ArevaEPRDCPEm Resource

From: Mitra, Sikhindra
Sent: Friday, May 03, 2013 11:01 AM
To: Dennis.Williford@areva.com
Cc: Snyder, Amy; Hearn, Peter; Segala, John; Harbuck, Craig; McKenna, Eileen; Le, Hien
Subject: FW: marked-up EPR generic TS Section 3.3 and bases Review Copy files with Partial Comments
Attachments: BPTS Partial Comments on TS 3 03 Bases 3-18-13 Review Copy.pdf; BPTS Partial Comments on TS 3 03 3-18-13 Review Copy.pdf; annotated_NRC IC TS Audit Issue Tracking Summary.docx

Importance: High

Hi Dennis,

Please find attached comments from NRC TS staff. Peter Hearn is not available today, as a back-up chapter PM, I am forwarding the comments. Thanks

Sikhindra (S.K) Mitra
Project Manager
EPR Project Branch
301-415-2783

From: Harbuck, Craig
Sent: Thursday, May 02, 2013 7:51 PM
To: Hearn, Peter
Cc: Snyder, Amy; McKenna, Eileen; Le, Hien
Subject: marked-up EPR generic TS Section 3.3 and bases Review Copy files with Partial Comments
Importance: High

Peter,

Please forward the attached files by forwarding this email to AREVA TS development staff contact.

By May 3rd Friday tomorrow morning

Additional comments will be coming by end of next week.

Let's plan to discuss with AREVA the state of the TS next Thursday May 9th during the afternoon public conference call. I am out of office beginning tomorrow May 3 until Wednesday May 8.

Thanks,

Craig Harbuck
Senior Reactor Engineer

_____

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From: Mitra, Sikhindra

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B 3.3 INSTRUMENTATION

B 3.3.1 Reactor Trip Instrumentation

BASES

BACKGROUND

para 1

The primary I&C systems used for control and monitoring in the plant are collectively referred to as the Distributed Control System (DCS). The DCS performs the majority of signal input processing, automation, operator interface, annunciation of abnormal process conditions, and actuator output functions in the plant. FSAR Section 7.1 (Ref. 1) describes the DCS and its constituent subsystems. The Protection System (PS) initiates a reactor trip to protect against violating the core specified acceptable fuel design limits and breaching the reactor coolant pressure boundary during anticipated operational occurrences (AOOs). The PS also initiates (and the Safety Automation System (SAS) controls) the Engineered Safety Features (ESF) actuations that are used to mitigate accidents. The ESF actuates necessary safety systems, based upon the values of selected plant parameters, to protect against violating core design limits, maintain the Reactor Coolant System (RCS) pressure boundary, and mitigate the consequences of accidents that could result in potential exposures comparable to the guidelines set forth in 10 CFR 100 during anticipated operational occurrences (AOOs) and ensures acceptable consequences during accidents.

The four redundant divisions of the DCS are physically separated in their respective safeguard buildings. The four divisionally separated rooms containing the DCS equipment are in different fire zones. Therefore, in general, the consequences of internal hazards (e.g., fire), would impact only one DCS division.

In general, the DCS architecture is four-fold redundant for both reactor trip and ESF functions. A single failure during corrective or periodic maintenance, or a single failure and the effects of an internal hazard does not prevent performance of the safety functions. For the reactor trip functions, each DCS division actuates one division of the reactor trip devices based on redundant processing performed in four PS divisions. For ESF functions, the redundancy of the safety function as a whole is defined by the redundancy of the ESF system mechanical trains.

In general, this results in one DCS division actuating one mechanical train of an ESF system based on redundant processing performed in four PS divisions. The DCS not only supports the redundancy of the mechanical trains, but also enhances this redundancy through techniques such as redundant actuation voting.

BASES

BACKGROUND (continued)

para 5

In general, three of the four DCS divisions are necessary to meet the redundancy and testability of GDC 21 in 10 CFR 50, Appendix A (Ref. 2). The fourth division provides additional flexibility by allowing one division to be removed from service for maintenance or testing while still maintaining a minimum two out of three logic.

Each of the DCS sensors, function processors, or trip actuation devices can be placed in lockout, which renders the component inoperable. The signals within the PS carry a value and a status. The signal status can be propagated through the software function blocks; therefore, if an input signal to a function block has a faulty status, the output of the function block also has a faulty status. When a signal with a faulty status reaches the voting function block, the signal is disregarded through modification of the voting logic. Individual function processors can be put into a testing and diagnostic mode via the service unit. The function processor that is being tested then behaves like a processor with a “detected fault” for the system. The signal outputs are disabled and those sent via the communication modules are marked with the status “Test” or “Error” and therefore masked by selection blocks with active status processing. In this case the receiving function processor behaves as if the transmitting function processor has failed.

The protection and monitoring systems have been designed to ensure safe operation of the reactor. This is achieved by specifying limiting safety system settings (LSSS) in terms of parameters monitored by the DCS, as well as LCOs on other reactor system parameters and equipment performance. The subset of LSSS that directly protect against violating the reactor core and RCS pressure boundary safety limits during AOOs are referred to as Safety Limit LSSS (SL-LSSS).

Technical Specifications are required by 10 CFR 50.36 to contain LSSS defined by the regulation as "...settings for automatic protective devices...so chosen that automatic protective actions will correct the abnormal situation before a Safety Limit (SL) is exceeded." The Analytical Limit is the limit of the process variable at which a safety action is initiated, as established by the safety analysis, to ensure that an SL is not exceeded. Any automatic protection action that occurs on reaching the Analytical Limit therefore ensures that the SL is not exceeded. However, in practice, the actual settings for automatic protective devices must be chosen to be more conservative than the Analytical Limit to account for instrument loop uncertainties related to the setting at which the automatic protective action would actually occur.

BASES

BACKGROUND (continued)

para 9

The Nominal Trip Setpoint (NTSP) is a predetermined setting for a protective device chosen to ensure automatic actuation prior to the process variable reaching the Analytical Limit and thus ensuring that the SL would not be exceeded. As such, the NTSP accounts for uncertainties in setting the device (e.g., CALIBRATION), uncertainties in how the device might actually perform (e.g., repeatability), changes in the point of action of the device over time (e.g., drift during surveillance intervals), and any other factors which may influence its actual performance (e.g., harsh accident environments (Ref. 3)). In this manner, the NTSP ensures that SLs are not exceeded. As such, the NTSP meets the definition of an SL-LSSS (Ref. 4). The Analytical Limits are determined as part of the safety analysis (Ref. 5). NTSPs and Analytical Limits are addressed in the Technical Specifications in accordance with Specification 5.5.19, “Setpoint Control Program.”

Technical Specifications contain values related to the OPERABILITY of equipment required for safe operation of the facility. OPERABLE is defined in Technical Specifications as "...being capable of performing its safety function(s)." However, the use of sensor calibration settings to define OPERABILITY in Technical Specifications would be an overly restrictive requirement if applied as the OPERABILITY limits for the "as-found" values of sensing device calibration settings during performance of Surveillances. This would result in Technical Specification compliance problems, as well as reports and corrective actions required by the rule which are not necessary to ensure safety. For example, a sensing device with an as-found sensor calibration setting value that has been found to be different from the specified calibration setting due to some drift of the sensor may still be OPERABLE since drift is to be expected. This expected drift would have been specifically accounted for in the setpoint methodology for calculating the NTSP and thus the automatic protective action would still have ensured that the SL would not be exceeded with the "as-found" value of the sensing device. Therefore, the sensing device would still be OPERABLE since it would have performed its safety function and the only corrective action required would be to calibrate the sensor to account for further drift during the next surveillance interval.

para 11

However, there is also some point beyond which the device would have not been able to perform its function due, for example, to greater than expected drift. The Allowable Value is the least conservative value of the as-found sensor calibration setting that a sensor can have when tested such that the sensor is OPERABLE if the as-found sensor calibration setting value is conservative with respect to the Allowable Value during a

BASES

BACKGROUND (continued)

CALIBRATION. As such, the Allowable Value differs from the sensor calibration setting by an amount greater than or equal to the expected instrument loop uncertainties, such as drift, during the surveillance interval. In this manner, the CALIBRATION of the device will ensure that an SL is not exceeded at any given point in time as long as the device has not drifted beyond that expected during the surveillance interval. Note that, although the sensor is OPERABLE under these circumstances, the as-left sensor calibration setting values must be set or confirmed to be within the as-left tolerance around the specified calibration settings at the completion of the surveillance, and confirmed to be operating within the statistical allowances of the uncertainty terms assigned (as-found). If the actual sensor calibration setting value is found to be non-conservative with respect to the Allowable Value, the sensor would be considered inoperable from a Technical Specification perspective. This requires corrective action including those actions required by 10 CFR 50.36 when automatic protective devices do not function as required.

para 12

During AOOs, which are those events expected to occur one or more times during the plant life, the acceptable limits are:

- The departure from nucleate boiling ratio (DNBR) shall be maintained above the SL value to prevent departure from nucleate boiling (DNB),
- Fuel centerline melting shall not occur; and
- The RCS pressure SL of 2803 psia shall not be exceeded.

Maintaining the parameters within the above values ensures that the offsite dose will be within the 10 CFR 100 (Ref. 6) criteria during AOOs.

para 13

Accidents are events that are analyzed even though they are not expected to occur during the plant life. The acceptable limit during accidents is that the offsite dose shall be maintained within an acceptable fraction of 10 CFR 100 limits. Different accident categories are allowed a different fraction of these limits, based on probability of occurrence. Meeting the acceptable dose limit for an accident category is considered having acceptable consequences for that event.

The PS is an integrated reactor protection system and engineered safety features actuation system. Individual sensors, function processors, (i.e., Acquisition and Processing Units (APUs) or Actuation Logic Units (ALUs)) that provide the actuation signal voting function, can be associated with multiple reactor trips, ESF functions, and permissives.

BASES

BACKGROUND (continued)

para 15

~~The PS is segmented into~~ three interconnected modules and associated ~~LCOs for the~~ Trip/ESF/Permissive Functions. These modules are:

- Input & Acquisition Logic Division: The portion of the logic that reads in the plant parameter (e.g. PZR pressure) and performs further conditioning (e.g. filters), calculations, comparison of values to setpoints, and sending to the voting logic. The hardware includes the sensor and associated conditioning equipment (e.g. Incore Instrumentation System and the Signal Conditioning and Distribution System (SCDS)), the APU, and cabling to the ALUs.

- Actuation Logic Division: The portion of the logic that receives the partial trigger value from the Input & Acquisition Logic and provides further calculation, voting, and logic before sending an actuation signal. The hardware includes the ALU, hardwired logic downstream of the ALU, and cabling to the priority and actuator control system (PACS) or reactor trip devices.

Suggest a paragraph about permissive signal creation and use

- Manual Division: The portion of the logic that provides a manual input to the Actuation Logic Division (system-level) or PACS (component-level). The hardware includes the manual device (Safety Information and Control System (SICS) pushbutton) and cabling to the Actuation Logic Division or PACS or reactor trip devices.

para 16

The instrument setpoint methodologies used for the U.S. EPR were submitted to NRC in References 4 and 7. The majority of reactor trips or protection functions are based on single division inputs; therefore, the uncertainties identified in Section 3.1 of Reference 4 are applicable for the trip. Reference 7 addresses the protection system trips or protection functions that are based on multiple inputs. The uncertainty calculations for the Self-Powered Neutron Detectors (SPNDs), incore instrumentation, high linear power density, high core power level, low saturation margin, anti-dilution, and DNBR use the statistical methodology described in Reference 7. As described therein, the NTSP is the LSSS since all known errors are appropriately combined in the total loop uncertainty calculation.

NTSPs that are in accordance with the Allowable Value will ensure that SLs of Chapter 2.0, "Safety Limits (SLs)," are not violated during AOOs, and the consequences of postulated accidents will be acceptable, providing the plant is operated from within the LCOs at the onset of the AOO or postulated accident and the equipment functions as designed.

BASES

BACKGROUND (continued)

para 18

Note that the Allowable Value is the least conservative value of the as-found sensor calibration setting value that a sensor can have during a periodic CALIBRATION, such that the sensor is OPERABLE if the as-found sensor calibration setting value is conservative with respect to the Allowable Value.

para 19

Functional testing of the entire DCS, from sensor input through the opening of individual sets of Reactor Trip Breakers (RTBs) or Reactor Trip Contactors (RTCs), is performed each refueling cycle. Process transmitter CALIBRATION is also normally performed on a refueling basis.

para 20

Reactor trip setpoints that directly protect against violating the reactor core or RCS pressure boundary Safety Limits during AOOs are SL-LSSS. Permissive setpoints allow bypass of trips when they are not required by the Safety Analysis. These permissives ensure that the starting conditions are consistent with the safety analysis, before preventative or mitigating actions occur. The permissives are only one of multiple conservative starting assumptions for the accident analysis. Therefore, permissive setpoints are not considered to be SL-LSSS. Each specified NTSP is more conservative than the Analytical Limit assumed in the safety analysis in order to account for instrument uncertainties appropriate to the trip function. The methodologies for considering uncertainties are defined in References 4 and 7.

Protection System

para 21a

The PS is a distributed, redundant computer system. It consists of four independent redundant data-processing automatic paths (divisions), each with layers of operation and running asynchronous with respect to each other. In addition to the computers associated with the automatic paths, there are two message and service interface computers to interface with each division.

Each SCDS division acquires analog and binary input signals from sensors in the plant (such as for temperature, pressure, and level measurements). Each SCDS division distributes its acquired and preprocessed input signals to the PS data processing computers (APUs).

para 21c

The APUs perform signal processing for plant protective functions such as signal online validation, limit value monitoring and calculations. Each PS division contains five APUs, two assigned to one subsystem and three assigned to the other subsystem. The APUs then send their outputs to two independent voter function processors (ALUs). Each PS division

BASES

BACKGROUND (continued)

contains four ALUs, two assigned to each subsystem. Two ALUs of the same subsystem within a division are redundant and perform the same processing using the same inputs. The outputs of two redundant ALUs are combined in a hardwired "functional AND" logic for reactor trip functions and in a hardwired "functional OR" logic for ESF functions. This avoids both unavailability of ESF functions and spurious reactor trips.

para 21d

In the ALUs, the outputs of the APUs of redundant divisions are processed together. An ALU controls a set of actuators. Each ALU receives the actuation signal from each of the redundant APUs. The ALU's task is to compare this redundant information and compute a validated (voted) actuating signal, which is used for actuating the end devices.

para 21e

When an APU is placed in lockout, network outputs are marked as invalid and are disregarded in downstream processing. For example, a two out of four voting function that receives one faulty input, votes two out of three on the remaining non-faulty inputs. Hardwired outputs (i.e., ALU outputs) are forced to a no output state, resulting in a reactor trip signal and no ESF actuation. No manual actions, beyond placing the function processor in lockout, are required for the downstream processing to properly accommodate the function processor in a lockout condition.

Reactor Trip Logic

para 22a

Critical plant parameters such as temperatures, pressures, and levels are sensed, acquired, and converted to electrical signals by the SCDS. These signals are sent to various reactor trip functions in the PS where they are processed. When prohibited operating conditions exist, a reactor trip signal is generated from the reactor trip functions. Besides being generated automatically from the PS, a reactor trip signal can also be generated from the following systems:

- Automatic reactor trip from the Diverse Actuation System (DAS) in the unlikely event of a software common cause failure of the PS;
- Manual reactor trip from the Main Control Room (MCR); and
- Manual reactor trip from the RSS. Note that the RSS manual reactor trip is not part of the required circuits for LCO 3.3.1.

The reactor trip functions ~~will~~ utilize voting logic in order to screen out potential upstream failures of sensors or function processors.

para 22c

The architecture of the PS, as well as logic implemented in the PS, ~~will~~ guard against spurious reactor trip orders while ensuring that ~~those~~ orders will be available when needed.

BASES

BACKGROUND (continued)

para 22d

Single failures upstream of the ALU layer that could result in an invalid signal being used in the reactor trip function are accommodated by modifying the vote in the ALU layer. For the reactor trip functions, the vote is always modified toward reactor trip.

The reactor trip outputs of the two OPERABLE redundant ALUs in a subsystem are combined in a hardwired "functional AND" configuration. This requires both ALUs to output the reactor trip signal for the associated Trip Actuation Device to be actuated. The outputs of the "functional AND' from both subsystems within a division are combined in a "functional OR" logic. The "functional AND" provides protection against spurious reactor trips while maintaining the ability to actuate a trip if an ALU has failed. However, if only one ALU in a subsystem is OPERABLE, the subsystem is still OPERABLE, and the single voting ALU will initiate a reactor trip.

para 22f

There are four dedicated reactor trip buttons in the MCR, one for each division. Any two of these buttons together will actuate a reactor trip.

para 23

Reactor Trip Actuation Devices

para 23a

The reactor trip actuation is performed by interrupting electrical power to the Control Rod Drive Mechanism (CRDM). Electrical power to the CRDM is delivered by the Non-Class 1E Uninterruptible Power Supply System.

para 23b

The power supply of the CRDM can be switched off via the following features:

para 23b-1

– Four RTBs distributed in two electrical divisions. Two RTBs are located in Division 2, two others in Division 3. The RTBs can be opened by two coils: one with a de-energized logic using an under voltage coil and the other with an energized logic using a shunt trip coil.

para 23b-2

The under voltage coil of the RTBs is actuated by the automatic reactor trip signals of the PS and the manual reactor trip from the SICS panel. The shunt coil of the RTBs is actuated by the automatic reactor trip signal from the DAS and the manual reactor trip signal from the RSS.

para 23b-3

– The reactor trip signal generated automatically by the PS and the manual reactor trip signal generated from the SICS panel actuates the RTCs.

para 23b-4

There are 23 sets of four RTCs, each set capable of removing power to four CRDM power supplies. Eleven sets of contactors are located in Division 1 and twelve sets are located in Division 4. Each division of the PS is assigned to one contactor in each of the 23 sets. Each set of four contactors is arranged to require at least two reactor trip orders to drop the rods assigned to the contactor set.

BASES

BACKGROUND (continued)

Once open, the RTBs require manual closure and they cannot be manually closed until the reactor trip signal is cleared by the PS.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The DCS is designed to ensure that the following operational criteria are met:

- The associated actuation will occur when the parameter monitored by each division reaches its setpoint and the specific coincidence logic is satisfied; and
- In general, separation and redundancy are maintained to permit a division to be out of service for testing or maintenance while still maintaining redundancy within the DCS instrumentation network.

Each of the analyzed transients and accidents can be detected by one or more PS functions. Each of the reactor trips included in the Technical Specifications are credited as part of the primary success path in the accident analysis. Therefore, the Reactor Trip Instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii). Non-credited ~~automatic~~ functions are not included in the Technical Specifications. Refer to FSAR Sections~~s~~ 7.2 for a description of the reactor trip functions. Credited functions are ~~included~~ in FSAR Table 15.0-7.

In general, the DCS Input & Acquisition Logic Division, Actuation Logic Division, and Manual Division that support reactor trips are required to be OPERABLE in MODES 1, 2 and/or 3 because the reactor is or can be made critical in these MODES. The automatic reactor trip functions are designed to take the reactor subcritical, which ~~maintains~~ the SLs during AOOs and assists the ESF in providing acceptable consequences during accidents.

The specific safety analysis and OPERABILITY requirements applicable to each ~~DCS protective~~ function are identified below. Permissives are addressed in LCO3.3.3, “Permissive Instrumentation.”

global comment: Validation or inhibition of a permissive is assumed to be automatic-- if not auto, then "manual" or "manually" must be included. This convention should be stated here, or somewhere at the beginning of the discussion of RT Functions, ESFAS, DAS, and if it applies, SAS Functions.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The Reactor Trip Instrumentation Functions are:

1-5. Departure from Nucleate Boiling Ration (DNBR) - Low

These trips protect the fuel against the risk of departure from nucleate boiling during AOOs that lead to a decrease of the DNBR value. There are five Low DNBR trips:

1. DNBR - Low,
2. DNBR with High Quality – Low,
3. DNBR with Imbalance or Rod Drop (1/4) – Low,
4. DNBR with High Quality and (Imbalance or Rod Drop) (1/4) – Low, and
5. DNBR with Rod Drop (2/4) – Low.

Together, these five trips protect against the following postulated accidents or AOOs:

– Increase in heat removal by the secondary system,
– Decrease in heat removal by the secondary system,
– Reactivity and power distribution anomalies, and
– Decrease in reactor coolant inventory.

Four divisions of the DNBR – Low (1) and DNBR with High Quality - Low (2) trip functions are required to be OPERABLE in MODE 1 with P2 permissive validated.

These trips utilize the following sensors:

– SPNDs (addressed in LCO 3.3.14, “Self-Powered Neutron Detectors (SPNDs),”
– RCP Speed sensors,
– Pressurizer Pressure (Narrow Range) sensors,
– Cold Leg Temperature (Narrow Range) sensors, and
– RCS Loop Flow sensors.

Four divisions of the DNBR with Imbalance or Rod Drop (1/4) – Low (3), DNBR with High Quality and (Imbalance or Rod Drop) (1/4) – Low (4), and DNBR with Rod Drop (2/4) – Low (5) trip functions are required to be OPERABLE in MODE 1 with P2 permissive validated.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

These trips utilize the following sensors:

- SPNDs (addressed in LCO 3.3.14, “Self-Powered Neutron Detectors (SPNDs),”
- Rod Cluster Control Assembly (RCCA) Analog Position Indication sensors,
- RCP Speed sensors,
- Pressurizer Pressure (Narrow Range) sensors,
- Cold Leg Temperature (Narrow Range) sensors, and
- RCS Loop Flow sensors.

The NTSPs are low enough to provide an operating envelope that prevents an unnecessary low DNBR reactor trip. The NTSPs are high enough for the system to maintain a margin to unacceptable fuel cladding damage for AOOs that leads to an uncontrolled decrease of the DNBR value.

Validation of the P2 permissive automatically enables the five Low DNBR trip signals when the reactor power level, as measured by the Power Range Detectors, is greater than approximately 10% RTP. When power is less than or equal to this threshold, the trips are automatically disabled by inhibition of the P2 permissive.

6. Linear Power Density - High

This trip protects the fuel against the risk of melting at the center of the fuel pellet, during AOOs that lead to an uncontrolled increase of the linear power density. This trip protects against the following postulated accidents or AOOs:

- Increase in heat removal by the secondary system, and
- Reactivity and power distribution anomalies.

