to 2 hours for surveillance testing provided that the other RHR loop is OPERABLE and in operation.
3. No reactor coolant pump shall be started with one or more RCS cold leg temperatures  $\leq 235^{\circ}\text{F}$  (Unit 1),  $270^{\circ}\text{F}$  (Unit 2) unless the secondary side water temperature of each SG is  $\leq 50^{\circ}\text{F}$  above each of the RCS cold leg temperatures.
4. All RHR loops may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.

-----

APPLICABILITY: MODE 5 with RCS loops filled.



ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One required RHR loop inoperable.</p> <p><u>AND</u></p> <p>One RHR loop OPERABLE.</p>	<p>A.1 Initiate action to restore a second RHR loop to OPERABLE status.</p>	Immediately
	<p><u>OR</u></p> <p>A.2 Initiate action to restore required SG secondary side water level to within limits.</p>	Immediately
<p>B. Required SG with secondary side water level not within limits.</p> <p><u>AND</u></p> <p>One RHR loop OPERABLE.</p>	<p>B.1 Initiate action to restore a second RHR loop to OPERABLE status.</p>	Immediately
	<p><u>OR</u></p> <p>B.2 Initiate action to restore required SG secondary side water level to within limits.</p>	Immediately
<p>C. No required RHR loops OPERABLE.</p> <p><u>OR</u></p> <p>Required RHR loop not in operation.</p>	<p>C.1 Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1.</p>	Immediately
	<p><u>AND</u></p> <p>C.2 Initiate action to restore one RHR loop to OPERABLE status and operation.</p>	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.7.1	Verify required RHR loop is in operation.	12 hours
SR 3.4.7.2	Verify SG secondary side water level is $\geq 17\%$ in required SG.	12 hours
SR 3.4.7.3	<p>-----NOTE-----            Not required to be performed until 24 hours            after a required pump is not in operation.            -----</p> <p>Verify correct breaker alignment and            indicated power are available to the            required RHR pump not in operation.</p>	7 days

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### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.8 RCS Loops—MODE 5, Loops Not Filled

LCO 3.4.8 Two residual heat removal (RHR) loops shall be OPERABLE and one RHR loop shall be in operation.

----- NOTES -----

1. All RHR pumps may be removed from operation for  $\leq 15$  minutes when switching from one loop to another provided:
    - a. The core outlet temperature is maintained  $> 10^{\circ}\text{F}$  below saturation temperature;
    - b. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1; and
    - c. No draining operations to further reduce the RCS water volume are permitted.
  2. One RHR loop may be inoperable for  $\leq 2$  hours for surveillance testing provided that the other RHR loop is OPERABLE and in operation.
- 

APPLICABILITY: MODE 5 with RCS loops not filled.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required RHR loop inoperable.	A.1 Initiate action to restore RHR loop to OPERABLE status.	Immediately

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. No required RHR loop OPERABLE.  <u>OR</u>  Required RHR loop not in operation.	B.1 Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1.	Immediately
	<u>AND</u>  B.2 Initiate action to restore one RHR loop to OPERABLE status and operation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.8.1    Verify required RHR loop is in operation.	12 hours
SR 3.4.8.2    -----NOTE----- Not required to be performed until 24 hours after a required pump is not in operation. ----- Verify correct breaker alignment and indicated power are available to the required RHR pump not in operation.	7 days

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.9 Pressurizer

LCO 3.4.9 The pressurizer shall be OPERABLE with:

- a. Pressurizer water level  $\leq 93\%$ ; and
- b. Two groups of pressurizer heaters OPERABLE with the capacity of each group  $\geq 125$  kW and capable of being powered from an emergency bus.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressurizer water level not within limit.	A.1 Be in MODE 3.	6 hours
	<u>AND</u>	
	A.2 Fully insert all rods.	6 hours
	<u>AND</u>	
	A.3 Place Rod Control System in a condition incapable of rod withdrawal.	6 hours
	<u>AND</u>	
	A.4 Be in MODE 4.	12 hours
B. One required group of pressurizer heaters inoperable.	B.1 Restore required group of pressurizer heaters to OPERABLE status.	72 hours
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3.	6 hours
	<u>AND</u>	
	C.2 Be in MODE 4.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.9.1	Verify pressurizer water level is $\leq 93\%$ .	12 hours
SR 3.4.9.2	Verify capacity of each required group of pressurizer heaters is $\geq 125$ kW.	18 months

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.10 Pressurizer Safety Valves

LCO 3.4.10 Three pressurizer safety valves shall be OPERABLE with lift settings of 2485 psig, +2%/-3% average with no single valve outside  $\pm 3\%$ .