Four divisions of the Linear Power Density - High trip function are required to be OPERABLE in MODE 1 with P2 permissive validated.

This trip utilizes the SPNDs. SPNDs are addressed in LCO 3.3.14, “Self-Powered Neutron Detectors (SPNDs).”

The NTSP is high enough to provide an operating envelope that prevents unnecessary Linear Power Density - High trips. The NTSP is low enough for the system to maintain a margin to unacceptable fuel centerline melt for any AOOs that lead to an uncontrolled increase of the linear power density.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Validation of the P2 permissive automatically enables the reactor trip signal when the reactor power level, as measured by the Power Range Detectors, is greater than approximately 10% RTP. When power is less than or equal to this threshold, the trip is automatically disabled by inhibition of the P2 permissive.

7. Neutron Flux Rate of Change - High

This trip limits the consequences of an excessive reactivity increase from a range ~~in~~ reactor power levels, including RTP. This trip protects against reactivity and power distribution anomalies.

Four divisions of the Neutron Flux Rate of Change - High trip function are required to be OPERABLE in:

- MODES 1, 2, and
- MODE 3 with the RCSL System capable of withdrawing an RCCA or one or more RCCAs not fully inserted.

This trip utilizes the ~~following~~ Power Range Detectors.

The NTSP is high enough to provide an operating envelope that prevents unnecessary High Neutron Flux Rate of Change (Power Range) reactor trips. The NTSP is low enough for the system to maintain a margin to unacceptable fuel cladding damage due to an excessive reactivity increase.

There are no permissives associated with this trip.

8. Core Power Level - High

This trip limits the consequences of an excessive reactivity increase from a range ~~in~~ reactor power levels, including RTP. This trip protects against the following postulated accidents or AOOs:

- Increase in heat removal by the secondary system, and
- Reactivity and power distribution anomalies.

Four divisions of the Core Power Level - High trip function are required to be OPERABLE in:

- MODE 1, and
- MODE 2 with P5 permissive validated.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

This trip utilizes the following sensors:

- Cold Leg Temperature (Wide Range) sensors,
- Hot Leg Pressure (Wide Range) sensors,
- Hot Leg Temperature (Narrow Range) sensors, and
- RCS Loop Flow sensors.

The NTSP is high enough to provide an operating envelope that prevents an unnecessary High Core Power Level reactor trip. The NTSP is low enough for the system to maintain a margin to unacceptable fuel cladding damage due to an excessive reactivity increase from a range in reactor power levels, including RTP.

Validation of the P5 permissive automatically enables the High Core Power Level trip when the reactor power level is greater than approximately 10^{-5}% RTP. Inhibition of the P5 permissive automatically disables the High Core Power Level trip when less than or equal to this threshold.

9. Saturation Margin - Low

This trip provides a reactor trip before saturation occurs in a hot leg. The Core Power Level - High trip relies on RCS loop temperature measurements as part of the calculation of thermal and hydraulic conditions. The Core Power Level - High calculation would not be valid if saturation were to occur in a hot leg. Therefore, the Saturation Margin - Low reactor trip is introduced because, in case of saturation occurring in a hot leg, the thermal core power level calculation becomes invalid.

Four divisions of the Saturation Margin – Low trip function are required to be OPERABLE in:

- MODE 1, and
- MODE 2 with P5 permissive validated.

This trip utilizes the following sensors:

- Cold Leg Temperature (Wide Range) sensors,
- Hot Leg Pressure (Wide Range) sensors,
- Hot Leg Temperature (Narrow Range) sensors, and
- RCS Loop Flow sensors.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The NTSP is low enough to provide an operating envelope that prevents an unnecessary Saturation Margin - Low reactor trip. The NTSP is high enough for the system to maintain a margin to unacceptable fuel cladding damage during AOOs.

Validation of the P5 permissive automatically enables the Saturation Margin - Low trip when the reactor power level is greater than approximately 10^{-5}% RTP. Inhibition of the P5 permissive automatically disables the Saturation Margin - Low trip when less than or equal to this threshold.

10. RCS Flow Rate – Low in Two Loops

This trip initiates a reactor trip and is inhibited below a certain level of nuclear power under which the protection is not necessary because DNB is no longer a risk in this condition. This trip protects against the following postulated accidents or AOOs:

- Decrease in heat removal by the secondary system, and
- Decrease in RCS flow rate.

Four divisions of the RCS Flow Rate – Low in Two Loops trip function are required to be OPERABLE in MODE 1 with P2 permissive validated.

This trip utilizes the RCS Loop Flow sensors.

The NTSP is low enough to provide an operating envelope that prevents unnecessary RCS Flow Rate – Low in Two Loops reactor trips. The NTSP is high enough for the system to maintain a margin to ensure DNBR limits are met for AOOs.

Validation of the P2 permissive automatically enables the RCS Flow Rate – Low in Two Loops trip when the reactor power level is greater than approximately 10% RTP. Inhibition of the P2 permissive automatically disables the RCS Flow Rate – Low in Two Loops trip when less than or equal to this threshold.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

11. RCS Flow Rate – Low-Low in One Loop

This trip initiates a reactor trip and is inhibited below a certain level of nuclear power under which the protection is not necessary because DNB is no longer a risk in this condition. This trip protects against the following postulated accidents or AOOs:

- Decrease in heat removal by the secondary system, and
- Decrease in RCS flow rate.

Four divisions of the RCS Flow Rate – Low-Low in One Loop trip function are required to be OPERABLE in MODE 1 with P3 permissive validated.

This trip utilizes the RCS Loop Flow sensors.

The NTSP is low enough to provide an operating envelope that prevents unnecessary RCS Flow Rate – Low-Low in One Loop reactor trips. The NTSP is high enough for the system to maintain a margin to ensure DNBR limits are met for AOOs and bounded for postulated accidents.

Validation of the P3 permissive automatically enables the RCS Flow Rate – Low-Low in One Loop trip when the reactor power level is greater than approximately 70% RTP. Inhibition of the P3 permissive automatically disables the RCS Flow Rate – Low-Low in One Loop trip when less than or equal to this threshold.

12. RCP Speed – Low in Two Loops

Due to electrical transients that may affect the RCPs, a specific protection function is required. This function initiates a reactor trip and is inhibited below a low level of reactor power under which the protection is not necessary because DNB is no longer a risk. This trip protects against the following postulated accidents or AOOs:

- Decrease in heat removal by the secondary system, and
- Decrease in RCS flow rate.

Four divisions of the RCP Speed – Low in Two Loops trip function are required to be OPERABLE in MODE 1 with P2 permissive validated.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

This trip utilizes the RCP Speed sensors.

The NTSP is low enough to provide an operating envelope that prevents unnecessary RCP Speed – Low in Two Loops reactor trips. The NTSP is high enough for the system to maintain a margin to ensure DNBR limits are met for AOOs.

Validation of the P2 permissive automatically enables the RCP Speed – Low in Two Loops trip when the reactor power level is greater than approximately 10% RTP. When the reactor power level is less than or equal to this threshold, the trip is automatically disabled by inhibition of the P2 permissive.

13. Neutron Flux - High (Intermediate Range)

This trip limits the consequences of an excessive reactivity increase when the reactor is started up from a sub-critical or low power start-up condition. This trip protects against reactivity and power distribution anomalies.

Four divisions of the Neutron Flux - High (Intermediate Range) trip function are required to be OPERABLE in:

- MODE 1 with P6 permissive inhibited,
- MODE 2, and
- MODE 3 with the RCSL System capable of withdrawing an RCCA or one or more RCCAs not fully inserted.

This trip utilizes the Intermediate Range Detectors.

The NTSP is high enough to provide an operating envelope that prevents an unnecessary Neutron Flux - High (Intermediate Range) reactor trip. The NTSP is low enough for the system to maintain a margin to unacceptable fuel cladding damage for AOOs that ~~leads~~ to an uncontrolled increase of the linear power density.

Inhibition of the P6 permissive automatically enables the Neutron Flux - High (Intermediate Range) reactor trip when the reactor power level is less than or equal to approximately 10% RTP. When the reactor power level is above this threshold, the trip is disabled by manual validation of the P6 permissive.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

14. Doubling Time – Low

This trip limits the consequences of an excessive reactivity increase when the reactor is started up from a sub-critical or low power start-up condition. This trip protects against reactivity and power distribution anomalies.

Four divisions of the Doubling Time – Low trip function are required to be OPERABLE in:

- MODE 1 with P6 permissive inhibited,
- MODE 2, and
- MODE 3 with the RCSL System capable of withdrawing an RCCA or one or more RCCAs not fully inserted.

This trip utilizes the Intermediate Range Detectors.

The NTSP is high enough to provide an operating envelope that prevents an unnecessary Doubling Time – Low reactor trip. The NTSP is low enough for the system to maintain a margin to unacceptable fuel cladding damage for any postulated event that leads to an uncontrolled increase of the linear power density.

Inhibition of the P6 permissive automatically enables the Doubling Time – Low reactor trip when the reactor power level is less than or equal to approximately 10% RTP. When the reactor power level is above this threshold, the trip is disabled by manual validation of the P6 permissive.

15. Pressurizer Pressure - Low

~~A~~ 1 RCS depressurization may lead to a risk of excessive boiling, thus a reactor trip is required to ensure fuel rod integrity and to adapt reactor power to the capacity of the safety systems. This trip protects against a decrease in reactor coolant inventory.

Four divisions of the Pressurizer Pressure - Low trip function are required to be OPERABLE in MODE 1 with P2 permissive validated.

This trip utilizes the Pressurizer Pressure (Narrow Range) sensors.

The NTSP is sufficiently below the full load operating value for RCS pressure so as not to interfere with normal plant operation, but still high enough to provide the required protection in the event of an RCS depressurization.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Validation of the P2 permissive automatically enables the Pressurizer Pressure - Low trip when the reactor power level is greater than approximately 10% RTP. When the reactor power level is less than or equal to this threshold, the trip is automatically disabled by inhibition of the P2 permissive.

16. Pressurizer Pressure - High

In case of an RCS overpressure, a reactor trip is required in order to:

- Adapt the reactor power to the capacity of the safety systems,
- Ensure RCS integrity, and
- Avoid opening of the Pressurizer safety valves in certain primary side overpressure transients.

This trip protects against a decrease in heat removal by the secondary system.

Four divisions of the Pressurizer Pressure - High trip function are required to be OPERABLE in MODES 1 and 2.

This trip utilizes the Pressurizer Pressure (Narrow Range) sensors.

The NTSP is sufficiently below the nominal lift setting of the Pressurizer Safety Relief Valves (PSRV)~~, and its operation avoids~~ the undesirable operation of these valves during normal plant operation. In the event of a complete loss of electrical load from 100% power, this setpoint ensures the reactor trip will take place, thereby limiting further heat input to the RCS and consequent pressure rise. The PSRVs may lift to prevent overpressurization of the RCS.

There are no permissives associated with this trip.

17. Pressurizer Level - High

In case of increasing Pressurizer level, a reactor trip is required in order to avoid Pressurizer overfilling. This trip protects against increases in reactor coolant inventory.

Four divisions of the Pressurizer Level - High trip function are required to be OPERABLE in:

- MODE 1, and
- MODE 2 with P12 permissive inhibited.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

This trip utilizes the Pressurizer Level (Narrow Range) sensors.

The NTSP is sufficiently below the point where the associated transient would reach the nominal lift setting of the PSRVs, and ~~its operation avoids~~ the undesirable operation of these valves during normal plant operation. In the event of a CVCS malfunction, this setpoint ensures a timely reactor trip will take place in order to avoid filling the pressurizer. The PSRVs may lift to prevent overpressurization of the RCS.

Inhibition of the P12 permissive automatically enables the Pressurizer Level - High trip when the pressurizer pressure is greater than or equal to approximately 2005 psia. When below this threshold, the trip is disabled by manual validation of the P12 permissive.

18. Hot Leg Pressure - Low

A RCS depressurization may lead to a risk of excessive boiling, thus a reactor trip is required to ensure fuel rod integrity and to adapt reactor power to the capacity of the safety systems. This trip protects against a decrease in reactor coolant inventory.

Four divisions of the Hot Leg Pressure - Low trip function are required to be OPERABLE in:

- MODES 1, 2, and
- MODE 3 with P12 permissive inhibited and with the RCSL System capable of withdrawing an RCCA or one or more RCCAs are not fully inserted.

This trip utilizes the Hot Leg Pressure (Wide Range) sensors.

The NTSP is sufficiently below the full load operating value so as not to interfere with normal plant operation, but still high enough to provide the required protection in the event of abnormal conditions.

Inhibition of the P12 permissive automatically enables the Hot Leg Pressure - Low trip when the pressure is greater than or equal to approximately 2005 psia. When below this threshold, the trip is disabled by manual validation of the P12 permissive.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

19. SG Pressure Drop – Low

In case of steam or feedwater system piping failure, the affected Steam Generator (SG) depressurizes leading to an RCS cooldown or heatup. A reactor trip is required in order to ensure the fuel rod integrity and to adapt the reactor power to the capacity of the safety systems. This trip protects against the following postulated accidents or AOOs:

- Increase in heat removal by the secondary system, and
- Decrease in heat removal by the secondary system.

Four divisions of the SG Pressure Drop – Low trip Function are required to be OPERABLE in:

- MODES 1, 2, and
- MODE 3 with the RCSL System capable of withdrawing an RCCA or one or more RCCAs not fully inserted.

This trip utilizes the SG Pressure sensors.

The condition to be detected is an SG pressure drop greater than a specified value. This is accomplished by using a variable pressure setpoint tracking the steam line pressure with a constant offset. The setpoint has a limitation on its maximum pressure and its maximum rate of decrease. If the steam line pressure increases, the setpoint will increase until the limitation on maximum pressure is reached. If the steam line pressure decreases, the setpoint will follow the decrease as long as the rate is less than or equal to the limitation on maximum rate of decrease. If the steam line pressure decreases more rapidly than the limitation on the maximum rate of decrease, the margin between the actual pressure and the setpoint will decrease until the steam line pressure equals the setpoint and protective action occurs.

The NTSP is sufficiently below the full load operating value so as not to interfere with normal plant operation, but still high enough to provide the required protection in the event of a pipe break.

There are no permissives associated with this trip.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

20. SG Pressure - Low

In case of steam or feedwater system piping failure, the affected SG depressurizes leading to an RCS cooldown or heatup. For small breaks, the setpoint of the reactor trip on SG Pressure Drop may not be reached. Therefore, a reactor trip on SG Pressure - Low is introduced in order to ensure fuel rod integrity and to adapt the reactor power to the capacity of safety systems. This trip protects against the following postulated accidents or AOOs:

- Increase in heat removal by the secondary system, and
- Decrease in heat removal by the secondary system.

Four divisions of the SG Pressure - Low trip function are required to be OPERABLE in:

- MODES 1, 2, and
- MODE 3 with P12 permissive inhibited and with the RCSL System capable of withdrawing an RCCA or one or more RCCAs not fully inserted.

This trip utilizes the SG Pressure sensors.

The NTSP is sufficiently below the full load operating value so as not to interfere with normal plant operation, but still high enough to provide the required protection in the event of a pipe break.

Inhibition of the P12 permissive automatically enables the SG Pressure - Low trip when the pressure is greater than or equal to approximately 2005 psia. When below this threshold, the trip is disabled by manual validation of the P12 permissive.

21. SG Pressure - High

In case of a loss of the main heat sink, the reactor has to be tripped in order to:

- Ensure fuel rods integrity at power
- [illegible]city
- [illegible]

Reduce power < 50% RTP
(see Audit Item 19)

4 hours

ems, and

This tri[illegible] removal by the second[illegible]

What about Required Action and associated Completion Time of Condition F or H not met for Function 6.c, Main Steam Relief Isolation Valve Opening - Manual, and Function 5.c, Partial Cooldown Actuation - Manual? Or should these functions specify Condition V instead of Condition U?

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Four divisions of the SG Pressure - High trip function are required to be OPERABLE in MODE 1.

This trip utilizes the SG Pressure sensors.

The NTSP is high enough to avoid spurious operation. In case of a loss of the main heat sink, the NTSP is low enough to trip the reactor in order to:

- ~~Ensure fuel rod integrity at power,~~
- ~~Adapt the reactor power to the capacity of safety systems, and~~
- ~~Ensure SG integrity.~~

There are no permissives associated with this trip.

22. SG Level - Low

This trip protects the reactor from a loss of heat sink in case of SG steam/feedwater flow mismatch. This trip protects against a decrease in heat removal by the secondary system.

Four divisions of the SG Level – Low Level trip function are required to be OPERABLE in:

- MODE 1, and
- MODE 2 with P13 permissive inhibited.

This trip utilizes the SG Level (Narrow Range) sensors.

The NTSP is sufficiently below the full load operating value so as not to interfere with normal plant operation, but still high enough to provide the required protection in the event of a flow mismatch.

Inhibition of the P13 permissive automatically enables the SG Level – Low trip when the hot leg temperature is greater than or equal to approximately 200°F. When below this threshold, the trip is disabled by manual validation of the P13 permissive.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

23. SG Level - High

This trip protects the turbine against moisture carryover in case of a main feedwater (MFW) malfunction causing an increase in feedwater flow or in case of SG level increase. This reactor trip ensures core integrity during these transients since an increase in feedwater flow leads to an RCS overcooling event and hence a reactivity insertion. This trip protects against an increase in heat removal by the secondary system.

Four divisions of the SG Level - High trip function are required to be OPERABLE in:

- MODES 1, 2, and
- MODE 3 with P13 permissive inhibited and the RCSL System capable of withdrawing an RCCA or one or more RCCAs not fully inserted.

This trip utilizes the SG Level (Narrow Range) sensors.

The NTSP is sufficiently above the full load operating value so as not to interfere with normal plant operation, but still low enough to provide the required protection in the event of an abnormal condition.

Inhibition of the P13 permissive automatically enables the SG Level - High trip when the hot leg temperature is greater than or equal to approximately 200°F. When below this threshold, the trip is disabled by manual validation of the P13 permissive.

24. Containment Pressure - High

In case of a postulated high energy initiating event leading to water or steam discharge into the containment, a reactor trip is performed in order to ensure containment integrity and to adapt the reactor power to the capacity of the safety systems. This trip protects against the following postulated accidents or AOOs:

- Increase in heat removal by secondary system,
- Decrease in heat removal by the secondary system, and
- Decrease in reactor coolant inventory.

This trip is also necessary to actuate the Containment Isolation (Stage 1) - High Containment Pressure ESF function.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Four divisions of the Containment Pressure - High trip function are required to be OPERABLE in:

- MODES 1, 2, and
- MODE 3 with the RCSL System capable of withdrawing an RCCA or one or more RCCAs not fully inserted.

This trip utilizes the following sensors:

- Containment Equipment Compartment Pressure sensors, and
- Containment Service Compartment Pressure (Narrow Range) sensors.

The NTSP is high enough to allow for small pressure increases in containment expected during normal operation (i.e., plant heatup) and is not indicative of an abnormal condition. It is low enough to initiate a reactor trip when an abnormal condition is indicated.

There are no permissives associated with this trip.

25. Safety Injection Actuation - Automatic

This function is provided to trip the reactor when the Safety Injection Signal (SIS) is automatically actuated by the PS. In each division of the PS, when a SIS Actuation signal is generated, a reactor trip order is also generated in the same division.

Four divisions of the reactor trip on Safety Injection Actuation - Automatic function are required to be OPERABLE in MODES 1 and 2.

The sensors required to generate the SIS Actuation signal are identified under each separate automatic ESF function:

- SIS Actuation - Low Pressurizer Pressure (ESF 1.a),
- SIS Actuation - Low Delta Psat (ESF 1.b), and
- SIS Actuation – Low Hot Leg Loop Level (ESF 1.c).

There are no permissives associated with this trip.

26. Emergency Feedwater System Actuation – Low-Low SG Level

This function is provided to trip the reactor when the EFWS is actuated by the PS due to low SG level. In each division of the PS, when an EFWS Actuation signal is generated due to low SG level (regardless of the EFWS train to be initiated), a reactor trip signal is also generated in the same division.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Four divisions of the reactor trip on Emergency Feedwater System Actuation – Low-Low SG Level Function are required to be OPERABLE in MODES 1 and 2.

The sensors required to generate the Emergency Feedwater System Actuation – Low-Low SG Level signal are identified under ESF 2.a: EFWS Actuation - Low-Low SG Level (Affected SG).

There are no permissives associated with this trip.

27. Manual Rector Trip - Manual

Manual actuation switches are available in the SICS in the Main Control Room. There is one manual Reactor Trip switch per division. Any two together will actuate a reactor trip.

The four manual Reactor Trip switches are required to be OPERABLE in:

– MODES 1, 2, and
– MODES 3 with the RCSL System capable of withdrawing an RCCA or one or more RCCAs not fully inserted.

A Manual Reactor Trip accomplishes the same results as any one of the automatic trip Functions. It is used by the reactor operator to shut down the reactor whenever any parameter is rapidly trending toward its Trip Setpoint.

There is no NTSP associated with this Function.

There are no permissives associated with this Function.

28. Reactor Trip Breakers

There are two RTBs in Divisions 2 and 3 only.

Two RTBs per division (Divisions 2 and 3 only) are required to be OPERABLE in:

– MODES 1 and 2, and
– MODES 3 with the RCSL System capable of withdrawing an RCCA or one or more RCCAs not fully inserted.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

These trip actuation devices support the reactor trip functions.

This Function does not utilize any sensors.

There is no NTSP associated with this Function.

There are no permissives associated with this Function.

29. Reactor Trip Contactors

There are four RTCs in each of twenty-three sets in Divisions 1 and 4 only.

Four RTCs in each of twenty-three sets per division (Divisions 1 and 4 only) are required to be OPERABLE in:

- MODES 1 and 2, and
- MODE 3 with the RCSL System capable of withdrawing an RCCA or one or more RCCAs not fully inserted.

These trip actuation devices support the reactor trip functions.

This Function does not utilize any sensors.

There is no NTSP associated with this Function.

There are no permissives associated with this Function.

30. Actuation Logic

Four divisions of the Actuation Logic are required to be OPERABLE in:

- MODES 1 and 2, and
- MODE 3 with the RCSL System capable of withdrawing an RCCA or one or more RCCAs not fully inserted.

This Function does not utilize any sensors.

There is no NTSP associated with this Function.