APPLICABILITY: MODES 1, 2, and 3,  
MODE 4 with all RCS cold leg temperatures > 235°F (Unit 1),  
270°F (Unit 2).

----- NOTE -----  
The lift settings are not required to be within the LCO limits during MODES 3 and 4 for the purpose of setting the pressurizer safety valves under ambient (hot) conditions. This exception is allowed for 54 hours following entry into MODE 3 provided a preliminary cold setting was made prior to heatup.  
-----

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One pressurizer safety valve inoperable.	A.1 Restore valve to OPERABLE status.	15 minutes
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
<u>OR</u>	<u>AND</u>	
Two or more pressurizer safety valves inoperable.	B.2 Be in MODE 4 with any RCS cold leg temperatures $\leq$ 235°F (Unit 1), 270°F (Unit 2).	24 hours



Pressurizer Safety Valves  
3.4.10

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.10.1 Verify each pressurizer safety valve is OPERABLE in accordance with the Inservice Testing Program. Following testing, lift settings shall be within $\pm 1\%$ .	In accordance with the Inservice Testing Program

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

----- NOTE -----  
Separate Condition entry is allowed for each PORV and each block valve.  
-----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more PORVs inoperable due to inoperable backup nitrogen supply and capable of being manually cycled.	A.1 Restore backup nitrogen supply to OPERABLE status.	14 days
B. One or more PORVs inoperable for reason other than Condition A and capable of being manually cycled.	B.1 Close and maintain power to associated block valve.	1 hour
C. One PORV inoperable and not capable of being manually cycled.	C.1 Close associated block valve.	1 hour
	<u>AND</u>	
	C.2 Remove power from associated block valve.	1 hour
	<u>AND</u>	
	C.3 Restore PORV to OPERABLE status.	72 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One block valve inoperable.	-----NOTE----- Required Action D.1 and D.2 do not apply when block valve is inoperable solely as a result of complying with Required Action C.2. -----	
	D.1 Place associated PORV in manual control.	1 hour
	<u>AND</u> D.2 Restore block valve to OPERABLE status.	72 hours
E. Required Action and associated Completion Time of Condition A, B, C, or D not met.	E.1 Be in MODE 3.	6 hours
	<u>AND</u> E.2 Be in MODE 4.	12 hours
F. Two PORVs inoperable and not capable of being manually cycled.	F.1 Be in MODE 3.	6 hours
	<u>AND</u> F.2 Be in MODE 4.	12 hours

# ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. Two block valves inoperable.	<p>G.1 -----NOTE----- Required Action G.1 does not apply when block valve is inoperable solely as a result of complying with Required Action C.2. -----</p> <p>Restore one block valve to OPERABLE status.</p>	2 hours
H. Required Action and associated Completion Time of Condition G not met.	<p>H.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>H.2 Be in MODE 4.</p>	<p>6 hours</p> <p>12 hours</p>

# SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.11.1 Verify PORV backup nitrogen supply pressure is within limit.	7 days
<p>SR 3.4.11.2 -----NOTES-----</p> <p>1. Not required to be performed with block valve closed in accordance with the Required Actions of this LCO.</p> <p>2. Only required to be performed in MODES 1 and 2.</p> <p>-----</p> <p>Perform a complete cycle of each block valve.</p>	92 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.11.3	-----NOTE----- Only required to be performed in MODES 1 and 2. ----- Perform a complete cycle of each PORV.	18 months
SR 3.4.11.4	Perform a complete cycle of each solenoid control valve and check valve on the accumulators in PORV control systems.	18 months

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.12 Low Temperature Overpressure Protection (LTOP) System

LC0 3.4.12 An LTOP System shall be OPERABLE with a maximum of one charging pump and one low head safety injection (LHSI) pump capable of injecting into the RCS and the accumulators isolated, with power removed from the isolation valve operators, and one of the following pressure relief capabilities:

- a. Two power operated relief valves (PORVs) with lift settings of:
  1.  $\leq 500$  psig (Unit 1), 415 psig (Unit 2) when any RCS cold leg temperature  $\leq 235^{\circ}\text{F}$  (Unit 1),  $270^{\circ}\text{F}$  (Unit 2); and
  2.  $\leq 395$  psig (Unit 1), 375 psig (Unit 2) when any RCS cold leg temperature  $\leq 150^{\circ}\text{F}$  (Unit 1),  $130^{\circ}\text{F}$  (Unit 2).
- b. The RCS depressurized and an RCS vent of  $\geq 2.07$  square inches.

----- NOTES -----

1. Two charging pumps may be made capable of injecting for  $\leq 1$  hour for pump swapping operations.
  2. Accumulator isolation with power removed from the isolation valve operators is only required when accumulator pressure is greater than the PORV lift setting.
- 

APPLICABILITY: MODE 4 when any RCS cold leg temperature is  $\leq 235^{\circ}\text{F}$  (Unit 1),  $270^{\circ}\text{F}$  (Unit 2),  
MODE 5,  
MODE 6 when the reactor vessel head is on.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Two LHSI pumps capable of injecting into the RCS.	A.1 Initiate action to verify a maximum of one LHSI pump is capable of injecting into the RCS.	Immediately

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Two or more charging pumps capable of injecting into the RCS.	B.1 Initiate action to verify a maximum of one charging pump is capable of injecting into the RCS.	Immediately
C. -----NOTE----- Only applicable when accumulator pressure is greater than PORV lift setting. ----- An accumulator not isolated.  <u>OR</u>  Power available to one or more accumulator isolation valve operators.	C.1 Isolate affected accumulator.  <u>AND</u>  C.2 Remove power from affected accumulator isolation valve operators.	Immediately   1 hour
D. Required Action and associated Completion Time of Condition C not met.	D.1 Increase RCS cold leg temperature to > 235°F (Unit 1), 270°F (Unit 2).  <u>OR</u>  D.2 Depressurize affected accumulator to less than PORV lift setting.	12 hours   12 hours
E. One required PORV inoperable in MODE 4.	E.1 Restore required PORV to OPERABLE status.	7 days
F. One required PORV inoperable in MODE 5 or 6.	F.1 Restore required PORV to OPERABLE status.	24 hours

# ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>G. Two required PORVs inoperable.</p> <p><u>OR</u></p> <p>Required Action and associated Completion Time of Condition A, B, D, E, or F not met.</p> <p><u>OR</u></p> <p>LTOP System inoperable for any reason other than Condition A, B, C, D, E, or F.</p>	<p>G.1 Depressurize RCS and establish RCS vent of <math>\geq 2.07</math> square inches.</p>	<p>12 hours</p>

# SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.12.1 Verify a maximum of one LHSI pump is capable of injecting into the RCS.</p>	<p>12 hours</p>
<p>SR 3.4.12.2 Verify a maximum of one charging pump is capable of injecting into the RCS.</p>	<p>12 hours</p>
<p>SR 3.4.12.3 -----NOTE----- Only required to be met if accumulator pressure is greater than PORV lift setting. ----- Verify each accumulator is isolated and power is removed from the accumulator isolation valve operator.</p>	<p>12 hours</p>



SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.12.4	Verify required RCS vent $\geq 2.07$ square inches open.	12 hours for unlocked open vent valve(s)  <u>AND</u> 31 days for other vent paths
SR 3.4.12.5	Verify PORV block valve is open for each required PORV and PORV keyswitch is in AUTO.	72 hours
SR 3.4.12.6	Verify required PORV backup nitrogen supply pressure is within limit.	7 days
SR 3.4.12.7	<p>-----NOTE-----            Not required to be met until 12 hours after decreasing RCS cold leg temperature to <math>\leq 235^{\circ}\text{F}</math> (Unit 1), <math>270^{\circ}\text{F}</math> (Unit 2).            -----</p> <p>Perform a COT on each required PORV, excluding actuation.</p>	31 days
SR 3.4.12.8	Perform CHANNEL CALIBRATION for each required PORV actuation channel.	18 months

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.13 RCS Operational LEAKAGE

LC0 3.4.13 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b. 1 gpm unidentified LEAKAGE;
- c. 10 gpm identified LEAKAGE;
- d. 1 gpm total primary to secondary LEAKAGE through all steam generators (SGs); and
- e. 500 gallons per day primary to secondary LEAKAGE through any one SG.

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

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCS LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours
B. Required Action and associated Completion Time of Condition A not met.  <u>OR</u>  Pressure boundary LEAKAGE exists.	B.1 Be in MODE 3.  <u>AND</u>  B.2 Be in MODE 5.	6 hours    36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.13.1 -----NOTE-----  Not required to be performed until 12 hours  after establishment of steady state  operation.  -----  Verify RCS operational LEAKAGE is within  limits by performance of RCS water  inventory balance.</p>	<p>72 hours</p>
<p>SR 3.4.13.2 Verify steam generator tube integrity is in  accordance with the Steam Generator Tube  Surveillance Program.</p>	<p>In accordance  with the Steam  Generator Tube  Surveillance  Program</p>

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.14 RCS Pressure Isolation Valve (PIV) Leakage

LCO 3.4.14 Leakage from each RCS PIV required to be tested shall be within limit.

APPLICABILITY: MODES 1, 2, and 3,  
MODE 4, except any required valves in the residual heat removal (RHR) flow path when in, or during the transition to or from, the RHR mode of operation.