There are no permissives associated with this Function

MUST INSERT INTERIM REV 4 (pdf file pages 80 to 97) DISCUSSION OF EACH SENSOR INPUT TO APUs/CUs AND THE RT, ESF, PERMISSIVE, AND SAS FUNCTIONS THAT USE THE SENSOR'S OUTPUT; include statement of the broadest Applicability based on Applicabilities of supported functions.

BASES

ACTIONS

The most common causes of division inoperability are outright failure or drift of the sensor sufficient to exceed the tolerance allowed by the plant specific setpoint analysis. Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function. This determination is generally made during the performance of a CALIBRATION when the sensor is set up for adjustment to bring it to within specification. If an as-found sensor calibration setting value is non-conservative with respect to the Allowable Value, the sensor is immediately declared inoperable, and the appropriate Condition(s) must be entered.

In the event that any sensor or function processor is found inoperable, then all affected Trip/ESF/Permissive Functions provided by that sensor or function processor must be declared inoperable, and the plant must enter any applicable Condition for the particular Trip/ESF/Permissive Function affected.

When the number of inoperable Functions exceeds that specified in Table 3.3.1-1, redundancy is lost and actions must be taken to restore the required redundancy.

A Note has been added to the ACTIONS to clarify the application of the Completion Time rules. The Conditions of this Specification may be entered independently for each Function. The Completion Times of each inoperable Function will be tracked separately, starting from the time the Condition was entered for that Function.

review the actions at the office

A.1

Condition A applies to all Reactor Trip Instrumentation Functions. Condition A addresses the situation where one or more Functions with one or more divisions are inoperable. The Required Action is to refer to Table 3.3.1-1 and to take the Required Actions for the Functions affected. The Completion Times are those from the referenced Conditions and Required Actions.

B.1

Condition B applies when one Input & Acquisition Logic division is inoperable. In this condition, the minimum number of OPERABLE divisions to read the plant parameter, perform conditioning, calculations, compare the values to setpoints, and sending to the voting logic during an AOO or postulated accident coupled with a single failure is still available. Verification that the Actuation Logic voting has been modified ensures the

BASES

ACTIONS (continued)

Protection System reflects the condition. The Completion Time of 6 hours is reasonable considering the availability of automatic actuation and the low probability of an AOO or postulated accident occurring during this time.

C.1

Condition C The Completion Time of applies when one Manual division is inoperable. In this condition, the remaining OPERABLE Manual divisions are available to send a trip signal during an AOO or postulated accident coupled with a single failure.

The OPERABILITY of the other Manual divisions must be verified within 6 hours. The Completion Time of 6 hours is reasonable considering that there are three Manual divisions available, the low probability of an event occurring during this interval and the time necessary for performing the verification.

D.1

Condition D applies when two Manual divisions are inoperable. In this condition, the two remaining OPERABLE Manual divisions are available to send a trip signal during an AOO or postulated accident.

One inoperable Manual division must be restored to OPERABLE status within 72 hours. The Completion Time of 72 hours is reasonable considering that there are two Manual divisions available, the low probability of an event occurring during this interval, and the time necessary for repairs.

E.1

Condition E applies when one Reactor Trip Breaker or one Reactor Trip Contactor in a set is inoperable.

A Note has been added to the Condition to clarify the application of the Completion Time rules. The Conditions of this Specification may be entered independently for each Reactor Trip Contactor Set. The Completion Times of each inoperable Reactor Trip Contactor Set will be tracked separately, starting from the time the Condition was entered for that Reactor Trip Contactor Set.

BASES

ACTIONS (continued)

In this condition, the remaining OPERABLE Reactor trip Breakers and Reactor Trip Contactors in the set are available to open the breakers during an AOO or postulated accident coupled with a single failure.

The operability of the Reactor Trip Breaker or Reactor Trip Contactor in a set must be restored to OPERABLE status within 72 hours. The Completion Time of 72 hours is reasonable considering the availability Reactor trip Breakers and Reactor Trip Contactors, the low probability of an event occurring during this interval, and the time necessary for repairs.

F.1

Condition F addresses the failure of two or more Input & Acquisition Logic divisions, or the inability to complete the remedial measures in the time allowed by Required Action B.1. The plant must be brought to a MODE where the LCO is no longer applicable.

The Completion Time of 4 hours to reach MODE 1 with P2 inhibited is reasonable, based on operating experience, to reach the required power level from full power conditions in an orderly manner and without challenging plant systems.

G.1

Condition G addresses the failure of two or more Input & Acquisition Logic divisions, three or more manual divisions, two or more Reactor Trip Breakers, two or more Reactor Trip Contactors in any set, or the inability to complete the remedial measures in the time allowed by Required Actions B.1, C.1, D.1, or E.1. The plant must be brought to a MODE where the LCO is no longer applicable.

The Completion Time of 6 hours to reach MODE 3 with the Reactor Control, Surveillance and Limitation (RCSL) System not capable of withdrawing an RCCA and RCCAs fully inserted is reasonable, based on operating experience, to reach the required power level from full power conditions in an orderly manner and without challenging plant systems.

H.1

Condition H addresses the failure of two or more Input & Acquisition Logic divisions or the inability to complete the remedial measures in the time allowed by Required Action B.1. The plant must be brought to a MODE where the LCO is no longer applicable.

BASES

ACTIONS (continued)

The Completion Time of 6 hours to reach MODE 2 with P5 inhibited is reasonable, based on operating experience, to reach the required power level from full power conditions in an orderly manner and without challenging plant systems.

I.1

Condition I addresses the failure of two or more Input & Acquisition Logic divisions or the inability to complete the remedial measures in the time allowed by Required Action B.1. The plant must be brought to a MODE where the LCO is no longer applicable.

The Completion Time of 6 hours to reach MODE 3 with the Reactor Control, Surveillance and Limitation (RCSL) System not capable of withdrawing an RCCA and RCCAs fully inserted with P12 validated is reasonable, based on operating experience, to reach the required power level from full power conditions in an orderly manner and without challenging plant systems.

J.1

Condition J addresses the failure of two or more Input & Acquisition Logic divisions or the inability to complete the remedial measures in the time allowed by Required Action B. The plant must be brought to a MODE where the LCO is no longer applicable.

The Completion Time of 6 hours to reach MODE 2 is reasonable, based on operating experience, to reach the required power level from full power conditions in an orderly manner and without challenging plant systems.

K.1

Condition K addresses the failure of two or more Input & Acquisition Logic divisions or the inability to complete the remedial measures in the time allowed by Required Action B.1. The plant must be brought to a MODE where the LCO is no longer applicable.

The Completion Time of 2 hours to reach MODE 1 with P3 inhibited is reasonable, based on operating experience, to reach the required power level from full power conditions in an orderly manner and without challenging plant systems.

BASES

ACTIONS (continued)

L.1

Condition L addresses the failure of two or more Input & Acquisition Logic divisions or the inability to complete the remedial measures in the time allowed by Required Action B.1. The plant must be brought to a MODE where the LCO is no longer applicable.

The Completion Time of 6 hours to reach MODE 3 is reasonable, based on operating experience, to reach the required power level from full power conditions in an orderly manner and without challenging plant systems.

M.1

Condition M applies when one Actuation Logic division is inoperable. In this condition, the minimum number of OPERABLE divisions to send the voting logic during an AOO or postulated accident coupled with a single failure is still available. The OPERABILITY of the other Actuation Logic division must be verified within 6 hours. The Completion Time of 6 hours is reasonable considering the low probability of an event occurring during this interval and the time necessary to perform the verification.

N.1, N2, N.3, N.4, N.5, N.6, and N.7

Condition N addresses the failure of two or more Actuation Logic divisions or the inability to complete the remedial measures in the time allowed by Required Action M.1.

The Completion TimeRequired Action N.1 is modified by a Note that clarifies its applicability. Required Action N.1 is only applicable to the following Functions:

1. DNBR - Low,
2. DNBR with High Quality – Low,
3. DNBR with Imbalance or Rod Drop (1/4) – Low,
4. DNBR with High Quality and (Imbalance or Rod Drop) (1/4) – Low,
5. DNBR with Rod Drop (2/4) – Low,
6. Linear Power Density - High,
10. RCS Flow Rate – Low in Two Loops,
12. RCP Speed – Low in Two Loops, and
15. Pressurizer Pressure - Low.

BASES

ACTIONS (continued)

In this condition, the associated Functions are inoperable and the plant must be brought to a MODE where the associated LCO is no longer applicable. To achieve this status, the plant must be brought to at least MODE 1 with P2 inhibited within 4 hours. The Completion Time is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Required Action N.2 is modified by a Note that clarifies its applicability. Required Action N.2 is only applicable to the following Functions:

7. Neutron Flux Rate of Change - High,
13. Neutron Flux - High (Intermediate Range),
14. Doubling Time – Low,
19. SG Pressure Drop – High,
23. SG Level - High,
24. Containment Pressure - High, and
26. EFWS Actuation - Low-Low SG Level.

b. Partial Cooldown Actuation - Manual Reset — 1,2,3,4(k) — 4 divisions

In this condition, the associated Functions are inoperable and the plant must be brought to a MODE where the associated LCO is no longer applicable. To achieve this status, the plant must be brought to at least MODE 3 with the RCSL not capable of withdrawing an RCCA and RCCAs fully inserted within 6 hours. The Completion Time is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Required Action N.3 is modified by a Note that clarifies its applicability. Required Action N.3 is only applicable to the following Functions:

8. Core Power Level – High, and
9. Saturation Margin - Low

In this condition, the associated Functions are inoperable and the plant must be brought to a MODE where the associated LCO is no longer applicable. To achieve this status, the plant must be brought to at least MODE 2 with P5 inhibited within 6 hours. The Completion Time is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

BASES

ACTIONS (continued)

Required Action N.4 is modified by a Note that clarifies its applicability. Required Action N.4 is only applicable to the following Functions:

18. Hot Leg Pressure - Low, and
20. SG Pressure - Low.

In this condition, the associated Functions are inoperable and the plant must be brought to a MODE where the associated LCO is no longer applicable. To achieve this status, the plant must be brought to at least MODE 3 with P12 validated and the RCSL not capable of withdrawing an RCCA and RCCAs fully inserted within 6 hours. The Completion Time is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Required Action N.5 is modified by a Note that clarifies its applicability. Required Action N.5 is only applicable to the SG Pressure - High Function. In this condition, the Function is inoperable and the plant must be brought to a MODE where the associated LCO is no longer applicable. To achieve this status, the plant must be brought to at least MODE 2 within 6 hours. The Completion Time is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Required Action N.6 is modified by a Note that clarifies its applicability. Required Action N.6 is only applicable to the RCS Flow Rate – Low-Low in One Loop Function. In this condition, the Function is inoperable and the plant must be brought to a MODE where the associated LCO is no longer applicable. To achieve this status, the plant must be brought to at least MODE 3 with P3 inhibited within 6 hours. The Completion TimeTime is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Required Action N.7 is modified by a Note that clarifies its applicability. Required Action N.7 is only applicable to the following Functions:

16. Pressurizer Pressure - High,
17. Pressurizer Level - High,
22. SG Level - Low, and
25. SI Actuation - Automatic.

BASES

ACTIONS (continued)

In this condition, the associated Functions are inoperable and the plant must be brought to a MODE where the associated LCO is no longer applicable. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours. The Completion Time is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

The SRs for each Function are indentified by the Surveillance Requirements (SRs) column of Table 3.3.1-1 for that Function. Most Functions are subject to CHANNEL CHECK, ACTUATION DEVICE OPERATIONAL TEST, CALIBRATION, SENSOR OPERATIONAL TEST, EXTENDED SELF TESTS, and RESPONSE TIME testing.

The SRs are modified by a Note. The Note directs the reader to Table 3.3.1-1 to determine the correct SRs to perform for each Function.

SR 3.3.1.1

SR 3.3.3.1 compares the calorimetric heat balance calculation to the Power Range Detector division output every 24 hours. If the calorimetric heat balance calculation results exceed the Power Range Detector division output by more than 2% RTP, the Power Range Detector division is not declared inoperable, but must be adjusted. The Power Range Detector division output shall be adjusted consistent with the calorimetric heat balance calculation results if the calorimetric calculation exceed the Power Range Detector division output by more than +2% RTP. If the Power Range Detector division output cannot be properly adjusted, the division is declared inoperable.

If the calorimetric is performed at reduced power (< 70% RTP), adjusting the Power Range Detector division output in the increasing power direction will assure a reactor trip below the safety analysis limit (< 117% RTP). Making no adjustment to the Power Range Detector division output in the decreasing power direction due to a reduced power calorimetric assures a reactor trip consistent with the safety analyses.

This allowance does not preclude making indicated power adjustments, if desired, when the calorimetric heat balance calculation is less than the Power Range Detector division output. To provide close agreement between indicated power and to preserve operating margin, the Power Range Detector division outputs are normally adjusted when operating at

BASES

SURVEILLANCE REQUIREMENTS (continued)

or near full power during steady-state conditions. However, discretion must be exercised if the Power Range Detector division output is adjusted in the decreasing power direction due to a reduced power calorimetric (< 70% RTP).

This action may introduce a non-conservative bias at higher power levels. The cause of the potential non-conservative bias is the decreased accuracy of the calorimetric at reduced power conditions. The primary error contributor to the instrument uncertainty for a secondary side power calorimetric measurement is the feedwater flow measurement, which is typically a delta pressure measurement across a feedwater venturi.

While the measurement uncertainty remains constant in delta pressure as power decreases, when translated into flow, the uncertainty increases as a square term. Thus a 1% flow error at 100% power can approach a 10% flow error at 30% RTP even though the delta pressure error has not changed.

An evaluation of extended operation at reduced power conditions would conclude that it is prudent to administratively adjust the setpoint of the High Neutron Flux Rate of Change (Power Range) reactor trip when: 1) the Power Range Detector division output is adjusted in the decreasing power direction due to a reduced power calorimetric below 70% RTP; or 2) for a post refueling startup. The evaluation of extended operation at reduced power conditions would also conclude that the potential need to adjust the setpoint of the High Neutron Flux Rate of Change (Power Range) reactor trip in the decreasing power direction is quite small, primarily to address operation in the intermediate range about 10% RTP to allow enabling of the High Neutron Flux Rate of Change (Power Range) reactor trips. Before the High Neutron Flux Rate of Change (Power Range) reactor trip setpoint is reset, the Power Range Detector division output adjustment must be confirmed based on a calorimetric performed at ≥ 70% RTP.

The Note clarifies that 12 hours are allowed for performing the first Surveillance after reaching 20% RTP. A reactor power level of 20% RTP is chosen based on plant stability, (i.e., automatic rod control capability and turbine generator synchronized to the grid). The Frequency of every 24 hours is adequate. It is based on plant operating experience, considering instrument reliability and operating history data for instrument drift. Together these factors demonstrate that a difference between the calorimetric heat balance calculation and the Power Range Detector division output of more than +2% RTP is not expected in any 24 hour period.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.2

Performance of the CHANNEL CHECK ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; therefore, it is key in verifying that the instrumentation continues to operate properly between each CALIBRATION.

Agreement criteria are determined by the plant staff, based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE.

The Frequency of 31 days is based on operating experience that demonstrates that channel failure is rare. The CHANNEL CHECK supplements less formal checks of channels during operational use of the displays associated with the LCO required channels.

What happened to Footnote "(x) As specified in the COLR."

SR 3.3.1.3

SR 3.3.1.3 is the performance of an ADOT every 31 days. This test shall verify OPERABILITY by actuation of the RTBs and RTCs. The ADOT may be performed by means of any series of sequential, overlapping, or total steps.

SR 3.3.1.4

The incore – excore CALIBRATION for the Power Range indication consists of a normalization of the detector addressable constant multipliers based on a power calorimetric and flux map performed at or above 15% RTP. This surveillance is modified by two Notes. The first Note to the SR states that the SR is not required to be performed until 24 hours after THERMAL POWER ≥ 15% RTP. At lower power levels, incore – excore calibration of the Power Range Detectors would be

SURVEILLANCE REQUIREMENTS (continued)

inaccurate. During a refueling startup calibrations performed at lower power levels should be verified against higher level flux maps and calibrated, if necessary, to ensure accurate power range performance. The second Note states that neutron detectors are excluded from the CALIBRATION. The CALIBRATION for the Source Range Detectors consists of obtaining the detector plateau or preamp discriminator curves, evaluating those curves, and comparing the curves to the manufacturer's data. This Surveillance is not required for the Intermediate Range Detectors for entry into MODE 2, because the plant must be in at least MODE 2 to perform the test for the Intermediate Range Detectors.

If the absolute difference between the power range and incore measurements is greater than the allowable difference specified in the Setpoint Control Program, the power range channel is not inoperable, but an adjustment of the addressable constant multipliers is necessary to ensure that the incore measured axial offset agrees with the indicated excore axial offset. If the power range channel cannot be properly recalibrated, the channel is declared inoperable. The 31 day Frequency is adequate, considering that long term drift of the excore linear amplifiers is small, burnup of the detectors, and changes in axial offset are slow. Also, the excore readings are a strong function of the power produced in the peripheral fuel bundles, and do not represent an integrated reading across the core. The slow changes in neutron flux during the fuel cycle (radially and axially) can also be detected and incorporated in the periodic incore – excore CALIBRATION at this interval.

SR 3.3.1.5

A CALIBRATION of each RCS flow indication and calculation input every 24 months ensures that each instrument division is accurate and within the specified tolerance. This CALIBRATION consists of a normalization of the addressable constant multipliers based on RCS flow measured by a precision calorimetric (SR 3.4.1.4). If the absolute difference between the flow indication / calculation input and the value measured in the surveillance is greater than the allowable difference specified in the Setpoint Control Program, the flow indication / calculation input are not inoperable, but an adjustment of the addressable constant multipliers is necessary to ensure that the flow indication / calculation input agrees with measured RCS flow. If the RCS flow indication and calculation input cannot be properly recalibrated, the division is declared inoperable.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Note to the SR states that the CALIBRATION is not required to be performed until 12 hours after THERMAL POWER ≥ 70% RTP. The RCS Flow Rate – Low-Low in One Loop trip function is required to be OPERABLE in MODE 1 with P3 permissive validated, which corresponds to this power level. The 24 month Frequency is adequate, considering that the RCS flow change over an operating cycle is small.

SR 3.3.1.6

A SENSOR OPERATIONAL TEST (SOT) is performed every 24 months to ensure the devices will perform their intended function when needed. The test is performed in accordance with the Setpoint Control Program. A SOT shall be the injection of a simulated or actual signal into the division as close to the sensor as practicable to verify OPERABILITY of all devices in the division required for division OPERABILITY. The SOT shall include the verification of the accuracy and time constants of the analog input modules.

The SOT may be performed by means of any series of sequential, overlapping, or total steps.

SR 3.3.1.7

A CALIBRATION of each sensor every 24 months ensures that each instrument division is reading accurately and within tolerance. The test is performed in accordance with the Setpoint Control Program. A CALIBRATION shall be the adjustment, as necessary, of the sensor output such that it responds within the necessary range and accuracy to known values of the parameter that the division monitors. The CALIBRATION shall encompass all devices in the division required for sensor OPERABILITY.

The CALIBRATION includes provisions for the following:

1. Evaluation of sensor performance to verify that the sensor is functioning as required prior to returning the sensor to service if the as-found sensor calibration setting values are outside their predefined as-found tolerance for the specified calibration settings (e.g., 0, 25, 50, 75, and 100 percent), but conservative with respect to the Allowable Value, and

BASES

SURVEILLANCE REQUIREMENTS (continued)

2. Declaring the sensor immediately inoperable if the sensor cannot be calibrated such that the as-left sensor calibration setting values are within the specified as-left tolerance around the specified calibration settings (e.g., 0, 25, 50, 75, and 100 percent), at the completion of the surveillance.

The CALIBRATION may be performed by means of any series of sequential, overlapping, or total steps.

SR 3.3.1.8

The features of continuous self-monitoring of the Protection System are described in Reference 8. Additional tests, which require the function processor to be inoperable are not normally performed during operation. These EXTENDED SELF TESTS are performed at start-up of a function processor each cycle. The startup sequence is as follows:

- Hardware basic test using the internal diagnosis monitor,
- Start-up self test of the operating system, and
- Switch over to normal operation after approximately two minutes.

Additional information is provided in Section 2 of Reference 8.

SR 3.3.1.9

SR 3.3.1.9 is the performance of an ACTUATING DEVICE OPERATIONAL TEST (ADOT) every 24 months. The ADOT may be performed by means of any series of sequential, overlapping, or total steps.

SR 3.3.1.10

SR 3.3.1.10 verifies that the NTSPs have been properly loaded into the applicable APUs.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.11

Instrument Calibration

For intermediate range neutron flux channels, CALIBRATION is a complete check and readjustment of the channels, from the preamplifier input to the indicators. This test verifies the channel responds to a measured parameter within the necessary range and accuracy. CALIBRATION leaves the channel adjusted to account for instrument drift to ensure that the instrument channel remains operational between successive tests. There is a plant specific program which verifies that the instrument channel functions as required by verifying the as-left and as-found settings are consistent with those established by the setpoint methodology.

Setpoint Determination

Before each refueling startup determine the relative change in the peripheral assemblies when compared to the last time that the intermediate range setpoint (amps) was verified at the corresponding core power (percent power). Using the relative change for each assembly apply a weighting factor for a limited number of assemblies to calculate a new setpoint. The limited number of assemblies and the appropriate weighting factor is determined by a statistical analysis method (Monte Carlo). The analytical method determines the probability of a neutron that is born in any assembly reaching the intermediate range detector. For some assemblies like the center assembly in the core it is impossible to be born and survive long enough to get to the intermediate range detector. The setpoint calculation shall also account for things like replacing the detectors with a more sensitive model and changes in plant parameters, if necessary. During each startup (refueling or mid-cycle) the setpoint is verified when core power is equivalent to the intermediate range setpoint. If the absolute difference between the current intermediate range setpoint and the intermediate range current at the corresponding core power is greater than the allowable difference specified in the Setpoint Control Program, the intermediate range channel is not inoperable, but an adjustment of the addressable constant multipliers is necessary to ensure that the intermediate range measured current agrees with the desired intermediate setpoint. If the intermediate range channel cannot be properly recalibrated, the channel is declared inoperable. This intermediate range information can be used to make an adjustment to the setpoint, if necessary, and shall be used to calculate the next refueling setpoint.