#### ACTIONS

- NOTES -----
1. Separate Condition entry is allowed for each flow path.
  2. Enter applicable Conditions and Required Actions for systems made inoperable by an inoperable PIV.
- 

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more flow paths with leakage from one or more required RCS PIVs not within limit.	A.1 Restore RCS PIV leakage to within limit.	4 hours
B. Required Action and associated Completion Time for Condition A not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.14.1 -----NOTES-----</p> <ol style="list-style-type: none"> <li>1. Not required to be performed in MODES 3 and 4.</li> <li>2. Not required to be performed on any RCS PIVs required to be tested located in the RHR flow path when in the shutdown cooling mode of operation.</li> <li>3. RCS PIVs actuated during the performance of this Surveillance are not required to be tested more than once if a repetitive testing loop cannot be avoided.</li> </ol> <p>-----</p> <p>Verify leakage from each RCS PIV required to be tested is equivalent to <math>\leq 0.5</math> gpm per nominal inch of valve size up to a maximum of 5 gpm at an RCS pressure <math>\geq 2215</math> psig and <math>\leq 2255</math> psig.</p>	<p>In accordance with the Inservice Testing Program, and 18 months</p> <p><u>AND</u></p> <p>Prior to entering MODE 2 whenever the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months</p> <p><u>AND</u></p> <p>Within 24 hours following valve actuation due to automatic or manual action or flow through the valve</p>

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.15 RCS Leakage Detection Instrumentation

LCO 3.4.15 The following RCS leakage detection instrumentation shall be OPERABLE:

- a. One containment sump (level or discharge flow) monitor;  
and
- b. One containment atmosphere radioactivity monitor (gaseous or particulate).

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

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required containment sump monitor inoperable.	<p>A.1 -----NOTE----- Not required until 12 hours after establishment of steady state operation. -----</p> <p>Perform SR 3.4.13.1.</p>	Once per 24 hours
	<p><u>AND</u></p> <p>A.2 Restore required containment sump monitor to OPERABLE status.</p>	30 days

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required containment atmosphere radioactivity monitor inoperable.	B.1.1 Analyze grab samples of the containment atmosphere.	Once per 24 hours
	<u>OR</u>	
	B.1.2 -----NOTE----- Not required until 12 hours after establishment of steady state operation. -----  Perform SR 3.4.13.1.	Once per 24 hours
	<u>AND</u>  B.2 Restore required containment atmosphere radioactivity monitor to OPERABLE status.	30 days
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	6 hours
	<u>AND</u>  C.2 Be in MODE 5.	36 hours
D. All required monitors inoperable.	D.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.15.1	Perform CHANNEL CHECK of the required containment atmosphere radioactivity monitor.	12 hours
SR 3.4.15.2	Perform COT of the required containment atmosphere radioactivity monitor.	92 days
SR 3.4.15.3	Perform CHANNEL CALIBRATION of the required containment sump monitor.	18 months
SR 3.4.15.4	Perform CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor.	18 months



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### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.16 RCS Specific Activity

LCO 3.4.16 The specific activity of the reactor coolant shall be within limits.

APPLICABILITY: MODES 1 and 2,  
MODE 3 with RCS average temperature ( $T_{avg}$ )  $\geq 500^{\circ}\text{F}$ .

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. DOSE EQUIVALENT I-131 > 1.0 $\mu\text{Ci/gm}$ .	A.1 Verify DOSE EQUIVALENT I-131 within the acceptable region of Figure 3.4.16-1.	Once per 4 hours
	<u>AND</u> A.2 Restore DOSE EQUIVALENT I-131 to within limit.	48 hours
B. Gross specific activity of the reactor coolant not within limit.	B.1 Be in MODE 3 with $T_{avg} < 500^{\circ}\text{F}$ .	6 hours
C. Required Action and associated Completion Time of Condition A not met.  <u>OR</u>  DOSE EQUIVALENT I-131 in the unacceptable region of Figure 3.4.16-1.	C.1 Be in MODE 3 with $T_{avg} < 500^{\circ}\text{F}$ .	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.16.1 Verify reactor coolant gross specific activity $\leq 100/\bar{E}$ $\mu\text{Ci/gm}$ .	7 days
<p>SR 3.4.16.2 -----NOTE----- Only required to be performed in MODE 1. -----</p> <p>Verify reactor coolant DOSE EQUIVALENT I-131 specific activity <math>\leq 1.0 \mu\text{Ci/gm}</math>.</p>	<p>14 days</p> <p><u>AND</u></p> <p>Between 2 and 6 hours after a THERMAL POWER change of <math>\geq 15\%</math> RTP within a 1 hour period</p>
<p>SR 3.4.16.3 -----NOTE----- Not required to be performed until 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for <math>\geq 48</math> hours. -----</p> <p>Determine <math>\bar{E}</math> from a sample taken in MODE 1 after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for <math>\geq 48</math> hours.</p>	184 days

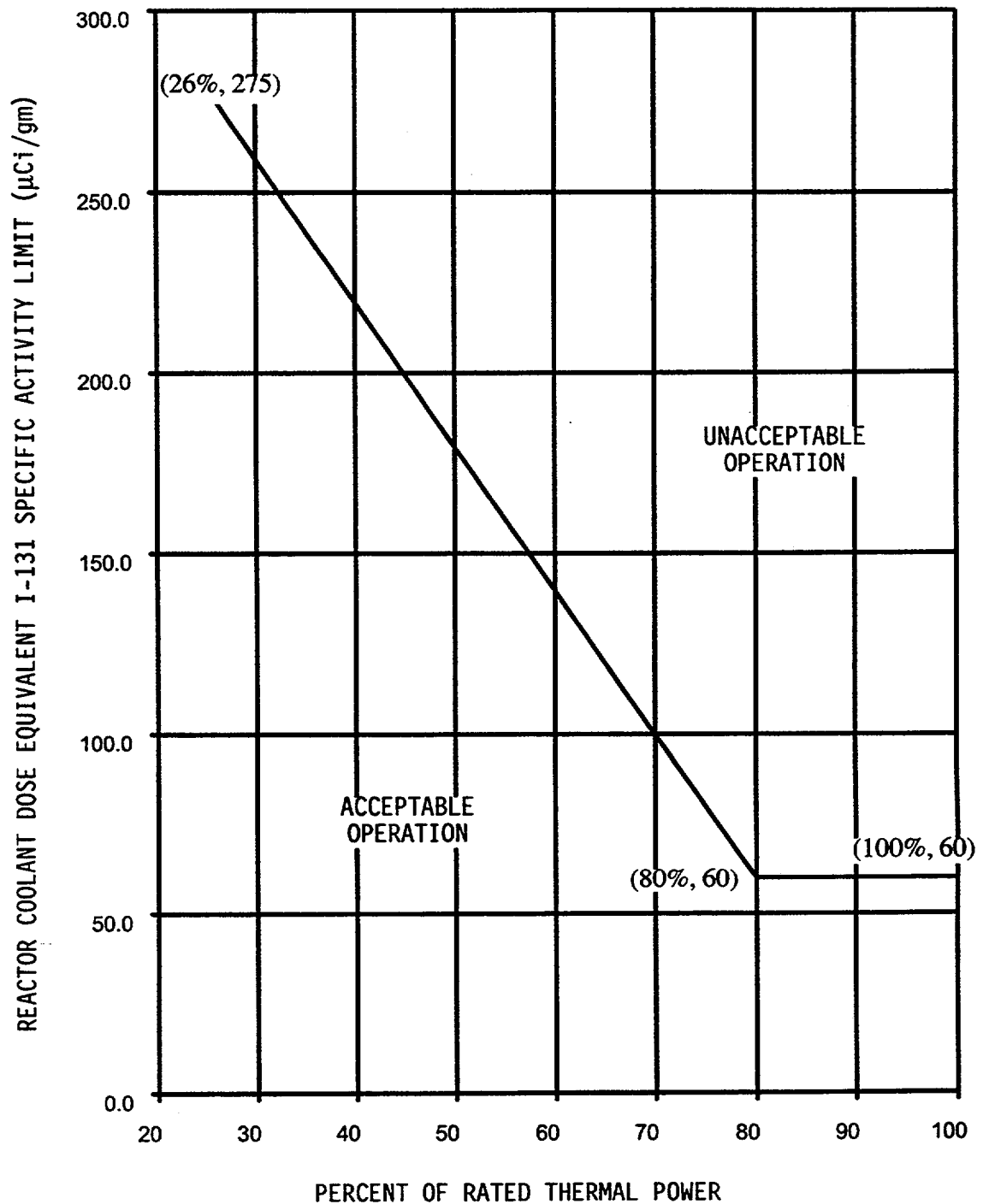


Figure 3.4.16-1 (page 1 of 1)  
Reactor Coolant DOSE EQUIVALENT I-131 Specific Activity  
Limit Versus Percent of RATED THERMAL POWER

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### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.17 RCS Loop Isolation Valves

LC0 3.4.17 Each RCS hot and cold leg loop isolation valve shall be open with power removed from each isolation valve operator.