BASES

SURVEILLANCE REQUIREMENTS (continued)

General

The SR is modified by two Notes. The first Note requires the SR to be performed prior to withdrawing RCCAs for startup. The second Note ~~excluding~~ neutron detectors from CALIBRATION. It is not necessary to test the detectors because generating a meaningful test signal is difficult. In addition, the detectors are of simple construction, and any failures in the detectors will be apparent as a change in channel output. The Frequency is based on operating experience and consistency with the typical industry refueling cycle and is justified by demonstrated instrument reliability over a 24 month interval such that the instrument is not adversely affected by drift.

SR 3.3.1.12

This surveillance verifies that the individual division actuation response times are less than or equal to the maximum values assumed in the accident analysis. Response time testing acceptance criteria are included in a document controlled under 10 CFR 50.59. Individual component response times are not modeled in the analyses.

The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the trip setpoint value at the sensor to the point at which the equipment reaches the required functional state (e.g., valves in full closed position).

For divisions that include dynamic transfer functions (e.g., lag, lead/lag, rate/lag, etc.), the response time test may be performed with the transfer function set to one, with the resulting measured response time compared to the appropriate FSAR response time. Alternately, the response time test can be performed with the time constants set to their nominal value, provided the required response time is analytically calculated assuming the time constants are set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured.

SR 3.3.1.12 is modified by a Note stating that neutron detectors are excluded from RTS RESPONSE TIME testing. This Note is necessary because of the difficulty in generating an appropriate detector input signal. Excluding the detectors is acceptable because the principles of detector operation ensure a virtually instantaneous response.

BASES

SURVEILLANCE REQUIREMENTS (continued)

----------REVIEWER'S NOTE----------
The following Bases apply to plants that have obtained NRC approval to utilize allocations for selected components based on NRC-approved U.S. EPR-applicable Topical Reports.

[Response time may be verified by actual response time tests in any series of sequential, overlapping or total division measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the division. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) in place, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. NRC-approved U.S. EPR-applicable Topical Report provides the basis and methodology for using allocated sensor response times in the overall verification of the division response time for specific sensors identified in the report. Response time verification for other sensor types must be demonstrated by test.

NRC-approved U.S. EPR-applicable Topical Report (provide reference) provides the basis and methodology for using allocated signal processing and actuation logic response times in the overall verification of the DCS division response time.

The allocations for sensor, signal conditioning, and actuation logic response times must be verified prior to placing the component in operational service and re-verified following maintenance that may adversely affect response time. In general, electrical repair work does not impact response time provided the parts used for repair are of the same type and value. One example where response time could be affected is replacing the sensing assembly of a transmitter.]

As appropriate, each division's response must be verified every 24 months on a STAGGERED TEST BASIS. Testing of the final actuation devices is included in the testing. Response times cannot be determined during plant operation because equipment operation is required to measure response times. Experience has shown that these components usually pass this surveillance when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

BASES

REFERENCES

1. FSAR Section 7.1

2. 10 CFR 50, Appendix A, GDC 21.

3. 10 CFR 50.49.

4. ANP-10275P-A, “U.S. EPR Instrument Setpoint Methodology Topical Report,” January 2008.

5. FSAR Chapter 15.

6. 10 CFR 100.

7. ANP-10287P, “Incore Trip Setpoint and Transient Methodology for U.S. EPR Topical Report,” November 2007.

8. ANP-10315P, Revision 1, “U.S. EPR Protection System Surveillance Testing and Teleperm XS Self-Monitoring Technical Report,” June 2011.

Also need to include FSAR Section 7.2

B 3.3 INSTRUMENTATION

B 3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation

BASES

BACKGROUND

Refer to B 3.3.1, "Reactor Trip Instrumentation," for background information on the Distributed Control System.

The Engineered Safety Feature (ESF) function logic monitors plant conditions and initiates the operation of necessary features in response to accident situations. The ESF functions along with reactor trips ensure the following:

- The integrity of the reactor coolant pressure boundary;
- The capability to shut down the reactor and maintain it in a safe shutdown condition; and
- The capability to prevent or mitigate the consequences of accidents which could result in potential off-site exposures.

As with the reactor trip logic, critical plant parameters such as temperatures, pressures, and levels are sensed, acquired, and converted to electrical signals by the Signal Conditioning and Distribution System (SCDS) and acquired by the PS. When prohibited operating conditions exist, an ESF actuation signal is generated from the PS. In addition to the automatic ESF functions performed by the PS, the capability to manually initiate these functions is provided in the main control room. These manual functions are implemented at the system level and perform the same actions as the automatic functions.

Single failures upstream of the Actuation Logic Units (ALU) layer that could result in an invalid signal being used in the ESF function are accommodated by modifying the vote in the ALU layer. Each ESF function is evaluated on a case-by-case basis to determine whether the vote is modified toward actuation or no actuation. In cases where inappropriate actuation of an ESF function could challenge plant safety, the function is modified toward no actuation. Otherwise, the function is modified toward actuation.

The ESF actuation signals of the redundant ALUs in each subsystem are combined in a hardwired "functional OR" logic; therefore, either of the redundant ALUs in a subsystem can actuate an ESF function.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The Distributed Control System (DCS) is designed to ensure that the following operational criteria are met:

– The associated actuation will occur when the parameter monitored by each division reaches its setpoint and the specific coincidence logic is satisfied; and

– In general, separation and redundancy are maintained to permit a division to be out of service for testing or maintenance while still maintaining redundancy within the DCS instrumentation network.

Each of the analyzed transients and accidents can be detected by one or more PS functions. Each of the ~~automatic ESFAS actuations~~ included in the Technical Specifications are credited as part of the primary success path in the accident analysis. Therefore, the automatic ESFAS Instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii). Refer to FSAR Sections 7.3 for a description of the ESF functions. Credited functions are included in FSAR Tables 15.0-8 and 15.0-9. Manual initiation of ESFAS Functions satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii). Exception are noted when ~~the~~ manual Function is credited as part of the safety analysis (Ref. 1).

In general, the Input & Acquisition Logic Divisions, Actuation Logic Divisions, Manual Divisions, and actuated devices that support reactor trips are required to be OPERABLE in MODES 1, 2 and/or 3 because the reactor is or can be made critical in these MODES. The automatic reactor trip functions are designed to take the reactor subcritical, which maintains the Safety Limits (SLs) during AOOs and assists the ESF in providing acceptable consequences during accidents. The Input & Acquisition Logic Divisions, Actuation Logic Divisions, Manual Divisions, and actuated devices that support reactor trip functions are not required to be OPERABLE in MODES 4 and 5 when all RCCAs are fully inserted, and only if the Reactor Control, Surveillance and Limitation (RCSL) System is placed in a configuration whereby inadvertent RCCA withdrawal is precluded. In MODES 4 and 5, the emphasis is placed on return to power events. The reactor is protected in these MODES by ensuring adequate shutdown margin (SDM).

In general, the Input & Acquisition Logic Divisions, Actuation Logic Divisions, Manual Divisions, and actuated devices that support ESFAS functions are required to be OPERABLE in MODES 1, 2, 3 and/or 4 since there is sufficient energy in the primary and secondary systems to warrant automatic ESF system responses to:

– Isolate the Main Steam System to preclude a positive reactivity addition,

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

- Actuate the Emergency Feedwater System (EFWS) to preclude the loss of the steam generators (SG) as a heat sink (in the event the normal feedwater system is not available),

- Actuate ESF systems to prevent or limit the release of fission product radioactivity to the environment by isolating containment and limiting the containment pressure from exceeding the containment design pressure during a design basis Loss of Coolant Accident (LOCA) or Main Steam Line Break (MSLB), and

- Actuate ESF systems to ensure sufficient borated inventory to permit adequate core cooling and reactivity control during a design basis LOCA or MSLB accident.

In MODES 5 and 6, automatic actuation of ESF functions ~~is~~ not normally required because adequate time is available to evaluate plant conditions and respond by manually operating the ESF components if required. Exceptions to this are:

- ~~ESF~~ 1.c: SIS Actuation - Low Hot Leg Loop Level,

- ~~ESF~~ 11.a: Pressure Safety Relief Valve (PSRV) Opening – High Hot Leg Pressure,

- Chemical and Volume Control System Isolation (Refer to LCO 3.3.5, “Chemical and Volume Control System (CVCS) Isolation Instrumentation,”)

- Control Room Emergency Filtration (Refer to LCO 3.3.7, “Control Room emergency Filtration (CREF) Instrumentation,”) and

- EDG Actuation (Refer to LCO 3.3.8, “EDG Actuation Instrumentation,”).

These ESF functions are required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies to ensure that:

- Systems to provide adequate coolant inventory makeup ~~are available~~ for the irradiated fuel assemblies in the core;

- Systems needed to mitigate a fuel handling accident are ~~available~~; and

- Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are ~~available~~.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The specific safety analysis and OPERABILITY requirements applicable to each protective function are identified below. Permissives that enable a credited function are included in the Technical Specifications.

The Applicability requirements have been modified by a Note indicating that the SIS Actuation – Low Hot Leg Loop Level signal (1.c) may be bypassed for up to an hour while personnel are working in RCS components.

LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," addresses the following Functions:

1. Safety Injection System (SIS) Actuation

a. SIS Actuation - Low Pressurizer Pressure

In the event of a decrease in RCS water inventory, the makeup is supplied by the Medium Head Safety Injection (MHSI) in the high pressure phase of the event and the Low Head Safety Injection (LHSI) in the low pressure phase. For a potential overcooling event, the reactivity insertion is limited by the boron injection via the MHSI. Even if the boron injection is not required, MHSI injection is needed to stabilize the RCS pressure. This Function mitigates the following postulated accidents or AOOs:

- Excessive increase in secondary steam flow,
- Steam Generator Tube Rupture (SGRT),
- Small break LOCA,
- Inadvertent opening of a pressurizer pilot operated safety valve,
- MSLB,
- Large break LOCA.

Four divisions of the SIS Actuation - Low Pressurizer Pressure Function are required to be OPERABLE in:

– MODES 1, 2, and
– MODE 3 with P12 permissive inhibited.

This Function utilizes the Pressurizer Pressure (Narrow Range) sensors.

The NTSP is sufficiently below the full load operating value for RCS pressure so as not to interfere with normal plant operation. However, the NTSP is high enough to provide an SIS actuation during an RCS depressurization.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Inhibition of the P12 permissive automatically enables the SIS Actuation - Low Pressurizer Pressure Function when the pressurizer pressure is greater than or equal to approximately 2005 psia. When below this threshold, the Function is disabled by manual validation of the P12 permissive.

b. SIS Actuation - Low Delta P_{sat}

In case of the listed events, this Function ensures that the SIS actuates before saturation occurs in a hot leg. This Function mitigates the following postulated accidents or AOOs:

- Small break LOCA,
- Large break LOCA, and
- Inadvertent opening of a pressurizer pilot operated safety valve.

Four divisions of the SIS Actuation - Low Delta P_{sat} Function are required to be OPERABLE in MODE 3. Three divisions are required to be OPERABLE in MODE 4 with P12 permissive validated and P15 permissive inhibited.

This Function utilizes the Hot Leg Pressure (Wide Range) and Hot Leg Temperature (Wide Range) sensors.

The NTSP is low enough to avoid spurious operation but high enough to maintain core coverage in the event of an RCS pipe break.

Manual validation of the P12 permissive enables the SIS Actuation - Low Delta P_{sat} Function when the pressurizer pressure is less than approximately 2005 psia. Manual validation of the P15 permissive disables the SIS Actuation - Low Delta P_{sat} Function when no RCPs are running, the hot leg pressure is less than approximately 464 psia, and the hot leg temperature is less than approximately 350ºF.

For loss of RHR scenarios with RCPs running, the RCS inventory would be essentially full with the pressurizer at normal level. The secondary side (steam generator) would also be available if RCPs were in operation. Under these conditions, a loss of RHR event

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

would result in a minor heat-up until decay heat is removed through the secondary side. Thus, safety injection on Low Delta P_{sat} would not be required in MODE 5 if RCPs were in operation, but would still be available.

c. SIS Actuation - Low Hot Leg Loop Level

This Function mitigates the following postulated accidents or AOOs:

- Loss of Residual Heat Removal during mid-loop operations,
- Uncontrolled loss of RCS inventory,
- Small break LOCA, and
- Large break LOCA.

Three divisions of the SIS Actuation - Low Hot Leg Loop Level Function are required to be OPERABLE in MODE 4 with P15 permissive validated and Manual SIS – Loop Level Bypass inhibited. Two divisions of the SIS Actuation - Low Hot Leg Loop Level Function are required to be OPERABLE in MODES 5 and 6 with P15 permissive validated and Manual SIS – Loop Level Bypass inhibited.

This Function utilizes the Hot Leg Loop Level sensors.

The NTSP is low enough to avoid spurious operation but high enough to ensure core cooling is maintained.

In MODES 5 and 6, safety injection requirements are based on loss of RHR events during reduced inventory (mid-loop) conditions. Before entering mid-loop operation the RCPs are secured and the RCS is vented. Two MHSI pumps are available and automatic injection is available on low loop level following manual validation of the P15 permissive. In the event of a loss of RHR under these conditions, the MHSI pumps would automatically inject on low loop level to maintain the core covered and replace the inventory that boils-off.

Manual validation of the P15 permissive enables the SIS Actuation - Low Hot Leg Loop Level Function when no RCPs are running, the hot leg pressure is less than approximately 464 psia, and the hot leg temperature is less than approximately 350ºF.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

d. SIS Actuation - Manual

The capability for manual system-level initiation of the SIS is provided to the operator on the Safety Information and Control System (SICS) in the MCR. This manual system-level initiation starts the four trains of safety injection as well as the associated protective actions, such as partial cooldown and reactor trip. For a SGTR event, the operator is credited to perform a manual system-level initiation of SIS from the SICS. Four manual system level initiation controls are provided, any two of which will start the four SIS trains.

This Function mitigates the following postulated accidents or AOOs:

- Excessive increase in secondary steam flow,
- SGTR,
- Small break LOCA,
- Inadvertent opening of a pressurizer pilot operated safety valve,
- MSLB,
- Large break LOCA.
- Loss of Residual Heat Removal during mid-loop operations, and
- Uncontrolled loss of RCS inventory.

Four divisions of this Function are required to be OPERABLE in MODES 1, 2, and 3. Three divisions are required to be OPERABLE in MODE ~~and~~ 4. Two divisions are required to be OPERABLE in MODES 5 and 6.

There is no NTSP associated with this Function.

There are no permissives associated with this Function.

The manual system-level initiation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

2. Emergency Feedwater System (EFWS) Actuation

a. EFWS Actuation - Low-Low SG Level (Affected SG)

In case of loss of Main Feedwater (MFW), the EFWS is actuated to remove residual heat via secondary side. With an EFWS actuation signal, SG blowdown is also isolated to conserve SG inventory. This Function ensures heat is removed from the primary system through the SGs in the event of a loss of MFW or feedwater line break, as indicated by low SG level.

This Function mitigates the following postulated accidents or AOOs:

- Loss of normal feedwater flow,
- Feedwater system piping failure, and
- Loss of Offsite Power (LOOP).

Four divisions of the EFWS Actuation - Low-Low SG Level (Affected SG) Function are required to be OPERABLE in:

- MODES 1 and 2, and
- MODE 3 with P13 permissive inhibited.

This Function utilizes the SG Level (Wide Range) and SG Pressure sensors.

The NTSP is low enough to provide an operating envelope that prevents unnecessary actuations but high enough to ensure sufficient make-up is provided to the SGs.

Inhibition of the P13 permissive automatically enables the EFWS Actuation - Low-Low SG Level Function when the hot leg temperature is greater than or equal to approximately 200°F. When below this threshold, the Function is disabled by manual validation of the P13 permissive.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

b. EFWS Actuation - Manual (Affected SG)

The capability for manual system-level initiation of the EFWS on a per-train basis is provided on the SICS in the MCR. Three manual system-level initiation controls are provided per EFW train. One-out-of-two logic is used on two of these controls to start the EFW pump, open the associated EFW valves, and isolate the SG blowdown line. The third control is used only to close SG blowdown isolation valves that are redundant to those closed by the first two controls.

This Function mitigates the following postulated accidents or AOOs:

– Loss of normal feedwater flow,
– Feedwater system piping failure, and
– Loss of Offsite Power (LOOP).

Four divisions of the EFWS Actuation – Manual (Affected SG) Function are required to be OPERABLE in MODES 1, 2, and 3. Two divisions of the EFWS Actuation – Manual (Affected SG) Function are required to be OPERABLE in MODE 4 with P13 permissive inhibited and the SGs are relied upon for heat removal.

There is no NTSP associated with this Function.

Inhibition of the P13 permissive automatically enables the EFWS Actuation - Manual Function when the hot leg temperature is greater than or equal to approximately 200°F. When below this threshold, the Function is disabled by manual validation of the P13 permissive.

3. Common Steam Generator Blowdown (SGBD) Valve Isolation

a. Common SGBD Valve Isolation - Manual

The capability for manual system-level initiation of the EFWS (which includes SGBT valve isolation) on a per-train basis is provided on the SICS in the MCR. Three manual system-level initiation controls are provided per EFW train. One-out-of-two logic is used on two of these controls to start the EFW pump, open the associated EFW valves, and isolate the SG blowdown line. The third control is used only to close SG blowdown isolation valves that are redundant to those closed by the first two controls.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

In case of loss of MFW, the EFWS is actuated to remove residual heat via secondary side. With an EFWS actuation signal, SG blowdown is also isolated to conserve SG inventory. This Function ensures heat is removed from the primary system through the SGs in the event of a loss of MFW or feedwater line break, as indicated by low SG level.

The capability for manual system-level initiation of SG isolation (which includes SGBT valve isolation) on a per SG basis is provided on the SICS in the MCR. Four manual system-level initiation controls are provided per SG, any two of which will isolate the desired SG.

In case of an SGTR, partial cooldown is initiated to depressurize the RCS to the point where MHSI becomes effective. The SG containing the tube rupture is isolated after the partial cooldown is initiated if a high SG level or high main steam activity level is detected. This is done to prevent the release of contaminated fluid from the affected SG, and to prevent other water sources from adding to the uncontrolled SG level increase.

Two divisions of the Common SGBD Valve Isolation - Manual Function are required to be OPERABLE in MODES 1, 2, and 3 and in MODE 4 with P13 permissive inhibited and the SGs are relied upon for heat removal.

There is no NTSP associated with this Function.

Inhibition of the P13 permissive automatically enables the Common SGBD Valve Isolation - Manual Function when the hot leg temperature is greater than or equal to approximately 200°F. When below this threshold, the Function is disabled by manual validation of the P13 permissive.

4. EFWS Isolation

a. EFWS Isolation - High SG Level (Affected SG)

In case of a SGTR, the EFWS is isolated to avoid SG overfill and potential radioactive water discharge via the main steam relief train.

This Function mitigates a SGTR.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Four divisions of the EFWS Isolation - High SG Level (Affected SG) Function are required to be OPERABLE in:

- MODES 1 and 2, and
- MODE 3 with P13 permissive inhibited.

This Function utilizes the SG Level (Wide Range) and SG Pressure sensors.

The NTSP is high enough to provide an operating envelope that prevents unnecessary isolations but low enough to ensure sufficient make-up is provided to the SGs.

Inhibition of the P13 permissive automatically enables the EFWS Isolation on High SG Level Function when the hot leg temperature is greater than or equal to approximately 200°F. When below this threshold, the Function is disabled by manual validation of the P13 permissive.

b. EFWS Isolation - Manual

The capability for manual system-level EFWS isolation on a per train basis is provided to the operator on the SICS in the MCR. Two manual system-level isolation controls are provided per EFWS train. Any one of these two controls actuates the isolation function.

In case of a SGTR, the EFWS is manually isolated to avoid SG overfill and potential radioactive water discharge via the main steam relief train.

This Function mitigates a SGTR.

Four divisions of the EFWS Isolation – Manual (Affected SG) Function are required to be OPERABLE in MODES 1, 2, and 3 and in MODE 4 with P13 permissive inhibited and the SGs are relied upon for heat removal.

There is no NTSP associated with this Function.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Inhibition of the P13 permissive automatically enables the EFWS Isolation - Manual Function when the hot leg temperature is greater than or equal to approximately 200°F. When below this threshold, the Function is disabled by manual validation of the P13 permissive.

5. Partial Cooldown Actuation

a. Partial Cooldown Actuation – Automatic on SIS Actuation

The partial cooldown consists of lowering the main steam relief isolation valve (MSRIV) opening setpoint to allow depressurization of the RCS to a point where the MHSI is effective.

This Function mitigates the following postulated accidents or AOOs:

- Excessive increase in secondary steam flow,
- MSLB,
- Inadvertent opening of a Pressurizer pilot operated safety valve,
- SGTR, and
- Small break LOCA.

Four divisions of the Partial Cooldown Actuation – Automatic on SIS Actuation Function are required to be OPERABLE in MODES 1 and 2, and in MODE 3 with P14 permissive inhibited.

The sensors and NTSPs associated with this Function are described above for each individual automatic SIS Actuation Function (i.e., 1.a, 1.b, and 1.c).

Manual inhibition of the P14 permissive enables the Partial Cooldown Actuation – Automatic on SIS Actuation Function when the hot leg pressure is greater than or equal to approximately 464 psia or the hot leg temperature is greater than or equal to approximately 350°F. Manual validation of the P14 permissive disables the Function when the hot leg pressure is less than approximately 464 psia and the hot leg temperature is less than approximately 350°F.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

manual system-level reset of the Partial Cooldown Function should go with Function 5 - NOT Function 6

b. Partial Cooldown Actuation – Manual

The capability for manual system-level actuation of partial cooldown is provided on the SICS in the MCR. This manual initiation starts the partial cooldown via all four main steam trains if P14 is inhibited and the reactor is tripped. Four manual initiation controls are provided, any two of which will start the partial cooldown.

This Function mitigates the following postulated accidents or AOOs:

- Excessive increase in secondary steam flow,
- MSLB,
- Inadvertent opening of a Pressurizer pilot operated safety valve,
- SGTR, and
- Small break LOCA.

Four divisions of the Partial Cooldown Actuation – Manual Function are required to be OPERABLE in MODES 1, 2, and 3 and in MODE 4 with P14 permissive inhibited and the SGs are relied upon for heat removal.

There is no NTSP associated with this Function.