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

#### ACTIONS

----- NOTE -----  
Separate Condition entry is allowed for each RCS loop isolation valve.  
-----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Power available to one or more loop isolation valve operators.	A.1 Remove power from loop isolation valve operators.	30 minutes
B. -----NOTE----- All Required Actions shall be completed whenever this Condition is entered. -----  One or more RCS loop isolation valves closed.	B.1 Maintain valve(s) closed.  <u>AND</u>  B.2 Be in MODE 3.  <u>AND</u>  B.3 Be in MODE 5.	Immediately   6 hours   36 hours

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.17.1 Verify each RCS loop isolation valve is open.	Once prior to removing power to the valve operator

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.17.2 Verify power removed from each RCS loop isolation valve.	31 days

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.18 RCS Isolated Loop Startup

LCO 3.4.18 Each RCS isolated loop shall remain isolated with both loop isolation valves closed and power removed from the valve operators unless:

a. The isolated loop is filled and:

1. The boron concentration of the isolated loop is  $\geq$  the boron concentration required to meet SDM of LCO 3.1.1 or the boron concentration of LCO 3.9.1 prior to opening the hot leg isolation valve;
2. The hot leg isolation valve has been open with recirculation line flow of  $\geq 125$  gpm for  $\geq 90$  minutes prior to opening the cold leg isolation valve; and
3. The cold leg temperature of the isolated loop is  $\leq 20^\circ\text{F}$  below the highest cold leg temperature of the operating loops prior to opening the cold leg isolation valve; or

b. The isolated loop is drained and:

----- NOTE -----  
Seal injection may be initiated to the RCP in the isolated, drained loop and continued during filling of the isolated loop from the active RCS volume provided:

- 1) The isolated loop is initially drained; and
- 2) The boron concentration of the seal injection source is  $\geq$  the boron concentration required to meet the SDM of LCO 3.1.1 or the boron concentration of LCO 3.9.1.

- 
1. Pressurizer water level is maintained  $\geq 32\%$  prior to and during the opening of the hot or cold leg isolation valves; and
  2. The hot and cold leg isolation valves are fully open within 2 hours after the loop is filled.



----- NOTE -----  
A hot or cold leg isolation valve may be closed for up to two hours for valve maintenance or testing. If the isolation valve is not opened within 2 hours, the loop shall be isolated.  
-----

APPLICABILITY: MODES 5 and 6.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Isolated, filled loop boron concentration requirement not met when performing isolated loop startup in accordance with LCO 3.4.18.a.	A.1 Close hot and cold leg isolation valves.	Immediately
B. Isolated, filled loop recirculation line flow $\geq 125$ gpm for $\geq 90$ minutes with hot leg isolation valve open not established when performing isolated loop startup in accordance with LCO 3.4.18.a.	B.1 Close cold leg isolation valve.	Immediately
C. Isolated, filled loop temperature requirement not met when performing isolated loop startup in accordance with LCO 3.4.18.a.	C.1 Close cold leg isolation valve.	Immediately