Manual inhibition of the P14 permissive enables the Partial Cooldown Actuation - Manual Function when the hot leg pressure is greater than or equal to approximately 464 psia or the hot leg temperature is greater than or equal to approximately 350°F. Manual validation of the P14 permissive disables the Function when the hot leg pressure is less than approximately 464 psia and the hot leg temperature is less than approximately 350°F.

6. Main Steam Relief Isolation Valve Opening

a. Main Steam Relief Isolation Valve (MSRIV) Opening– High SG Pressure (Affected SG)

In the event of a loss of the secondary side heat sink, the residual heat is removed through the steam relief valves to the atmosphere. This is done by the Main Steam Relief Train (MSRT). The MSRT also ensures SG overpressure protection, minimizes the actuation of the Main Steam Safety Valves (MSSVs), which reduces the risk of a stuck open safety valve.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

This Function mitigates the following postulated accidents or AOOs:

- Total loss of load and/or turbine trip,
- Loss of main heat sink (condenser),
- Inadvertent closure of a Main Steam Isolation Valve (MSIV),
- SGTR,
- RCP seizure (locked rotor) or RCP shaft break, and
- Feedwater system piping failure.

Four divisions of the MSRIV Opening - High SG Pressure (Affected SG) Function are required to be OPERABLE in:

- MODES 1, 2, 3, and
- MODE 4 when the SGs are relied upon for heat removal.

This Function utilizes the following sensors:

- SG Pressure sensors,
- Hot Leg Temperature (Wide Range) sensors (for setpoint selection), and
- Hot Leg Pressure (Wide Range) sensors (for setpoint selection).

The NTSP is high enough to avoid spurious operation and low enough to open and relieve SG pressure before overpressurization limits are reached.

The P14 permissive is utilized for setpoint selection.

b. Partial Cooldown Actuation – Manual Reset

The capability for manual system-level reset of the Partial Cooldown Function is provided to the operator on the SICS in the MCR. This manual system-level reset enables the Partial Cooldown Actuation – Manual Function. Four manual system level initiation controls are provided, any one will reset its associated division.

Should this go with Function 5 (as 5.b or 5.c)?

Should this go with Function 5 (as 5.b or 5.c)?

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

This Function mitigates the following postulated accidents or AOOs:

- Excessive increase in secondary steam flow,
- MSLB,
- Inadvertent opening of a Pressurizer pilot operated safety valve,
- SGTR, and
- Small break LOCA.

Four divisions of the Partial Cooldown Reset – Manual Function are required to be OPERABLE in MODES 1, 2, and 3.

There is no NTSP associated with this Function.

There are no permissives associated with this Function.

This Function satisfies 10 CFR 50.36(c)(2)(ii) Criterion 3.

c. MSRIV Opening– Manual

Figure 10.3-2—Main Steam Isolation and Main Steam Relief Isolation Valve Actuators
Figure 7.3-10—MSRIV Opening (Div. 1&2)
Figure 7.3-10—MSRIV Opening (Div. 3&4)

Need to discuss MSRIV Opening as depicted on the above Figures, to understand the LCO and ACTIONS proposed in 3.3.2 for Functions 6.b and 6.c, & ACTIONS G, F, H, U

The capability for manual system-level opening of the MSRIV on a per-train basis is provided on the SICS in the MCR. Two manual system-level initiation controls are provided per MSRIV. Any one of these two controls opens the desired MSRIV.

This Function mitigates the following postulated accidents or AOOs:

- Total loss of load and/or turbine trip,
- Loss of main heat sink (condenser),
- Inadvertent closure of a MSIV,
- SGTR,
- RCP seizure (locked rotor) or RCP shaft break, and
- Feedwater system piping failure.

Four divisions of the MSRIV Opening - Manual Function are required to be OPERABLE in:

- MODES 1, 2, 3, and
- MODE 4 when the SGs are relied upon for heat removal.

There is no NTSP associated with this Function.

There are no permissives associated with this Function.

This Function satisfies 10 CFR 50.36(c)(2)(ii) Criterion 4.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

7. Main Steam Relief Train Isolation

a. Main Steam Relief Train (MSRT) Isolation – Low SG Pressure (Affected SG)

The MSRIVs are opened during events in order to control pressure in the SGs. In order to prevent a stuck open Main Steam Relief Control Valve (MSRCV) from causing an RCS cooldown and a risk of return to critical conditions, the MSRIV and MSRCV both receive a closing order in the event of a low SG pressure condition.

This Function mitigates the following postulated accidents or AOOs:

- Excessive increase in secondary steam flow,
- SGTR,
- Loss of main heat sink (condenser),
- Inadvertent opening of SG safety or relief valve, and
- MSLB.

Four divisions of the MSRT Isolation - Low SG Pressure (Affected SG) Function are required to be OPERABLE in:

- MODES 1, 2, and
- MODE 3 with P12 permissive inhibited.

This Function utilizes the SG Pressure sensors.

The NTSP is low enough to avoid spurious operation and high enough to limit the rate of RCS cooldown.

Inhibition of the P12 permissive automatically enables the MSRT Isolation - Low SG Pressure Function when the pressure is greater than or equal to approximately 2005 psia. When below this threshold, the Function is disabled by manual validation of the P12 permissive.

b. MSRT Isolation – Manual

The capability for manual system-level isolation of ~~the~~ MSRT on a per train basis is provided on the SICS in the MCR. Two manual system-level isolation controls are provided per MSRT. Any one of these two controls isolates the ~~desired~~ MSRT.

3.3 INSTRUMENTATION

3.3.1 Reactor Trip Instrumentation

LCO 3.3.1 The Reactor Trip 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 divisions inoperable.	A.1 Enter the applicable Condition referenced in Table 3.3.1-1.	Immediately
B. One Input & Acquisition Logic division inoperable.	B.1 Verify Actuation Logic voting is modified.	6 hours
C. One Manual division inoperable.	C.1 Verify OPERABILITY of other Manual divisions.	6 hours
D. Two Manual divisions inoperable.	D.1 Restore one Manual division to OPERABLE status.	72 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One Reactor Trip Breaker inoperable. OR ---------- NOTE ---------- Separate Condition entry is allowed for each Reactor Trip Contactor Set. ---------- One Reactor Trip Contactor in a set inoperable.	E.1 Restore to OPERABLE status.	72 hours
F. Two or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B not met.	F.1 Be in MODE 1 with P2 inhibited.	4 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. Two or more Input & Acquisition Logic divisions inoperable. OR Three or more Manual divisions inoperable. OR Two or more Reactor Trip Breakers inoperable. OR Two or more Reactor Trip Contactors in any set inoperable. OR Required Action and associated Completion Time of Condition B, C, D, or E not met.	G.1 Be in MODE 3 with the RCSL not capable of withdrawing an RCCA and RCCAs fully inserted.	6 hours
H. Two or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B not met.	H.1 Be in MODE 2 with P5 inhibited.	6 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. Two or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B not met.	I.1 Be in MODE 3 with the RCSL not capable of withdrawing an RCCA and RCCAs fully inserted and with P12 validated.	6 hours
J. Two or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B not met.	J.1 Be in MODE 2.	6 hours
K. Two or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B not met.	K.1 Be in MODE 1 with P3 inhibited.	2 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
L. Two or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B not met.	L.1 Be in MODE 3.	6 hours
M. One Actuation Logic division inoperable.	M.1 Verify OPERABILITY of other Actuation Logic divisions.	6 hours
N. Two or more Actuation Logic divisions inoperable. OR Required Action and associated Completion Time of Condition M not met.	N.1 ---------- NOTE ---------- Only applicable to Functions 1, 2, 3, 4, 5, 6, 10, 12, and 15. ---------- Be in MODE 1 with P2 inhibited. AND N.2 ---------- NOTE ---------- Only applicable to Functions 7, 13, 14, 19, 23, 24, and 26. ---------- Be in MODE 3 with the RCSL not capable of withdrawing an RCCA and RCCAs fully inserted. AND	4 hours 6 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
	N.3 ---------- NOTE ---------- Only applicable to Functions 8 and 9. ---------- Be in MODE 2 with P5 inhibited.	6 hours
	AND	
	N.4 ---------- NOTE ---------- Only applicable to Functions 18 and 20. ---------- Be in MODE 3 with the RCSL not capable of withdrawing an RCCA and RCCAs fully inserted and with P12 validated.	6 hours
	AND	
	N.5 ---------- NOTE ---------- Only applicable to Function 21. ---------- Be in MODE 2.	6 hours
	AND	
	N.6 ---------- NOTE ---------- Only applicable to Function 11. ---------- Be in MODE 3 with P3 inhibited.	6 hours
	AND	

CONDITION	REQUIRED ACTION	COMPLETION TIME
	N.7 ---------- NOTE ---------- Only applicable to Functions 16, 17, 22, and 25. ---------- Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

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

	SURVEILLANCE	FREQUENCY
SR 3.3.1.1	---------- NOTE ---------- Not required to be performed until 12 hours after THERMAL POWER ≥ 20% RTP. ---------- Compare results of calorimetric heat balance calculation to Power Range Detector division output.	24 hours
SR 3.3.1.2	Perform CHANNEL CHECK.	31 days
SR 3.3.1.3	Perform ACTUATING DEVICE OPERATIONAL TEST.	31 days
SR 3.3.1.4	---------- NOTES ---------- 1. Not required to be performed until 24 hours after THERMAL POWER ≥ 15% RTP. 2. Neutron detectors are excluded from CALIBRATION. ---------- Perform CALIBRATION in accordance with the Setpoint Control Program.	31 effective full power days
SR 3.3.1.5	---------- NOTE ---------- Not required to be performed until 12 hours after THERMAL POWER ≥ 70% RTP. ---------- Perform CALIBRATION in accordance with the Setpoint Control Program.	24 months
SR 3.3.1.6	Perform SENSOR OPERATIONAL TEST in accordance with the Setpoint Control Program.	24 months

SURVEILLANCE		FREQUENCY
SR 3.3.1.7	Perform CALIBRATION in accordance with the Setpoint Control Program.	24 months
SR 3.3.1.8	Perform EXTENDED SELF TESTS.	24 months
SR 3.3.1.9	Perform ACTUATING DEVICE OPERATIONAL TEST.	24 months
SR 3.3.1.10	Verify NTSPs properly loaded in accordance with the Setpoint Control Program.	24 months
SR 3.3.1.11	---------- NOTES ---------- 1. Required to be performed prior to withdrawing RCCAs for startup. 2. Neutron detectors are excluded from CALIBRATION. ---------- Perform CALIBRATION in accordance with the Setpoint Control Program.	24 months
SR 3.3.1.12	---------- NOTE ---------- Neutron detectors are excluded from RESPONSE TIME testing. ---------- Verify RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

Table 3.3.1-1
Reactor Trip Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
1.	Departure from Nucleate Boiling Ratio (DNBR)				
	Low	1[(a)]	4 divisions	B,F	SR 3.3.1.2 SR 3.3.1.5 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
2.	DNBR with High Quality				
	Low	1[(a)]	4 divisions	B,F	SR 3.3.1.2 SR 3.3.1.5 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
3.	DNBR with Imbalance or Rod Drop (1/4)				
	Low	1[(a)]	4 divisions	B,F	SR 3.3.1.2 SR 3.3.1.5 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
4.	DNBR with High Quality and (Imbalance or Rod Drop (1/4))				
	Low	1[(a)]	4 divisions	B,F	SR 3.3.1.2 SR 3.3.1.5 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
5.	DNBR with Rod Drop (2/4)				
	Low	1[(a)]	4 divisions	B,F	SR 3.3.1.2 SR 3.3.1.5 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
6.	Linear Power Density				
	High	1[(a)]	(b)	(b)	(b)
7.	Neutron Flux Rate of Change				
	High (Power Range)	1,2,3[(c)]	4 divisions	B,G	SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.4 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
8.	Core Power Level				
	High	1,2[(d)]	4 divisions	B,H	SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
9.	Saturation Margin				
	Low	1,2[(d)]	4 divisions	B,H	SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
10.	RCS Flow Rate				
	Low in Two Loops	1[(a)]	4 divisions	B,F	SR 3.3.1.2 SR 3.3.1.5 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
11.	RCS Flow Rate				
	Low-Low in One Loop	1[(e)]	4 divisions	B,K	SR 3.3.1.2 SR 3.3.1.5 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
12.	RCP Speed				
	Low in Two Loops	1[(a)]	4 divisions	B,F	SR 3.3.1.2 SR 3.3.1.5 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
13.	Neutron Flux				
	High (Intermediate Range)	1[(f)],2,3[(c)]	4 divisions	B,H	SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.12
14.	Doubling Time				
	Low (Intermediate Range)	1[(f)],2,3[(c)]	4 divisions	B,H	SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.12

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
15. Pressurizer Pressure				
Low	1[(a)]	4 divisions	B,F	SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
16. Pressurizer Pressure				
High	1,2	4 divisions	B,L	SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
17. Pressurizer Level				
High	1,2[(g)]	4 divisions	B,L	SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
18. Hot Leg Pressure				
Low	1,2,3[(c)(g)]	4 divisions	B,I	SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
19. SG Pressure Drop				
Low	1,2,3[(c)]	4 divisions	B,G	SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
20. SG Pressure				
Low	1,2,3[(c)(g)]	4 divisions	B,I	SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
21. SG Pressure				
High	1	4 divisions	B,J	SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
22. SG Level				
Low	1,2[(h)]	4 divisions	B,L	SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
23. SG Level				
High	1,2,3[(c)(h)]	4 divisions	B,F	SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
24. Containment Pressure				
High	1,2,3[(c)]	4 divisions	B,G	SR 3.3.1.2 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.12
25. SI Actuation				
Automatic	3[(c)]	(k)	(k)	(k)
26. EFWS Actuation				
Low-Low SG Level	3[(c)]	(k)	(k)	(k)
27. Manual Reactor Trip				
Manual	1,2,3[(c)]	4 divisions	C,D,G	SR 3.3.1.2
28. Reactor Trip Breakers	1,2,3[(c)]	2 per division, (Divisions 2 and 3)	E,G	SR 3.3.1.3 SR 3.3.1.12
29. Reactor Trip Contactors	1,2,3[(c)]	4 per set, 23 sets, (Divisions 1 and 4)	E,G	SR 3.3.1.9 SR 3.3.1.12
30. Actuation Logic	1,2,3[(c)]	4 divisions	M,N	SR 3.3.1.8 SR 3.3.1.9 SR 3.3.1.12

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS

(a) With P2 validated (Power Range Flux Measurement Higher than First Setpoint).

(b) See LCO 3.3.14, SPNDs for Input & Acquisition Logic division OPERABILITY, ACTION, and Surveillance Requirements.

(c) With the RCSL System capable of withdrawing an RCCA or one or more RCCAs not fully inserted.

(d) With P5 validated (Intermediate Range Flux Measurement Higher than Setpoint).

(e) With P3 validated (Power Range Flux Measurement Higher than Second Setpoint).

(f) With P6 permissive inhibited (Thermal Core Power Lower than Setpoint).

(g) With P12 permissive inhibited (Pressurizer Pressure Higher than Setpoint).

(h) With P13 permissive inhibited (Hot Leg Temperature Higher than Setpoint).

(k) See LCO 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation for Input & Acquisition Logic division OPERABILITY, ACTION, and Surveillance Requirements.

3.3 INSTRUMENTATION

3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation

LCO 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.

---------- NOTE ----------
The SIS Actuation - Low Hot Leg Loop Level signal may be bypassed for up to 1 hour while personnel are working in RCS components.

ACTIONS

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

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more Functions with one or more divisions inoperable.	A.1	Enter the applicable Condition referenced in Table 3.3.2-1.	Immediately
B. One Input & Acquisition Logic division inoperable.	B.1	Verify Actuation Logic voting is modified.	6 hours
C. One required Input & Acquisition Logic division inoperable.	C.1	Verify Actuation Logic voting is modified.	6 hours
	AND		
	C.2	Restore required Input & Acquisition Logic division to OPERABLE status.	72 hours

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. Two Input & Acquisition Logic divisions inoperable.	D.1	---------- NOTE ---------- Only applicable to Function 6. ----------	
		Reduce power to less than 50% RTP.	4 hours
	AND		
	D.2	Verify Actuation Logic voting is modified.	6 hours
	AND		
	D.3	Restore one Input & Acquisition Logic division to OPERABLE status.	72 hours
E. One required Manual division inoperable.	E.1	Verify OPERABILITY of other required Manual divisions.	6 hours
	AND		
	E.2	Restore required Manual division to OPERABLE status.	72 hours
F. One Manual division inoperable.	F.1	Verify OPERABILITY of other Manual divisions.	6 hours
G. One Manual division inoperable.	G.1	Enter applicable Conditions and Required Actions of LCO 3.7.4, "Main Steam Relief Trains (MSRT)" for valves(s) made inoperable by ESFAS instrumentation.	Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. Two Manual divisions inoperable.	H.1 Verify OPERABILITY of other Manual divisions. AND H.2 Restore one Manual division to OPERABLE status.	6 hours 72 hours
I. One Manual division inoperable.	I.1 Verify OPERABILITY of other Manual divisions. AND I.2 Restore Manual division to OPERABLE status.	6 hours 72 hours
J. Required Action and associated Completion Time of Condition I not met.	J.1 Be in MODE 3. AND J.2 Be in MODE 4 without reliance upon steam generator for heat removal.	6 hours 24 hours
K. One required Input & Acquisition Logic divisions inoperable.	K.1 Suspend activities that could reduce RCS inventory. AND K.2 Initiate action to restore required division to OPERABLE status.	Immediately Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
L. Two or more required Input & Acquisition Logic divisions inoperable. OR Two or more required Manual divisions inoperable. OR Required Action and associated Completion Time of Condition C or E not met.	L.1 Enter applicable Conditions and Required Actions of LCO 3.4.11, "Low Temperature Overpressure Protection (LTOP)" for PSRV(s) or MHSI Large Miniflow Valve(s) made inoperable by ESFAS instrumentation.	Immediately
M. Two or more required Input & Acquisition Logic divisions inoperable. OR Two or more required Manual divisions inoperable. OR Required Action and associated Completion Time of Condition C or E not met.	M.1 Suspend activities that could reduce RCS inventory. AND M.2 Initiate action to restore required division(s) to OPERABLE status.	Immediately Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
N. Three or more Input & Acquisition Logic divisions inoperable. OR Two or more Manual divisions inoperable. OR Required Action and associated Completion Time of Condition B, D or I not met.	N.1 Enter applicable Conditions and Required Actions of LCO 3.4.11, "Low Temperature Overpressure Protection (LTOP)" for PSRV(s) or MHSI Large Miniflow Valve(s) made inoperable by ESFAS instrumentation.	Immediately
O. Three or more Input & Acquisition Logic divisions inoperable. OR Three or more Manual divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	O.1 Be in MODE 3 with P12 validated.	6 hours
P. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	P.1 Be in MODE 4 with P15 validated.	12 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
Q. Three or more Input & Acquisition Logic divisions inoperable. OR Three or more Manual divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	Q.1 Be in MODE 3. AND Q.2 Be in MODE 4.	6 hours 12 hours
R. Three or more Input & Acquisition Logic divisions inoperable. OR Three or more Manual divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	R.1 Be in MODE 3. AND R.2 Be in MODE 5.	6 hours 36 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
S. Three or more Input & Acquisition Logic divisions inoperable. OR Three or more Manual divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	S.1 Be in MODE 3 with all main steam isolation valves closed and deactivated.	6 hours
T. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	T.1 Be in MODE 3 with all main feedwater isolation valves closed and deactivated.	6 hours
U. Three or more Input & Acquisition Logic divisions inoperable. OR Three or more Manual divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	U.1 Be in MODE 3. AND U.2 Be in MODE 4 without reliance upon steam generator for heat removal. Reduce power < 50% RTP (see Audit Item 19)	6 hours 24 hours 4 hours

What about Required Action and associated Completion Time of Condition F or H not met for Function 6.c, Main Steam Relief Isolation Valve Opening - Manual, and Function 5.c, Partial Cooldown Actuation - Manual? Or should these functions specify Condition V instead of Condition U?

CONDITION	REQUIRED ACTION	COMPLETION TIME
V. Three or more Manual divisions inoperable. OR Required Action and associated Completion Time of Condition F or H not met.	V.1 Be in MODE 3. AND V.2 Be in MODE 5. AND V.3 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	6 hours 36 hours 36 hours

CONDITION	REQUIRED ACTION		COMPLETION TIME
W. Two or more required Manual divisions inoperable. OR Required Action and associated Completion Time of Condition E not met.	W.1	Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	AND		
	W.2	Suspend activities that could reduce RCS inventory.	Immediately
	AND		
	W.3	Enter applicable Conditions and Required Actions of LCO 3.4.11, "Low Temperature Overpressure Protection (LTOP)" for PSRV(s) or MHSI Large Miniflow Valve(s) made inoperable by ESFAS instrumentation.	Immediately
	AND		
	W.4.1	Place both CREF trains in emergency mode.	Immediately
	AND		
	W.4.2	Suspend movement of irradiated fuel assemblies	Immediately
	AND		
	W.5	Initiate action to restore required division(s) to OPERABLE status.	Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
X. One or more required Manual division(s) inoperable. OR Required Action and associated Completion Time of Condition H not met.	X.1 Suspend activities that could reduce RCS inventory. AND X.2 Initiate action to restore required division(s) to OPERABLE status.	Immediately Immediately
Y. One Actuation Logic division inoperable.	Y.1 ---------- NOTE ---------- Only applicable to Functions 2, 3, 5, 13, and 14. ---------- Verify OPERABILITY of other Actuation Logic divisions.	6 hours
Z. One Actuation Logic division inoperable.	Z.1 ---------- NOTE ---------- Only applicable to Functions 1, 4, 6, 7, 8, 9, 10, 12, 15, 16, and 18. ---------- Restore Actuation Logic division to OPERABLE status.	72 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
AA. One or more Actuation Logic divisions inoperable.	AA.1 ---------- NOTE ---------- Only applicable to Functions 11 and 17. ---------- Enter applicable Conditions and Required Actions of LCO 3.4.11, "Low Temperature Overpressure Protection (LTOP)" for PSRV(s) or MHSI Large Miniflow Valve(s) made inoperable by ESFAS instrumentation.	Immediately
BB. Two Actuation Logic divisions inoperable.	BB.1 ---------- NOTE ---------- Only applicable to Functions 2, 3, 5, 13, and 14. ---------- Restore one Actuation Logic division to OPERABLE status.	72 hours
CC. Two or more Actuation Logic divisions inoperable. OR Required Action and associated Completion Time of Condition Y, Z, or BB not met.	CC.1 ---------- NOTE ---------- Only applicable to Functions 1a and 13. ---------- Be in MODE 3 with P12 validated. AND	6 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
	CC.2 ---------- NOTE ---------- Only applicable to Function 1b. ---------- Be in MODE 4 with P15 validated. AND ---------- NOTE ---------- Required Actions CC.3.1 and CC.3.2 are only applicable to Functions 1c and 1d. ---------- CC.3.1 Suspend activities that could reduce RCS inventory. AND CC.3.2 Initiate action to restore division(s) to OPERABLE status. AND ---------- NOTE ---------- Required Actions CC.4.1 and CC.4.2 are only applicable to Functions 8c, 8d, 10d, 14, and 16. ---------- CC.4.1 Be in MODE 3. AND CC.4.2 Be in MODE 5. AND	 12 hours Immediately Immediately 6 hours 36 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
	CC.5 ---------- NOTE ---------- Only applicable to Function 9a. ---------- Be in MODE 3. AND ---------- NOTE ---------- Required Actions CC.6.1 and CC.6.2 are only applicable to Functions 8a and 8b. ---------- CC.6.1 Be in MODE 3 with all main steam isolation valves closed and deactivated. OR CC.6.2 Be in MODE 4. AND ---------- NOTE ---------- Required Actions CC.7.1 and CC.7.2 are only applicable to Function 9. ---------- CC.7.1 Be in MODE 3 with all main feedwater isolation valves closed and deactivated. OR CC.7.2 Be in MODE 4. AND	 6 hours 6 hours 24 hours 6 hours 24 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
	---------- NOTE ---------- Required Actions CC.8.1 and CC.8.2 are only applicable to Functions 4, 6, 10a, 10b, and 10c. ---------- CC.8.1 Be in MODE 3. AND CC.8.2 Be in MODE 4 without reliance upon steam generator for heat removal. AND ---------- NOTE ---------- Required Actions CC.9.1 and CC.9.2 are only applicable to Functions 2a, 4a, 5a, 6b, 7, 10a, 10b, and 12a. ---------- CC.9.1 Be in MODE 3. AND CC.9.2 Be in MODE 4.	 6 hours 24 hours 6 hours 24 hours
DD. Three or more Actuation Logic divisions inoperable. OR Required Action and associated Completion Time of Condition Y, Z, or BB not met.	---------- NOTE ---------- Required Actions DD.1.1 and DD.1.2 are only applicable to Functions 8c and 8d. ---------- DD.1.1 Be in MODE 3. AND DD.1.2 Be in MODE 5. AND	 6 hours 36 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
	DD.2 ---------- NOTE ---------- Only applicable to Function 13. ---------- Be in MODE 3.	6 hours
	AND ---------- NOTE ---------- Required Actions DD.3.1 and DD.3.2 are applicable to Functions 2b, 3a, 4b, 5b, 6a, 6c, 9c, 10c, 10e, 11b, and 15a. ---------- DD.3.1 Be in MODE 3.	6 hours
	AND DD.3.2 Be in MODE 4 without reliance upon steam generator for heat removal.	24 hours
EE. One required Manual division inoperable.	EE.1 Restore required Manual division to OPERABLE status.	72 hours
FF. Two required Manual divisions inoperable. OR Required Action and associated Completion Time of Condition EE not met.	FF.1 Be in MODE 4 without reliance upon steam generator for heat removal.	24 hours

SURVEILLANCE REQUIREMENTS

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

SURVEILLANCE		FREQUENCY
SR 3.3.2.1	Perform CHANNEL CHECK.	31 days
SR 3.3.2.2	Perform SENSOR OPERATIONAL TEST in accordance with the Setpoint Control Program.	24 months
SR 3.3.2.3	Perform CALIBRATION in accordance with the Setpoint Control Program.	24 months
SR 3.3.2.4	Perform EXTENDED SELF TESTS.	24 months
SR 3.3.2.5	Perform ACTUATING DEVICE OPERATIONAL TEST.	24 months
SR 3.3.2.6	Verify NTSPs properly loaded in accordance with the Setpoint Control Program.	24 months
SR 3.3.2.7	Verify RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

Table 3.3.2-1
ESFAS Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
1.	SIS Actuation				
a.	Low Pressurizer Pressure	1,2,3[a]	4 divisions	B,D,O	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
b.	Low Delta P_{sat}	3	4 divisions	B,D,P	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
		4[b][e]	3 divisions	B,D,P	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
c.	Low Hot Leg Loop Level	4[f][m]	3 divisions	C,M	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
		5[f][m],6[f][m]	2 divisions	K	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
d.	Manual	1,2,3	4 divisions	F,H.Q	SR 3.3.2.5
		4	3 divisions	E,M	SR 3.3.2.5
		5,6	2 divisions	X	SR 3.3.2.5
2.	EFWS Actuation				
a.	Low-Low SG Level (Affected SG)	1,2,3[c]	4 divisions	B,D,Q	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
b.	Manual (Affected SG)	1,2,3	4 divisions	I,J	SR 3.3.2.5
		4[c][k]	2 divisions	EE,FF	SR 3.3.2.5

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
3. Common SGBD Valve Isolation				
a. Manual (Affected SG)	1,2,3,4[(c)(k)]	4 divisions	J	SR 3.3.2.5
4. EFWS Isolation				
a. High SG Level (Affected SG)	1,2,3[(c)]	4 divisions	B,D,Q	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
b. Manual (Affected SG)	1,2,3,4[(c)(k)]	4 divisions	I,J	SR 3.3.2.5
5. Partial Cooldown Actuation				
a. Automatic on SIS Actuation	1,2,3[(d)]	4 divisions	B,D,Q	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
b. Partial Cooldown Actuation - Manual Reset	1,2,3,4(k)	4 divisions		
~~b.~~ a. Manual	1,2,3,4[(k)]	4 divisions	F,H,U	SR 3.3.2.5
6. Main Steam Relief Isolation Valve Opening				
a. High SG Pressure (Affected SG)	1,2,3,4[(k)(u)]	4 divisions	B,D,U	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
b. Manual Reset	1,2,3	4 divisions	G	SR 3.3.2.5
c. Manual	1,2,3,4[(k)]	4 divisions	F,H,U	SR 3.3.2.5
7. MSRT Isolation				
a. Low SG Pressure (Affected SG)	1,2,3[(a)]	4 divisions	B,D,Q	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
b. Manual	1,2,3[(a)]	4 divisions	F,H,Q	SR 3.3.2.5

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
8. Main Steam Isolation				
a. High SG Pressure Drop (All SGs)	1,2,3[(r)]	4 divisions	B,D,S	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
b. Low SG Pressure (All SGs)	1,2,3[(a)(r)]	4 divisions	B,D,S	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
c. High Containment Pressure (All SGs)	1,2,3,4	4 divisions	B,D,R	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
d. Manual	1,2,3,4	4 divisions	F,H,R	SR 3.3.2.5
9. Main Feedwater Full Load Isolation				
a. Reactor Trip Initiation (All SGs)	1,2,3[(o)]	4 divisions	B,D,T	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
b. High SG Level (Affected SG)	1,2,3,4[(c)]	4 divisions	B,D,U	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
c. Manual	1,2,3,4[(c)]	4 divisions	I,J	SR 3.3.2.5
10. Startup and Shutdown System (SSS) Isolation				
a. High SG Pressure Drop (Affected SG)	1,2,3[(p)]	4 divisions	B,D,Q	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
b. Low SG Pressure (Affected SG)	1,2,3[(a)(p)]	4 divisions	B,D,Q	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
c. High SG Level for Period of Time (Affected SG)	1,2,3,4[(c)(p)]	4 divisions	B,D,U	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
d. High Containment Pressure (All SGs)	1,2,3,4	(n)	(n)	(n)
e. Manual	1,2,3,4	4 divisions	I,J	SR 3.3.2.5
11. PSRV Opening				
a. High Hot Leg Pressure	4[(g)(h)]	4 divisions	B,D,N	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
	5[(g)(h)],6[(g)(h)]	3 divisions	C,L	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
b. Manual	4[(h)]	4 divisions	I.N	SR 3.3.2.5
	5[(h)],6[(h)]	3 divisions	E,L	SR 3.3.2.5
12. SG Isolation				
a. Manual	1,2,3[(c)]	4 divisions	F,H,Q	SR 3.3.2.5
13. Turbine Trip on Reactor Trip Initiation				
a. Automatic	1,2	(s)	(s)	(s)
b. Manual	1,2	4 divisions	F,H,O	SR 3.3.2.5
14. Hydrogen Mixing Dampers Opening				
a. High Containment Pressure	1,2,3,4	4 divisions	B,D,R	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
b. High Containment Compartments Delta Pressure	1,2,3,4	4 divisions	B,D,R	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
c. Manual	1,2,3,4	4 divisions	F,H,R	SR 3.3.2.5

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
15. SGBD Cross-Tie Valve Opening				
a. Manual	1,2,3[(v)]	4 divisions	I.J	SR 3.3.2.5
16. SIS Hot Leg Injection Valve Opening				
a. Manual	1,2,3[(w)],4	4 divisions	F,H,R	SR 3.3.2.5
17. MHSI Large Miniflow Valves				
a. Interlock	4[(g)(h)]	4 divisions	B,D,N	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
	5[(g)(h)],6[(g)(h)]	2 divisions	K,L	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.7
b. Manual	4[(h)]	4 divisions	I,N	SR 3.3.2.5
	5[(h)],6[(h)]	3 divisions	E,L	SR 3.3.2.5
18. Extra Borating System				
a. Manual Actuation	1,2,3,4,5	2 divisions	F,H,V	SR 3.3.2.5
b. Manual Isolation	1,2,3,4,5	2 divisions	F,H,V	SR 3.3.2.5
19. Operational I&C Disable Switch				
a. Manual	1,2,3,4	4 divisions	F,H,R	SR 3.3.2.5
	5,6,(z)	3 divisions	E,W	SR 3.3.2.5
20. Actuation Logic	1,2,3,4	4 divisions	Y,Z,AA,BB, CC,DD	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.7
	5,6,(z)	3 divisions	Z,CC	SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.7

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS

(a) With P12 inhibited (Pressurizer Pressure Higher than Setpoint).

(b) With P12 validated (Pressurizer Pressure Lower than Setpoint).

(c) With P13 inhibited (Hot Leg Temperature Higher than Setpoint).

(d) With P14 inhibited (Hot Leg Pressure or Hot Leg Temperature Higher than Setpoints).

(e) With P15 inhibited (Hot Leg Pressure or Hot Leg Temperature Higher than Setpoints or RCP in Operation).

(f) With P15 validated (Hot Leg Pressure and Hot Leg Temperature Lower than Setpoints and No RCP in Operation).

(g) With P17 validated (Cold Leg Temperature Lower than Setpoint).

(h) When MHSI Large Miniflow Valves and PSRV OPERABILITY are required by LCO 3.4.11, Low Temperature Overpressure Protection (LTOP).

(k) When the SGs are relied upon for heat removal.

(m) With Manual SIS - Loop Level Bypass inhibited.

(n) See LCO 3.3.4, Containment Isolation Instrumentation, for Input & Acquisition Logic division OPERABILITY, ACTION, and Surveillance Requirements.

(o) Except when all Main Feedwater Full Load isolation valves are closed and deactivated.

(p) Except when all Main Feedwater Full Load and SSS isolation valves are closed and deactivated.

(r) Except when all Main Steam isolation valves are closed and deactivated.

(s) See LCO 3.3.1, Reactor Trip Instrumentation, for Input & Acquisition Logic division OPERABILITY, ACTION, and Surveillance Requirements.

(t) With reactor trip initiated.

(u) P14 permissive is used for setpoint selection.

(v) With P18 validated (Hot Leg Temperature Lower than Setpoint or Reactor Trip).

(w) With P16 validated (Hot Leg Pressure Lower than Setpoint).

(z) During movement of irradiated fuel assemblies. What happened to Footnote "(x) As specified in the COLR."

3.3 INSTRUMENTATION

3.3.3 Permissive Instrumentation

LCO 3.3.3 The Permissive instrumentation for each Function in Table 3.3.3-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.3-1.

ACTIONS

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

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more Functions with one or more divisions inoperable.	A.1	Enter the applicable Condition referenced in Table 3.3.3-1.	Immediately
B. One Input & Acquisition Logic division inoperable.	B.1	Verify Actuation Logic voting is modified.	6 hours
C. One required Input & Acquisition Logic division inoperable.	C.1	Verify Actuation Logic voting is modified.	6 hours
	AND		
	C.2	Restore required Input & Acquisition Logic division to OPERABLE status.	72 hours
D. Two Input & Acquisition Logic divisions inoperable.	D.1	Verify Actuation Logic voting is modified.	6 hours
	AND		
	D.2	Restore one Input & Acquisition Logic division to OPERABLE status.	72 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	E.1 Be in MODE 1 with P2 inhibited.	4 hours
F. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	F.1 Be in MODE 1 with P3 inhibited.	2 hours
G. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	G.1 Be in MODE 2 with P5 inhibited.	6 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	H.1 Verify P6 is validated.	6 hours
I. Two or more required Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition C not met.	I.1 Verify P7 is inhibited.	6 hours
J. Two or more required Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition C not met.	J.1 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration. AND J.2 Initiate action to restore required division(s) to OPERABLE status.	Immediately Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
K. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	K.1 Be in MODE 3 with P8 inhibited.	6 hours
L. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	L.1 Verify P12 is inhibited.	6 hours
M. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	M.1 Be in MODE 3 with P12 validated.	6 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
N. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	N.1 Be in MODE 4 without reliance on steam generators for heat removal.	24 hours
O. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	O.1 Verify P14 is inhibited.	6 hours
P. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	P.1 Be in MODE 4 with P14 validated.	24 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
Q. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	Q.1 Verify P15 is inhibited.	6 hours
R. Two or more required Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition C not met.	R.1 Verify P15 is inhibited.	6 hours
S. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	S.1 Verify P15 is validated.	6 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
T. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	T.1 Verify P16 is validated.	6 hours
U. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	U.1 Verify P17 is inhibited.	6 hours
V. Three or more Input & Acquisition Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or D not met.	V.1 Verify P17 is validated.	30 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
W. One Manual division inoperable. OR One Actuation Logic division inoperable.	W.1 ---------- NOTE ---------- Only applicable to Functions 1, 2, 3, 4, 10, and 11. ---------- Enter applicable Conditions and Required Actions of LCO 3.3.1, "Reactor Trip Instrumentation," for Actuation Logic of Functions made inoperable by Permissive instrumentation. AND W.2 ---------- NOTE ---------- Only applicable to Functions 9, 12, 13, 14, 15, 16, and 17. ---------- Enter applicable Conditions and Required Actions of LCO 3.3.2, "ESFAS Instrumentation" for Actuation Logic of Functions made inoperable by Permissive instrumentation. AND W.3 ---------- NOTE ---------- Only applicable to Functions 5, 6, 7, 8, and 18. ---------- Enter applicable Conditions and Required Actions of LCO 3.3.5, "CVCS Instrumentation" for Actuation Logic of Functions made inoperable by Permissive instrumentation.	Immediately Immediately Immediately

SURVEILLANCE REQUIREMENTS

---------- NOTE ----------
Refer to Table 3.3.3-1 to determine which SRs apply for each Function.

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform CHANNEL CHECK.	31 days
SR 3.3.3.2	---------- NOTES ---------- 1. Not required to be performed until 24 hours after THERMAL POWER is ≥ 15% RTP. 2. Neutron detectors are excluded from CALIBRATION. --- Perform CALIBRATION in accordance with the Setpoint Control Program.	31 effective full power days
SR 3.3.3.3	---------- NOTE ---------- Not required to be performed until 12 hours after THERMAL POWER ≥ 70% RTP. --- Perform CALIBRATION in accordance with the Setpoint Control Program.	24 months
SR 3.3.3.4	Perform SENSOR OPERATIONAL TEST in accordance with the Setpoint Control Program.	24 months
SR 3.3.3.5	Perform CALIBRATION in accordance with the Setpoint Control Program.	24 months
SR 3.3.3.6	Perform EXTENDED SELF TESTS.	24 months
SR 3.3.3.7	Perform ACTUATING DEVICE OPERATIONAL TEST.	24 months
SR 3.3.3.8	Verify NTSPs properly loaded in accordance with the Setpoint Control Program.	24 months

SURVEILLANCE		FREQUENCY
SR 3.3.3.9	---------- NOTES ---------- 1. Required to be performed prior to withdrawing RCCAs for startup. 2. Neutron detectors are excluded from CALIBRATION. ---------- Perform CALIBRATION in accordance with the Setpoint Control Program.	24 months

Table 3.3.3-1
Permissive Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
1.	P2 Automatic Validation				
	a. Power Range Flux Measurement Higher than First Setpoint	1	4 divisions	B,D,E	SR 3.3.3.1 SR 3.3.3.2 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8
2.	P3 Automatic Validation				
	a. Power Range Flux Measurement Higher than Second Setpoint	1	4 divisions	B,D,F	SR 3.3.3.1 SR 3.3.3.2 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8
3.	P5 Automatic Validation				
	a. Intermediate Range Flux Measurement Higher than Setpoint	2	4 divisions	B,D,G	SR 3.3.3.1 SR 3.3.3.3 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8
4.	P6 Automatic Inhibition				
	a. Thermal Core Power Lower than Setpoint	1	4 divisions	B,D,H	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8 SR 3.3.3.9
5.	P7 Automatic Validation				
	a. No RCPs in Operation	5	3 divisions	C,I	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8 SR 3.3.3.9
6.	P7 Automatic Inhibition				
	a. RCP in Operation	5	3 divisions	C,J	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8 SR 3.3.3.9

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
7.	P8 Automatic Validation				
a.	Shutdown RCCA Position Lower than Setpoint	3	4 divisions	B,D,K	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8
8.	P8 Automatic Inhibition				
a.	Shutdown RCCA Position Higher than Setpoint	2	4 divisions	B,D,K	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8
9.	P12 Manual Validation disables Function 3.3.2.1.a "SIS Actuation - Low Pressurizer Pressure" enables Function 3.3.2.1.b "SIS Actuation - Low Delta Psat				
a.	Pressurizer Pressure Lower than Setpoint < 2005 psia PZR PRESS NR [1] { [2] [3] [4] } Logic: 3 out of 4 AND manual validate push button	3	4 divisions	B,D,L	SR 3.3.3.1 CHANNEL CHECK SR 3.3.3.4 SENSOR OPERATIONAL TEST SR 3.3.3.5 CALIBRATION SR 3.3.3.6 EXTENDED SELF TESTS SR 3.3.3.8 Verify NTSPs properly loaded
b.	Manual	3	4 divisions	W	SR 3.3.3.7 ADOT
10.	P12 Automatic Inhibition enables Function 3.3.2.1.a "SIS Actuation - Low Pressurizer Pressure"				
a.	Pressurizer Pressure Higher than Setpoint > 2005 psia PZR PRESS NR [1] { [2] [3] [4] } Logic: 2 out of 4; 1 out of 4; 0 out of 4	3	4 divisions	B,D,M	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8
11.	P13 Automatic Inhibition				
a.	Hot Leg Temperature Higher than Setpoint	4	4 divisions	B,D,N	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8
12.	P14 Manual Validation				
a.	Hot Leg Pressure and Hot Leg Temperature Lower than Setpoints	4	4 divisions	B,D,O	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8
b.	Manual	4	4 divisions	W	SR 3.3.3.7
13.	P14 Manual Inhibition				
a.	Hot Leg Pressure or Hot Leg Temperature Higher than Setpoints	4	4 divisions	B,D,P	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8
b.	Manual	4	4 divisions	W	SR 3.3.3.7

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
14. P15 Manual Validation disables Function 3.3.2.1.b "SIS Actuation - Low Delta Psat when . . . enables Function 3.3.2.1.c "SIS Actuation - Low Hot Leg Loop Level when . . .				
a. Hot Leg Pressure and Hot Leg Temperature Lower than Setpoints and No RCP in Operation	4	4 divisions	B,D,Q	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8 SR 3.3.3.9
. . . no RCPs are running, the hot leg (WR) pressure is < 464 psia, and the hot leg (WR) temperature is < 350ºF.				
Logic: 3 out of 4 HLEG TEMP WR < 350ºF, AND 3 out of 4 HLEG PRESS WR < 464 psia, AND 2 out of 4: Div 1 RCP1 Breaker Open; Div 2 RCP1 Bus Breaker Open; Div 3 RCP1 Speed [1]; Div 4 RCP1 Speed [2], AND 2 out of 4: Div 1 RCP2 Breaker Open; Div 2 RCP2 Bus Breaker Open; Div 3 RCP2 Speed [1]; Div 4 RCP2 Speed [2], AND 2 out of 4: Div 3 RCP3 Breaker Open; Div 4 RCP3 Bus Breaker Open; Div 1 RCP3 Speed [1]; Div 2 RCP3 Speed [2], AND 2 out of 4: Div 3 RCP4 Breaker Open; Div 4 RCP4 Speed [1]; Div 2 RCP4 Speed [2], AND On Time Delay logic block times out AND manual validate push button	5	3 divisions	C,R	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8 SR 3.3.3.9
b. Manual	4	4 divisions	W	SR 3.3.3.7
	5	3 divisions	W	SR 3.3.3.7
15. P15 Automatic Inhibition enables Function 3.3.2.1.b "SIS Actuation - Low Delta Psat if . . .				
a. Hot Leg Pressure or Hot Leg Temperature Higher than Setpoints or RCP in Operation . . . a RCP is running, OR the hot leg (WR) pressure is > 464 psia, OR the hot leg (WR) temperature is < 350ºF.	4	4 divisions	B,D,S	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8 SR 3.3.3.9
16. P16 Manual Inhibition enables Function 3.3.2.16.a SIS Hot Leg Injection Valve Opening - Manual, Applicability is MODES 1,2,3(w),4 - (w) With P16 validated (Hot Leg Pressure Lower than Setpoint).				
a. Hot Leg Pressure Lower than Setpoint	4	4 divisions	B,D,T	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8
b. Manual	4	4 divisions	W	SR 3.3.3.7
17. P17 Manual Validation				
a. Cold Leg Temperature Lower than Setpoint	4[(a)]	4 divisions	B,D,U	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8
b. Manual	4[(a)]	4 divisions	W	SR 3.3.3.7
18. P17 Automatic Inhibition				
a. Cold Leg Temperature Higher than Setpoint	4	4 divisions	B,D,V	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
19. P18 Automatic Inhibition				
a. Hot Leg Temperature Higher than Setpoint and No Reactor Trip	4[(b)]	4 divisions	B,D,N	SR 3.3.3.1 SR 3.3.3.4 SR 3.3.3.5 SR 3.3.3.6 SR 3.3.3.8
20. Actuation Logic	1,2,3,4	4 divisions	W	SR 3.3.3.6
	5,6	3 divisions	W	SR 3.3.3.6

(a) When MHSI Large Miniflow Valves and PSRV OPERABILITY are required by LCO 3.4.11, Low Temperature Overpressure Protection (LTOP).