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>D. Pressurizer level requirement not met during filling of an initially drained loop when performing isolated loop startup in accordance with LCO 3.4.18.b.</p> <p><u>OR</u></p> <p>Seal injection boron concentration requirements not met during filling of an initially drained loop when performing isolated loop startup in accordance with LCO 3.4.18.b.</p>	<p>D.1 Close hot and cold leg isolation valves.</p>	<p>Immediately</p>
<p>E. Hot and cold leg isolation valves not fully open within 2 hours after filling an initially drained loop when performing isolated loop startup in accordance with LCO 3.4.18.b.</p>	<p>E.1 Close hot and cold leg isolation valves.</p> <p><u>OR</u></p> <p>E.2 Verify the boron concentration is <math>\geq</math> the boron concentration required to meet the SDM of LCO 3.1.1 or the boron concentration of LCO 3.9.1.</p>	<p>Immediately</p> <p>Immediately</p>
<p>F. Power available to one or more loop isolation valve operators of closed hot or cold isolation valve(s) with LCO 3.4.18.a.1 or LCO 3.4.18.b.1 not met.</p>	<p>F.1 Remove power from the loop isolation valve operator(s).</p>	<p>30 minutes</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.18.1 -----NOTE----- Only required to be met when utilizing the requirements of LCO 3.4.18.a. -----</p> <p>Verify cold leg temperature of a filled, isolated loop is <math>\leq 20^{\circ}\text{F}</math> below the highest cold leg temperature of the operating loops.</p>	<p>Within 30 minutes prior to opening the cold leg isolation valve in isolated loop</p>
<p>SR 3.4.18.2 -----NOTE----- Only required to be met when utilizing the requirements of LCO 3.4.18.a. -----</p> <p>Verify boron concentration of a filled, isolated loop is greater than or equal to boron concentration required to meet SDM of LCO 3.1.1 or the boron concentration of LCO 3.9.1.</p>	<p>Within 1 hour prior to opening the hot or cold leg isolation valve in isolated loop</p>
<p>SR 3.4.18.3 -----NOTE----- Only required to be met when utilizing the requirements of LCO 3.4.18.a. -----</p> <p>Verify that hot leg isolation valve is open with recirculation line flow <math>\geq 125</math> gpm for <math>\geq 90</math> minutes.</p>	<p>Within 30 minutes prior to opening the cold leg isolation valve in filled, isolated loop</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.18.4 -----NOTE----- Only required to be met when utilizing the requirements of LCO 3.4.18.b. ----- Verify that isolated loop is drained.</p>	<p>Within 2 hours prior to filling an initially drained loop from the active RCS volume  <u>OR</u> Within 2 hours prior to initiating seal injection to the RCP in a drained loop</p>
<p>SR 3.4.18.5 -----NOTES----- 1. Only required to be met when utilizing the requirements of LCO 3.4.18.b. 2. Only required to be met when using blended makeup flow as the source for RCP seal injection. ----- Verify the boron concentration of the source for RCP seal injection is <math>\geq</math> the boron concentration required to meet the SDM of LCO 3.1.1 or the boron concentration of LCO 3.9.1.</p>	<p>Within 1 hour prior to initiating RCP seal injection in the isolated loop  <u>AND</u> Once per hour during filling of an initially drained loop from the active RCS volume</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.18.6 -----NOTE----- Only required to be met when utilizing the requirements of LCO 3.4.18.b. ----- Verify that the pressurizer level is <math>\geq 32\%</math>.</p>	<p>Prior to filling an initially drained loop from the active RCS volume</p> <p><u>AND</u></p> <p>Once per 15 minutes during the filling of an initially drained loop from the active RCS volume</p>
<p>SR 3.4.18.7 -----NOTE----- Only required to be met when utilizing the requirements of LCO 3.4.18.b. ----- Verify the boron concentration of the isolated loop is <math>\geq</math> the boron concentration required to meet the SDM of LCO 3.1.1 or the boron concentration of LCO 3.9.1.</p>	<p>Within 1 hour prior to fully opening the cold leg isolation valve or opening the hot leg isolation valve</p>

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.19 RCS Loops—Test Exceptions

LCO 3.4.19 The requirements of LCO 3.4.4, "RCS Loops—MODES 1 and 2," may be suspended, with THERMAL POWER < P-7.

APPLICABILITY: MODES 1 and 2 during startup and PHYSICS TESTS.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. THERMAL POWER $\geq$ P-7.	A.1 Open reactor trip breakers.	Immediately

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.19.1 Verify THERMAL POWER is < P-7.	1 hour
SR 3.4.19.2 Perform a COT for each power range neutron flux—low channel, intermediate range neutron flux channel, P-10, and P-13.	Prior to initiation of startup and PHYSICS TESTS
SR 3.4.19.3 Perform an ACTUATION LOGIC TEST on P-7.	Prior to initiation of startup and PHYSICS TESTS

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### 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

#### 3.5.1 Accumulators

LCO 3.5.1 Three ECCS accumulators shall be OPERABLE.

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

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours
B. One accumulator inoperable for reasons other than Condition A.	B.1 Restore accumulator to OPERABLE status.	1 hour
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3.	6 hours
	<u>AND</u> C.2 Reduce RCS pressure to $\leq 1000$ psig.	12 hours
D. Two or more accumulators inoperable.	D.1 Enter LCO 3.0.3.	Immediately



SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.1.1	Verify each accumulator isolation valve is fully open.	12 hours
SR 3.5.1.2	Verify borated water volume in each accumulator is $\geq 7580$ gallons and $\leq 7756$ gallons.	12 hours
SR 3.5.1.3	Verify nitrogen cover pressure in each accumulator is $\geq 599$ psig and $\leq 667$ psig.	12 hours
SR 3.5.1.4	<p>-----NOTE-----  For Unit 2, until the first entry into MODE 4 following the Unit 2 Fall 2002 refueling outage, the accumulator boron concentration acceptance criteria shall be <math>\geq 2200</math> ppm and <math>\leq 2400</math> ppm.  -----</p> <p>Verify boron concentration in each accumulator is <math>\geq 2500</math> ppm and <math>\leq 2800</math> ppm.</p>	<p>31 days</p> <p><u>AND</u></p> <p>-----NOTE-----  Only required to be performed for affected accumulators  -----</p> <p>Once within 6 hours after each solution volume increase of <math>\geq 50\%</math> of indicated level that is not the result of addition from the refueling water storage tank</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.1.5	Verify power is removed from each accumulator isolation valve operator when RCS pressure is $\geq 2000$ psig.	31 days