(b) When the SGs are relied upon for heat removal.

3.3 INSTRUMENTATION

3.3.4 Containment Isolation Instrumentation

LCO 3.3.4 The Containment Isolation instrumentation for each Function in Table 3.3.4-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.4-1.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more divisions inoperable.	A.1 Enter the applicable Condition referenced in Table 3.3.4-1.	Immediately
B. One Input & Acquisition Logic division inoperable.	B.1 Verify Actuation Logic voting is modified.	6 hours
C. Two required Input & Acquisition Logic divisions inoperable.	C.1 Verify Actuation Logic voting is modified. AND C.2 Restore one Input & Acquisition Logic division to OPERABLE status.	6 hours 72 hours
D. One Manual division inoperable. OR One Actuation Logic division inoperable.	D.1 Restore division to OPERABLE status.	72 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Three or more Input & Acquisition Logic divisions inoperable. OR Two or more Manual divisions inoperable. OR Two or more Actuation Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B, C, or D not met.	E.1 Enter applicable Conditions and Required Actions of LCO 3.6.3, "Containment Isolation Valves" for containment isolation valve(s) made inoperable by Containment Isolation instrumentation. It is not clear which ACTIONS Condition in Specification 3.6.3 would apply in the event Required Action B.1, C.2, or D.1 are not met. AREVA to explain.	Immediately
F. One or more required Manual divisions inoperable.	F.1 Enter applicable Conditions and Required Actions of LCO 3.9.7, "Containment Penetrations" for containment isolation valve(s) made inoperable by Containment Isolation instrumentation.	Immediately

SURVEILLANCE REQUIREMENTS

---------- NOTE ----------
Refer to Table 3.3.4-1 to determine which SRs apply for each Function.

SURVEILLANCE		FREQUENCY
SR 3.3.4.1	Perform CHANNEL CHECK.	31 days
SR 3.3.4.2	Perform SENSOR OPERATIONAL TEST in accordance with the Setpoint Control Program.	24 months
SR 3.3.4.3	Perform CALIBRATION in accordance with the Setpoint Control Program.	24 months
SR 3.3.4.4	Perform EXTENDED SELF TESTS.	24 months
SR 3.3.4.5	Perform ACTUATING DEVICE OPERATIONAL TEST.	24 months
SR 3.3.4.6	Verify NTSPs properly loaded in accordance with the Setpoint Control Program.	24 months
SR 3.3.4.7	Verify RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

Table 3.3.4-1
Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
1. Containment Isolation (Stage 1)				
a. SIS Actuation	1,2,3,4	(a)	(a)	(a)
b. High Containment Pressure	1,2,3,4	4 divisions	B,C,E	SR 3.3.4.1 SR 3.3.4.2 SR 3.3.4.3 SR 3.3.4.4 SR 3.3.4.6 SR 3.3.4.7
c. High Containment Radiation	1,2,3,4	4 divisions	B,C,E	SR 3.3.4.1 SR 3.3.4.2 SR 3.3.4.3 SR 3.3.4.4 SR 3.3.4.6 SR 3.3.4.7
d. Manual	1,2,3,4	4 divisions	D,E	SR 3.3.4.5
	5[(b)(c)],6[(b)(d)]	3 divisions	F	SR 3.3.4.5
2. Containment Isolation (Stage 2)				
a. High-High Containment Pressure	1,2,3,4	4 divisions	B,C,E	SR 3.3.4.1 SR 3.3.4.2 SR 3.3.4.3 SR 3.3.4.4 SR 3.3.4.6 SR 3.3.4.7
b. Manual	1,2,3,4	4 divisions	D,E	SR 3.3.4.5
3. Actuation Logic	1,2,3,4	4 divisions	D,E	SR 3.3.4.4 SR 3.3.4.5 SR 3.3.4.7
	5[(b)(c)],6[(b)(d)]	3 divisions	F	SR 3.3.4.4 SR 3.3.4.5 SR 3.3.4.7

(a) See LCO 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation, for Input & Acquisition Logic division OPERABILITY, ACTION, and Surveillance Requirements.

(b) Only required for containment isolation valves providing direct access from the containment atmosphere to the outside atmosphere.

(c) With RCS loops not filled.

(d) With the refueling cavity water level < 23 ft above the top of the reactor vessel flange.

3.3 INSTRUMENTATION

3.3.5 Chemical and Volume Control System (CVCS) Isolation Instrumentation

LCO 3.3.5 The CVCS Isolation instrumentation for each Function in Table 3.3.5-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5-1.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more divisions inoperable.	A.1 Enter the applicable Condition referenced in Table 3.3.5-1.	Immediately
B. One Input & Acquisition Logic division inoperable.	B.1 Verify Actuation Logic voting is modified.	6 hours
C. One required Input & Acquisition Logic division inoperable.	C.1 Verify Actuation Logic voting is modified. AND C.2 Restore Input & Acquisition Logic division to OPERABLE status.	6 hours 72 hours
D. Two Input & Acquisition Logic divisions inoperable.	D.1 Verify Actuation Logic voting is modified. AND D.2 Restore one Input & Acquisition Logic division to OPERABLE status.	6 hours 72 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One Manual division inoperable. OR One Actuation Logic division inoperable.	E.1 Restore division to OPERABLE status.	72 hours
F. Three or more Input & Acquisition Logic divisions inoperable. OR Two or more Manual divisions inoperable. OR Two or more Actuation Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B, D, or E not met.	F.1 Enter applicable Conditions and Required Actions of LCO 3.1.8, "Anti-Dilution Mitigation (ADM)" for CVCS Volume Control Tank (VCT) or letdown isolation valve(s) made inoperable by CVCS Isolation instrumentation.	Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. Three or more Input & Acquisition Logic divisions inoperable. OR Two or more Manual divisions inoperable. OR Two or more Actuation Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B, D, or E not met.	G.1 Enter applicable Conditions and Required Actions of LCO 3.4.9, "Pressurizer" or LCO 3.6.3, "Containment Isolation Valves" for CVCS charging line isolation valve(s) made inoperable by CVCS Isolation instrumentation.	Immediately
H. Two or more required Input & Acquisition Logic divisions inoperable. OR One required Manual division inoperable. OR One required Actuation Logic division inoperable. OR Required Action and associated Completion Time of Condition C not met.	H.1 Enter applicable Conditions and Required Actions of LCO 3.1.8, "Anti-Dilution Mitigation (ADM)" for CVCS VCT or letdown isolation valve(s) made inoperable by CVCS Isolation instrumentation.	Immediately

SURVEILLANCE REQUIREMENTS

---------- NOTE ----------
Refer to Table 3.3.5-1 to determine which SRs apply for each Function.

SURVEILLANCE		FREQUENCY
SR 3.3.5.1	Perform CHANNEL CHECK.	31 days
SR 3.3.5.2	Perform CALIBRATION in accordance with the Setpoint Control Program.	31 EFPD
SR 3.3.5.3	Perform SENSOR OPERATIONAL TEST in accordance with the Setpoint Control Program.	24 months
SR 3.3.5.4	Perform CALIBRATION in accordance with the Setpoint Control Program.	24 months
SR 3.3.5.5	Perform EXTENDED SELF TESTS.	24 months
SR 3.3.5.6	Perform ACTUATING DEVICE OPERATIONAL TEST.	24 months
SR 3.3.5.7	Verify NTSPs properly loaded in accordance with the Setpoint Control Program.	24 months
SR 3.3.5.8	Verify RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

Table 3.3.5-1
CVCS Isolation Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
1.	CVCS Charging Line Isolation				
	a. High-High Pressurizer Level automatically enabled by automatic inhibition of the P17 permissive Cold Leg Temperature (Wide Range) > approximately 248°F	1,2,3,4[a]	4 divisions	B,D,F	SR 3.3.5.1 SR 3.3.5.3 SR 3.3.5.4 SR 3.3.5.5 SR 3.3.5.7 SR 3.3.5.8
	b. Manual	1,2,3,4	2 divisions (Divisions 1 and 4 only)	E,F	SR 3.3.5.5
2.	CVCS Isolation				
	a. ADM at Power	1,2[b]	4 divisions	B,D,G	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3 SR 3.3.5.4 SR 3.3.5.5 SR 3.3.5.7 SR 3.3.5.8
	b. ADM at Power with Calculation	1,2[b]	4 divisions	B,D,G	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3 SR 3.3.5.4 SR 3.3.5.5 SR 3.3.5.7 SR 3.3.5.8
	c. ADM at Shutdown with RCP in Operation	3[c][d],4[c][d]	4 divisions	B,D,G	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3 SR 3.3.5.4 SR 3.3.5.5 SR 3.3.5.7 SR 3.3.5.8
		5[c][d]	3 divisions	C,H	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3 SR 3.3.5.4 SR 3.3.5.5 SR 3.3.5.7 SR 3.3.5.8

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
d.	ADM at Shutdown with RCP in Operation with Calculation	3[(c)(d)],4[(c)(d)]	4 divisions	B,D,G	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3 SR 3.3.5.4 SR 3.3.5.5 SR 3.3.5.7 SR 3.3.5.8
		5[(c)(d)]	3 divisions	C,H	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3 SR 3.3.5.4 SR 3.3.5.5 SR 3.3.5.7 SR 3.3.5.8
e.	ADM at Shutdown with No RCP in Operation	4[(e)]	4 divisions	B,D,G	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3 SR 3.3.5.4 SR 3.3.5.5 SR 3.3.5.7 SR 3.3.5.8
		5[(e)],6[(e)]	3 divisions	C,H	SR 3.3.5.1 SR 3.3.5.2 SR 3.3.5.3 SR 3.3.5.4 SR 3.3.5.5 SR 3.3.5.7 SR 3.3.5.8
f.	Manual	1,2,3,4	2 divisions (Divisions 1 and 4 only)	E,G	SR 3.3.5.5
		5,6	1 division (Division 1 or 4)	H	SR 3.3.5.5
3.	Actuation Logic	1,2,3,4	2 divisions (Divisions 1 and 4 only)	E,G	SR 3.3.5.5 SR 3.3.5.6 SR 3.3.5.8
		5,6[(e)]	1 division (Division 1 or 4)	H	SR 3.3.5.5 SR 3.3.5.6 SR 3.3.5.8

(a) With P17 inhibited (Cold Leg Temperature Higher than Setpoint). > approximately 248°F (as stated in the COLR)

(b) With P8 inhibited (Shutdown RCCA Position Higher than Setpoint).

(c) With P7 inhibited (RCP in Operation).

(d) With P8 validated (Shutdown RCCA Position Lower than Setpoint).

(e) With P7 validated (No RCP in Operation).

3.3 INSTRUMENTATION

3.3.6 Reactor Coolant Pump (RCP) Trip Instrumentation

LCO 3.3.6 The RCP Trip instrumentation for each Function in Table 3.3.6-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.6-1.

ACTIONS

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

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more Functions with one or more divisions inoperable.	A.1	Enter the applicable Condition referenced in Table 3.3.6-1.	Immediately
B. One Input & Acquisition Logic division inoperable.	B.1	Verify Actuation Logic voting is modified.	6 hours
C. Two Input & Acquisition Logic divisions inoperable.	C.1	Verify Actuation Logic voting is modified.	6 hours
	AND		
	C.2	Restore one Input & Acquisition Logic division to OPERABLE status.	72 hours
D. One RCP Breaker inoperable.	D.1	Restore RCP Breaker to OPERABLE status.	72 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One Manual division inoperable. OR One Actuation Logic division inoperable.	E.1 Restore division to OPERABLE status.	72 hours
F. Three or more Input & Acquisition Logic divisions inoperable. OR One or more RCPs with two RCP Breakers inoperable. OR Two or more Manual divisions inoperable. OR Two or more Actuation Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B, C, D, or E not met.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours

use double line at end of ACTIONS table

SURVEILLANCE REQUIREMENTS

---------- NOTE ----------
Refer to Table 3.3.6-1 to determine which SRs apply for each Function.

	SURVEILLANCE	FREQUENCY
SR 3.3.6.1	Perform CHANNEL CHECK.	31 days
SR 3.3.6.2	Perform SENSOR OPERATIONAL TEST in accordance with the Setpoint Control Program.	24 months
SR 3.3.6.3	Perform CALIBRATION in accordance with the Setpoint Control Program.	24 months
SR 3.3.6.4	Perform EXTENDED SELF TESTS.	24 months
SR 3.3.6.5	Perform ACTUATING DEVICE OPERATIONAL TEST.	24 months
SR 3.3.6.6	Verify NTSPs properly loaded in accordance with the Setpoint Control Program.	24 months
SR 3.3.6.7	Verify RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

Table 3.3.6-1
RCP Trip Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
1. RCP Trip				
a. Low Delta Pressure across RCP and SIS Actuation for a Period of Time	1,2,3,4	4 divisions,(a)	B,G,F	SR 3.3.6.1 SR 3.3.6.2 SR 3.3.6.3 SR 3.3.6.4 SR 3.3.6.6 SR 3.3.6.7
b. Manual	1,2,3,4	4 divisions	E,F	SR 3.3.6.5
2. RCP Breakers	1,2,3,4	2 per pump	D,F	SR 3.3.6.5 SR 3.3.6.7
3. Actuation Logic	1,2,3,4	4 divisions	E,F	SR 3.3.6.4 SR 3.3.6.5 SR 3.3.6.7

(a) See LCO 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation for Input & Acquisition Logic division OPERABILITY, ACTION, and Surveillance Requirements.

why are previous functions 1.a, 1.c and 1.d omitted?

3.3 INSTRUMENTATION

3.3.7 Control Room Emergency Filtration (CREF) Instrumentation

LCO 3.3.7 The CREF instrumentation for each Function in Table 3.3.7-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.7-1.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more divisions inoperable.	A.1 Enter the applicable Condition referenced in Table 3.3.7-1.	Immediately
B. One Input & Acquisition Logic division inoperable. OR One Manual division inoperable. OR One Actuation Logic division inoperable.	B.1. Restore division to OPERABLE status.	72 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Two Input & Acquisition Logic divisions inoperable. OR Two or more Manual divisions inoperable. OR Two or more Actuation Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B not met.	C.1 Place both CREF trains in emergency mode. AND C.2 Suspend movement of irradiated fuel assemblies. AND C.3 Initiate action to restore one division to OPERABLE status.	Immediately Immediately Immediately
D. One or more required Input & Acquisition Logic divisions inoperable. OR One required Manual division inoperable. OR One or more required Actuation Logic divisions inoperable.	D.1 Place both CREF trains in emergency mode. AND D.2 Suspend movement of irradiated fuel assemblies. AND D.3 Initiate action to restore one division to OPERABLE status.	Immediately Immediately Immediately

SURVEILLANCE REQUIREMENTS

---------- NOTE ----------
Refer to Table 3.3.7-1 to determine which SRs apply for each Function.

SURVEILLANCE		FREQUENCY
SR 3.3.7.1	Perform CHANNEL CHECK.	31 days
SR 3.3.7.2	Perform SENSOR OPERATIONAL TEST in accordance with the Setpoint Control Program.	24 months
SR 3.3.7.3	Perform CALIBRATION in accordance with the Setpoint Control Program.	24 months
SR 3.3.7.4	Perform EXTENDED SELF TESTS.	24 months
SR 3.3.7.5	Perform ACTUATING DEVICE OPERATIONAL TEST.	24 months
SR 3.3.7.6	Verify NTSPs properly loaded in accordance with the Setpoint Control Program.	24 months
SR 3.3.7.7	Verify RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

Table 3.3.7-1
CREF Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
1. Control Room Emergency Filtration				
a. High Intake Activity	1,2,3,4	4 divisions	B,C	SR 3.3.7.1 SR 3.3.7.2 SR 3.3.7.3 SR 3.3.7.4 SR 3.3.7.6 SR 3.3.7.7
	5,6,(a)	3 divisions	D	SR 3.3.7.1 SR 3.3.7.2 SR 3.3.7.3 SR 3.3.7.4 SR 3.3.7.6 SR 3.3.7.7
b. Manual	1,2,3,4	2 divisions (Divisions 2 and 3 only)	B,C	SR 3.3.7.5
	5,6,(a)	1 division (Division 2 or 3)	D	SR 3.3.7.5
2. Actuation Logic	1,2,3,4	4 divisions	B,C	SR 3.3.7.4 SR 3.3.7.5 SR 3.3.7.7
	5,6,(a)	3 divisions	D	SR 3.3.7.4 SR 3.3.7.5 SR 3.3.7.7

(a) During movement of irradiated fuel assemblies.

3.3 INSTRUMENTATION

3.3.8 Emergency Diesel Generator (EDG) Actuation Instrumentation

LCO 3.3.8 The EDG Actuation instrumentation for each Function in Table 3.3.8-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.8-1.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more divisions inoperable.	A.1 Enter the applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources – Operating," or LCO 3.8.2, "AC Sources - Shutdown" for EDG made inoperable by EDG Actuation instrumentation.	Immediately

SURVEILLANCE REQUIREMENTS

---------- NOTE ----------
Refer to Table 3.3.8-1 to determine which SRs apply for each Function.

SURVEILLANCE		FREQUENCY
SR 3.3.8.1	Perform CHANNEL CHECK.	31 days
SR 3.3.8.2	Perform SENSOR OPERATIONAL TEST in accordance with the Setpoint Control Program.	24 months
SR 3.3.8.3	Perform CALIBRATION in accordance with the Setpoint Control Program.	24 months
SR 3.3.8.4	Perform EXTENDED SELF TESTS.	24 months
SR 3.3.8.5	Perform ACTUATING DEVICE OPERATIONAL TEST.	24 months
SR 3.3.8.6	Verify NTSPs properly loaded in accordance with the Setpoint Control Program.	24 months
SR 3.3.8.7	Verify RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

Table 3.3.8-1
EDG Actuation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
1. EDG Actuation				
a. EDG Actuation on Degraded Grid Voltage	1,2,3,4	4 divisions	A	SR 3.3.8.1 SR 3.3.8.2 SR 3.3.8.3 SR 3.3.8.4 SR 3.3.8.6 SR 3.3.8.7
	5,6,(a)	2 divisions in the same divisional pair	A	SR 3.3.8.1 SR 3.3.8.2 SR 3.3.8.3 SR 3.3.8.4 SR 3.3.8.6 SR 3.3.8.7
b. EDG Actuation on Loss of Voltage	1,2,3,4	4 divisions	A	SR 3.3.8.1 SR 3.3.8.2 SR 3.3.8.3 SR 3.3.8.4 SR 3.3.8.6 SR 3.3.8.7
	5,6,(a)	2 divisions in the same divisional pair	A	SR 3.3.8.1 SR 3.3.8.2 SR 3.3.8.3 SR 3.3.8.4 SR 3.3.8.6 SR 3.3.8.7
c. EDG Actuation on SIS Actuation	1,2,3,4	(b)	(b)	(b)
	5,6,(a)	(b)	(b)	(b)
d. Manual	1,2,3,4	4 divisions	A	SR 3.3.8.5
	5,6,(a)	2 divisions in the same divisional pair	A	SR 3.3.8.5
2. Actuation Logic	1,2,3,4	4 divisions	A	SR 3.3.8.4 SR 3.3.8.5 SR 3.3.8.7
	5,6,(a)	2 divisions in the same divisional pair	A	SR 3.3.8.4 SR 3.3.8.5 SR 3.3.8.7

(a) During movement of irradiated fuel assemblies.

(b) See LCO 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation for Input & Acquisition Logic division OPERABILITY, ACTION, and Surveillance Requirements.

3.3 INSTRUMENTATION

3.3.9 Engineered Safety Feature (ESF) Control Instrumentation

LCO 3.3.9 The ESF Control instrumentation for each Function in Table 3.3.9-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.9-1.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more divisions inoperable.	A.1 Enter the applicable Condition referenced in Table 3.3.9-1.	Immediately
B. One or more Logic Input divisions inoperable.	B.1 Enter applicable Conditions and Required Actions of LCO 3.7.5, "Emergency Feedwater (EFW) System" for division(s) made inoperable by ESF Control instrumentation.	Immediately
C. One or more Logic Input divisions inoperable.	C.1 Enter applicable Conditions and Required Actions of LCO 3.7.4, "Main Steam Relief Trains (MSRT)" for valves(s) made inoperable by ESF Control instrumentation.	Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more Manual divisions inoperable. OR One or more Control Logic divisions inoperable.	D.1 ---------- NOTE ---------- Only applicable to Functions 1b, 2 and 5. ---------- Enter applicable Conditions and Required Actions of LCO 3.7.5, "Emergency Feedwater (EFW) System" for division(s) made inoperable by ESF Control instrumentation. AND D.2 ---------- NOTE ---------- Only applicable to Functions 4b and 5. ---------- Enter applicable Conditions and Required Actions of LCO 3.7.4, "Main Steam Relief Trains (MSRT)" for valves(s) made inoperable by ESF Control instrumentation.	 Immediately Immediately
E. Required Action and associated Completion Time of Condition B, C, or D not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 5.	6 hours 36 hours
F. One required Manual division inoperable.	F.1 Restore required Manual division to OPERABLE status.	72 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. Two required Manual divisions inoperable. OR Required Action and associated Completion Time of Condition F not met.	G.1 Be in MODE 4 without reliance upon steam generator for heat removal.	24 hours

SURVEILLANCE REQUIREMENTS

---------- NOTE ----------
Refer to Table 3.3.9-1 to determine which SRs apply for each Function.