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### 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

#### 3.5.2 ECCS-Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

----- NOTE -----  
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.  
-----

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more trains inoperable.	A.1 Restore train(s) to OPERABLE status.	72 hours
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
C. Less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.	C.1 Enter LCO 3.0.3.	Immediately

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY																																				
SR 3.5.2.1	<p>Verify the following valves are in the listed position with power to the valve operator removed.</p> <p>Unit 1</p> <table> <tr> <th>Number</th><th>Position</th><th>Function</th></tr> <tr> <td>1-SI-MOV-1890A</td><td>Closed</td><td>LHSI to Hot Leg</td></tr> <tr> <td>1-SI-MOV-1890B</td><td>Closed</td><td>LHSI to Hot Leg</td></tr> <tr> <td>1-SI-MOV-1836</td><td>Closed</td><td>HHSI Pump to Cold Leg</td></tr> <tr> <td>1-SI-MOV-1869A</td><td>Closed</td><td>HHSI Pump to Hot Leg</td></tr> <tr> <td>1-SI-MOV-1869B</td><td>Closed</td><td>HHSI Pump to Hot Leg</td></tr> </table> <p>Unit 2</p> <table> <tr> <th>Number</th><th>Position</th><th>Function</th></tr> <tr> <td>2-SI-MOV-2890A</td><td>Closed</td><td>LHSI to Hot Leg</td></tr> <tr> <td>2-SI-MOV-2890B</td><td>Closed</td><td>LHSI to Hot Leg</td></tr> <tr> <td>2-SI-MOV-2836</td><td>Closed</td><td>HHSI Pump to Cold Leg</td></tr> <tr> <td>2-SI-MOV-2869A</td><td>Closed</td><td>HHSI Pump to Hot Leg</td></tr> <tr> <td>2-SI-MOV-2869B</td><td>Closed</td><td>HHSI Pump to Hot Leg</td></tr> </table>	Number	Position	Function	1-SI-MOV-1890A	Closed	LHSI to Hot Leg	1-SI-MOV-1890B	Closed	LHSI to Hot Leg	1-SI-MOV-1836	Closed	HHSI Pump to Cold Leg	1-SI-MOV-1869A	Closed	HHSI Pump to Hot Leg	1-SI-MOV-1869B	Closed	HHSI Pump to Hot Leg	Number	Position	Function	2-SI-MOV-2890A	Closed	LHSI to Hot Leg	2-SI-MOV-2890B	Closed	LHSI to Hot Leg	2-SI-MOV-2836	Closed	HHSI Pump to Cold Leg	2-SI-MOV-2869A	Closed	HHSI Pump to Hot Leg	2-SI-MOV-2869B	Closed	HHSI Pump to Hot Leg	12 hours
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2-SI-MOV-2869B	Closed	HHSI Pump to Hot Leg																																				
SR 3.5.2.2	Verify each ECCS manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days																																				
SR 3.5.2.3	Verify ECCS piping is sufficiently full of water.	92 days																																				
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																																				

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY														
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														
SR 3.5.2.6	Verify each ECCS pump capable of starting automatically starts automatically on an actual or simulated actuation signal.	18 months														
SR 3.5.2.7	<p>Verify each ECCS throttle valve listed below is secured in the correct position.</p> <table><tr><td><u>Unit 1 Valve Number</u></td><td><u>Unit 2 Valve Number</u></td></tr><tr><td>1-SI-188</td><td>2-SI-89</td></tr><tr><td>1-SI-191</td><td>2-SI-97</td></tr><tr><td>1-SI-193</td><td>2-SI-103</td></tr><tr><td>1-SI-203</td><td>2-SI-116</td></tr><tr><td>1-SI-204</td><td>2-SI-111</td></tr><tr><td>1-SI-205</td><td>2-SI-123</td></tr></table>	<u>Unit 1 Valve Number</u>	<u>Unit 2 Valve Number</u>	1-SI-188	2-SI-89	1-SI-191	2-SI-97	1-SI-193	2-SI-103	1-SI-203	2-SI-116	1-SI-204	2-SI-111	1-SI-205	2-SI-123	18 months
<u>Unit 1 Valve Number</u>	<u>Unit 2 Valve Number</u>															
1-SI-188	2-SI-89															
1-SI-191	2-SI-97															
1-SI-193	2-SI-103															
1-SI-203	2-SI-116															
1-SI-204	2-SI-111															
1-SI-205	2-SI-123															
SR 3.5.2.8	Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion.	18 months														

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