SURVEILLANCE		FREQUENCY
SR 3.3.9.1	Perform CHANNEL CHECK.	31 days
SR 3.3.9.2	Perform SENSOR OPERATIONAL TEST.	24 months
SR 3.3.9.3	Perform CALIBRATION.	24 months
SR 3.3.9.4	Perform EXTENDED SELF TESTS.	24 months
SR 3.3.9.5	Perform ACTUATING DEVICE OPERATIONAL TEST.	24 months

Table 3.3.9-1
ESF Control Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
1. Emergency Feedwater System (EFWS) Pump Flow Protection				
a. Automatic	1,2,3	4 divisions	B,E	SR 3.3.9.1 SR 3.3.9.2 SR 3.3.9.3
b. Manual	1,2,3	4 divisions	D,E	SR 3.3.9.5
	4[(a)]	2 divisions	F,G	SR 3.3.9.5
2. EFWS Level Control				
a. Manual	1,2,3	4 divisions	D,E	SR 3.3.9.5
3. Main Steam Relief Control Valve ~~Standby~~ (MSRCV) Standby Position Control				
a. Automatic	1,2,3,4[(a)]	4 divisions	C,E	SR 3.3.9.1 SR 3.3.9.2 SR 3.3.9.3
4. MSRCV Pressure Control				
a. Automatic	1,2,3	4 divisions	C,E	SR 3.3.9.1 SR 3.3.9.2 SR 3.3.9.3
b. Manual	1,2,3,4[(a)]	4 divisions	D,E	SR 3.3.9.5
5. Control Logic	1,2,3,4[(a)]	4 divisions	D,E	SR 3.3.9.4 SR 3.3.9.5

(a) When the Steam Generators are relied upon for heat removal.

3.3 INSTRUMENTATION

3.3.10 Essential Auxiliary Support (EAS) Control Instrumentation

LCO 3.3.10 The EAS Control instrumentation for each Function in Table 3.3.10-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.10-1.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more divisions inoperable.	A.1 Enter the applicable Condition referenced in Table 3.3.10-1.	Immediately
B. One or more Logic Input divisions inoperable. OR One or more Control Logic divisions inoperable.	B.1 Enter applicable Conditions and Required Actions of LCO 3.6.7, "Annulus Ventilation System (AVS)" for division(s) made inoperable by EAS instrumentation.	Immediately

ACTIONS (continued)

CONDITION	ACTION	COMPLETION TIME
C. One or more Logic Input divisions inoperable. OR One or more Control Logic divisions inoperable.	C.1 Enter applicable Conditions and Required Actions of LCO 3.7.7, "Component Cooling Water (CCW) System" for division(s) made inoperable by EAS instrumentation.	Immediately
D. One or more Logic Input divisions inoperable. OR One or more Control Logic divisions inoperable.	D.1 Enter applicable Conditions and Required Actions of LCO 3.7.8, "Essential Service Water (ESW) System" for division(s) made inoperable by EAS instrumentation.	Immediately
E. One or more Logic Input divisions inoperable. OR One or more Control Logic divisions inoperable.	E.1 Enter applicable Conditions and Required Actions of LCO 3.5.5, "Extra Borating System (EBS)" for division(s) made inoperable by EAS instrumentation.	Immediately

ACTIONS (continued)

CONDITION	ACTION	COMPLETION TIME
F. One or more required Logic Input divisions inoperable. OR One or more Control Logic divisions inoperable.	F.1 Enter applicable Conditions and Required Actions of LCO 3.7.10, "Control Room Emergency Filtration (CREF)" for division(s) made inoperable by EAS instrumentation.	Immediately
G. One or more required Logic Input divisions inoperable. OR One or more Control Logic divisions inoperable.	G.1 Enter applicable Conditions and Required Actions of LCO 3.7.11, "Control Room Air Conditioning System (CRACS)" for division(s) made inoperable by EAS instrumentation.	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. One or more Logic Input divisions inoperable. OR One or more Control Logic divisions inoperable.	H.1 Enter applicable Conditions and Required Actions of LCO 3.5.2, "ECCS – Operating" and LCO 3.5.3, "ECCS - Shutdown, MODE 4" for division(s) made inoperable by EAS instrumentation.	Immediately
I. One or more Logic Input divisions inoperable. OR One or more Control Logic divisions inoperable.	I.1 Enter applicable Conditions and Required Actions of LCO 3.7.13, "Safeguard Building Ventilation System Electrical Division (SBVSED)" for division(s) made inoperable by EAS instrumentation.	Immediately
J. One or more Logic Input divisions inoperable. OR One or more Control Logic divisions inoperable.	J.1 Enter applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources - Operating" for division(s) made inoperable by EAS instrumentation.	Immediately

ACTIONS (continued)

CONDITION	ACTION	COMPLETION TIME
K. One or more Logic Input divisions inoperable. OR One or more Control Logic divisions inoperable.	K.1 Enter applicable Conditions and Required Actions of LCO 3.7.5, "Emergency Feedwater (EFW) System" for division(s) made inoperable by EAS instrumentation.	Immediately
L. One or more Logic Input divisions inoperable. OR One or more Control Logic divisions inoperable.	L.1 Enter applicable Conditions and Required Actions of LCO 3.7.9, "Safety Chilled Water (SCW) System" for division(s) made inoperable by EAS instrumentation.	Immediately

SURVEILLANCE REQUIREMENTS

---------- NOTE ----------
Refer to Table 3.3.10-1 to determine which SRs apply for each Function.

SURVEILLANCE		FREQUENCY
SR 3.3.10.1	Perform CHANNEL CHECK.	31 days
SR 3.3.10.2	Perform SENSOR OPERATIONAL TEST.	24 months
SR 3.3.10.3	Perform CALIBRATION.	24 months
SR 3.3.10.4	Perform EXTENDED SELF TESTS.	24 months
SR 3.3.10.5	Perform ACTUATING DEVICE OPERATIONAL TEST.	24 months

Table 3.3.10-1
EAS Control Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
1.	Annulus Ventilation System				
a.	Accident Filtration Train Heater Control	1,2,3,4	2 divisions	B	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
b.	Accident Train Isolation on Containment Isolation	1,2,3,4	2 divisions	B	SR 3.3.10.2
2.	Component Cooling Water System				
a.	Common Header 1.b & 2.b Automatic Backup Switchover	1,2,3,4	4 divisions	C	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
b.	Emergency Temperature Control	1,2,3,4	4 divisions	C	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
c.	Emergency Leak Detection	1,2,3,4	4 divisions	C	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
d.	Emergency Leak Detection - Switchover Valves Leakage or Failure	1,2,3,4	4 divisions	C	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
e.	Switchover Valves Interlock	1,2,3,4	4 divisions	C	SR 3.3.10.2
f.	RCP Thermal Barrier Containment Isolation Valves Interlock	1,2,3,4	4 divisions	C	SR 3.3.10.2
g.	RCP Thermal Barrier Containment Isolation Valves Opening Interlock	1,2,3,4	4 divisions	C	SR 3.3.10.2
h.	SCWS Condenser Supply Water Flow Control	1,2,3,4	2 divisions	C	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
3.	ESWS Pump Building Ventilation System				
a.	ESWS Pump Rooms Temperature Control	1,2,3,4	4 divisions	D	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
4.	Fuel Building Ventilation System				
a.	EBS Rooms Heater Control	1,2,3,4,5	2 divisions	E	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
b.	EBS Pump Rooms Heat Removal	1,2,3,4,5	2 divisions	E	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
5. Main Control Room Air Conditioning System				
a. CREF Iodine Filtration Train Heater Control	1,2,3,4,5,6,(a)	2 divisions	F	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
b. CREF Heater Control for Outside Inlet Air	1,2,3,4,5,6,(a)	2 divisions	F	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
c. CRACS Pressure Control	1,2,3,4,5,6,(a)	2 divisions	G	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
d. CRACS Cooler Temperature Control	1,2,3,4	4 divisions	G	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
	5,6,(a)	3 divisions	G	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
6. Safeguard Building Controlled Area Ventilation System				
a. SIS / RHRS Pump Rooms Heat Removal	1,2,3,4	4 divisions	H	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
b. CCWS / EFWS Valve Rooms Heat Removal	1,2,3,4	4 divisions	C	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
c. Safeguards Building HVAC Reconfiguration on High Exhaust Activity	1,2,3,4	4 divisions	C	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
d. Safeguards Building HVAC Reconfiguration on Containment Isolation	1,2,3,4	(b)	(b)	(b)
e. Fuel Building Isolation on Containment Isolation	1,2,3,4	(b)	(b)	(b)
7. Safeguard Building Ventilation System Electrical Division				
a. Supply and Recirculation-Exhaust Air Flow Control	1,2,3,4	4 divisions	I	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
b. Supply Fan Safe Shut-Off	1,2,3,4	4 divisions	I	SR 3.3.10.2
c. Recirculation Fan Safe Shut-Off	1,2,3,4	4 divisions	C,K	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
d. Exhaust Fan Safe Shut-Off	1,2,3,4	4 divisions	C,K	SR 3.3.10.2
e. Supply Air Temperature Heater Control	1,2,3,4	4 divisions	I	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
f. Supply Air Temperature Control for Supply Air Cooling	1,2,3,4	4 divisions	I	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
g. Battery Room Heater Control	1,2,3,4	4 divisions	J	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
h. Battery Room Supply Air Temperature Control	1,2,3,4	4 divisions	J	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
i. EFWS Pump Room Heat Removal	1,2,3,4	4 divisions	K	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
j. CCWS Pump Room Heat Removal	1,2,3,4	4 divisions	C	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
8. Safety Chilled Water System				
a. SCWS Train Switchover on Low Evaporator Flow / Chiller Blackbox Internal Fault / SCWS Chiller Evaporator Water Flow Control / LOOP Re-Start Failure Interlock	1,2,3,4	4 divisions	L	SR 3.3.10.1 SR 3.3.10.2 SR 3.3.10.3
9. Safety Injection / Residual Heat Removal System				
a. RHR Suction Valve Interlock	1,2,3,4	4 divisions	H	SR 3.3.10.2
10. Control Logic	1,2,3,4	4 divisions	B,C,D,E,F,G, H,I,J,K,L	SR 3.3.10.4 SR 3.3.10.5
	5,6,(a)	3 divisions	G	SR 3.3.10.4 SR 3.3.10.5

(a) During movement of irradiated fuel assemblies.

3.3 INSTRUMENTATION

3.3.11 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.11 The PAM instrumentation for each Function in Table 3.3.11-1 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 Function with one channel inoperable.	A.1 Restore 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 5.6.5.	Immediately
C. One Function with two 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 Enter the applicable Condition referenced in Table 3.3.11-1 for the channel.	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. As required by Required Action D.1 and referenced in Table 3.3.11-1.	E.1 Be in MODE 3. AND E.2 Be in MODE 4.	6 hours 12 hours
---- REVIEWER'S NOTE ---- This Condition applies to plants that have developed a pre-planned alternate method of monitoring the normal Function when one or more Functions have less than the minimum required channels OPERABLE. ---------- [F. As required by Required Action D.1 and referenced in Table 3.3.11-1.	F.1 Initiate action in accordance with Specification 5.6.5.	Immediately]

SURVEILLANCE REQUIREMENTS

---------- NOTE ----------
These SRs applies to each PAM instrumentation Function.

	SURVEILLANCE	FREQUENCY
SR 3.3.11.1	Perform CHANNEL CHECK for each instrumentation channel that is normally energized.	31 days
SR 3.3.11.2	---------- NOTE ---------- Neutron detectors are excluded from CALIBRATION. --- Perform CALIBRATION.	24 months

Table 3.3.11-1
Post Accident Monitoring Instrumentation

	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION D.1
1.	Cold Leg Temperature (Wide Range)	2	E
2.	Containment Isolation Valve Position Indication	2 per penetration flow path[(a)(b)]	E, [F]
3.	Containment Service Compartment Pressure (Wide Range)	2	E
4.	Core Outlet Thermocouples (Wide Range)	2 per quadrant[(c)]	E, [F]
5.	EFW Flow to SG	2 per train	E, [F]
6.	Hot Leg Pressure (Wide Range)	2	E
7.	Hot Leg Temperature (Wide Range)	2	E
8.	Intermediate Range Detector Flux	2	E
9.	Low Head Safety Injection Flow (Wide Range)	2 per train	E, [F]
10.	Medium Head Safety Injection Flow (Wide Range)	2 per train	E, [F]
11.	Pressurizer Level (Narrow Range)	2	E
12.	Radiation Monitor - Annulus Ventilation System Gamma Activity	2	E, [F]
13.	Radiation Monitor - Containment High Range	2	E
14.	Radiation Monitor - Main Steam Line	2 per line	E, [F]
15.	Steam Generator Level (Wide Range)	2 per SG	E
16.	Steam Generator Pressure	2 per SG	E
17.	Source Range Detector Flux	2	E, [F]
18.	Subcooling Margin	2	E, [F]
[19.	Site-specific variables		]

(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) CHANNEL consists of three Core Outlet Thermocouples (Wide Range).

3.3 INSTRUMENTATION

3.3.12 Remote Shutdown Station (RSS)

LCO 3.3.12 The RSS shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

---------- NOTE ----------
Separate Condition entry is allowed for each Main Control Room (MCR)-RSS Transfer Switch or Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more MCR-RSS Transfer Switches inoperable.	A.1 Restore to OPERABLE status.	30 days
B. One or more Functions referenced in Table 3.3.12-1 inoperable.	B.1 Restore to OPERABLE status.	30 days
C. RSS Process Information and Control System (PICS) inoperable.	C.1 Restore to OPERABLE status.	30 days
D. Required Action and associated Completion Time of Condition A, B, or C not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 4.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.12.1	Perform ACTUATING DEVICE OPERATIONAL TEST on MCR-RSS Transfer Switches.	24 months
SR 3.3.12.2	Perform ACTUATING DEVICE OPERATIONAL TEST on RSS Safety Information and Control System (SICS) manual actuation switches.	24 months
SR 3.3.12.3	Verify that the RSS communicates controls and indications with each division of PICS.	24 months

Table 3.3.12-1
RSS SICS Manual Actuation Switches

	FUNCTION	NUMBER OF SWITCHES
1.	Reactor Trip	4
2.	Emergency Feedwater System (EFWS) Actuation Reset	4
3.	EFWS Isolation Reset	4
4.	Main Steam Relief Isolation Valve Opening Reset	4
5.	Main Steam Relief Train Isolation Reset	4
6.	Safety Injection System Actuation Reset	4
7.	Steam Generator Isolation Reset	4
8.	P12 Validation	4
9.	P14 Validation	4
10.	P14 Inhibition	4
11.	P15 Validation	4
12.	P17 Validation	4

3.3 INSTRUMENTATION

3.3.13 Diverse Actuation Instrumentation

LCO 3.3.13 The Diverse Actuation instrumentation for each Function specified in Table 3.3.13-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.13-1.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more divisions inoperable.	A.1 Enter the applicable Condition referenced in Table 3.3.13-1.	Immediately
B. One Logic Input division inoperable. OR One Diverse Logic division inoperable.		
B.1 Restore division to OPERABLE status.		30 days
C. Two Logic Input divisions inoperable. OR Two Diverse Logic divisions inoperable.		
C.1 Restore one division to OPERABLE status.		72 hours
D. One or more Manual Component Switch divisions inoperable.	D.1 Restore Manual Component Switch division(s) to OPERABLE status.	30 days

E. Three or more Logic Input divisions inoperable. OR Three or more Diverse Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B or C not met.	E.1 Be in MODE 1 with D3 inhibited. [The D3 permissive is automatically inhibited below 70% RTP; inhibition of the D3 permissive automatically disables Function 1.b, Reactor Trip on Low-Low RCS Flow Rate in One Loop.]	2 hours
F. Three or more Logic Input divisions inoperable. OR Three or more Diverse Logic divisions inoperable. OR Required Action and associated Completion Time of Condition B, C or D not met.	F.1 Be in MODE 1 with D2 inhibited. [The D2 permissive can be manually inhibited when the reactor power level is below 10% RTP; inhibition of the D2 permissive automatically disables all of the DAS functions except the Reactor Trip on Low-low RCS Flow in One Loop.]	6 hours

SURVEILLANCE REQUIREMENTS

---------- NOTE ----------
Refer to Table 3.3.13-1 to determine which SRs apply for each Function.

	SURVEILLANCE	FREQUENCY
SR 3.3.13.1	Perform CALIBRATION.	24 months
SR 3.3.13.2	Perform SENSOR OPERATIONAL TEST.	24 months
SR 3.3.13.3	Perform ACTUATION LOGIC TEST.	24 months
SR 3.3.13.4	Perform ACTUATING DEVICE OPERATIONAL TEST.	24 months
SR 3.3.13.5	---------- NOTE ---------- Neutron detectors are excluded from RESPONSE TIME testing. --- Verify RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

Table 3.3.13-1
Diverse Actuation Functions

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
1.	Reactor Trip				
a.	High Neutron Flux (Power Range)	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 CALIBRATION SR 3.3.13.2 SENSOR OPERATIONAL TEST SR 3.3.13.5 RESPONSE TIME
b.	Low-Low Reactor Coolant System (RCS) Flow Rate in One Loop	1[(b)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
c.	Low RCS Flow Rate in Two Loops	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
d.	High Pressurizer Pressure	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
e.	Low Hot Leg Pressure	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
f.	Low Steam Generator (SG)Pressure	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
g.	Low SG Level	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
h.	High SG Level	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
i.	Manual	1[(a)]	4 divisions	B,C,F	SR 3.3.13.4
j.	Reactor Trip Breakers Shunt Trip Coils	1[(a)]	4 divisions	B,C,F	SR 3.3.13.4 SR 3.3.13.5
2.	Turbine Trip				
a.	Reactor Trip Initiation	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
3.	Safety Injection System Actuation				
a.	Low Pressurizer Pressure	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
b.	Manual	1[(a)]	4 divisions	B,C,F	SR 3.3.13.4

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
4.	Feedwater Isolation				
	a. Full Load Isolation on High SG Level (Affected SG)	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
	b. SSS Isolation on Low SG Pressure (Affected SG)	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
5.	Emergency Feedwater System (EFWS) Actuation				
	a. Low SG Level (Affected SG)	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
	b. Manual	1[(a)]	4 divisions	B,C,F	SR 3.3.13.4
6.	Main Steam Isolation				
	a. Low SG Pressure	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
7.	Containment Isolation (Stage 1)				
	a. High Containment Radiation	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
	b. Manual	1[(a)]	4 divisions	B,C,F	SR 3.3.13.4
8.	Hydrogen Mixing Dampers Opening				
	a. High Containment Pressure	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
	b. High Containment Compartments Delta Pressure	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
	c. Manual	1[(a)]	4 divisions	B,C,F	SR 3.3.13.4
9.	Station Blackout (SBO) Diesel Actuation				
	a. Loss of Voltage	1[(a)]	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2 SR 3.3.13.5
10.	Permissives				
	a. D2 - Power Range Flux Measurement Higher than First Setpoint > 10% RTP	1	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2
	b. D3 - Power Range Flux Measurement Higher than Second Setpoint > 70% RTP	1	4 divisions	B,C,F	SR 3.3.13.1 SR 3.3.13.2
11.	Diverse Logic	1[(a)]	4 divisions	B,C,E,F	SR 3.3.13.3 SR 3.3.13.5

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED NUMBER	CONDITIONS	SURVEILLANCE REQUIREMENTS
12.	Manual Component Switches				
a.	Manual actuation of Extra Borating System	1[(a)]	2 divisions	D,F	SR 3.3.13.4
b.	Manual control of Medium Head Safety Injection	1[(a)]	4 divisions	D,F	SR 3.3.13.4
c.	Manual Main Control Room HVAC Reconfiguration	1[(a)]	2 divisions	D,F	SR 3.3.13.4
d.	Manual Chemical Volume Control System Isolation	1[(a)]	2 divisions	D,F	SR 3.3.13.4
e.	Manual Depressurize Reactor Coolant System with Pressurizer Sprays	1[(a)]	2 divisions	D,F	SR 3.3.13.4
f.	Manual Diesel Generator Loading (Emergency Diesel Generators (EDGs) or SBOs)	1[(a)]	4 divisions	D,F	SR 3.3.13.4
g.	Manual EDG Start	1[(a)]	4 divisions	D,F	SR 3.3.13.4
h.	Manual Feedwater Isolation (Main Feedwater ~~Water~~ and Emergency Feedwater ~~Water~~)	1[(a)]	4 divisions	D,F	SR 3.3.13.4
i.	Manual Main Steam Isolation Valve Closure	1[(a)]	4 divisions	D,F	SR 3.3.13.4
j.	Manual Main Steam Relief Train Control	1[(a)]	4 divisions	D,F	SR 3.3.13.4
k.	Manual Operation of EFWS for SG Level Control	1[(a)]	4 divisions	D,F	SR 3.3.13.4
l.	Manual Safety Injection Switchover to RCS Hot Leg Injection	1[(a)]	4 divisions	D,F	SR 3.3.13.4
m.	Manually Extend Partial Cooldown	1[(a)]	4 divisions	D,F	SR 3.3.13.4

(a) With D2 permissive validated. > 10% RTP

(b) With D3 permissive validated. > 70% RTP

3.3 Instrumentation

3.3.14 Self-Powered Neutron Detectors (SPNDs)

LCO 3.3.14 Seventy-two SPNDs shall be OPERABLE.

APPLICABILITY: MODE 1 with THERMAL POWER ≥ 10% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One, two, three, four, or five SPNDs inoperable.	A.1 Verify that penalty corresponding to inoperable SPND(s) described in COLR is implemented in LCO 3.3.1, "Reactor Trip Instrumentation" for Functions 1, 2, 3, 4, 5, and 6.	6 hours
B. Six or more SPNDs inoperable. OR Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 1 with P2 inhibited.	4 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.3.14.1	---------- NOTE ---------- Not required to be performed until 12 hours after THERMAL POWER ≥ 20% RTP. ----------	
	Perform CALIBRATION in accordance with Setpoint Control Program.	15 effective full power days

Note that SR 3.3.14.1 replaces the previously listed SRs 3.3.14.1, 2, and 3. AREVA needs to explain this change in the context of audit items 36(48) and 37(46).
SR 3.3.14.1 most closely matches previous

SR 3.3.14.1: "Perform a three dimensional power distribution measurement (flux map) using the incore measurement systems" | 15 EFPD
together with previous

SR 3.3.14.2: "Perform CALIBRATION of the addressable Reactor Trip Instrumentation constants for functions listed in Table 3.3.1-1 for monitoring the following parameters using the flux map.
1. LPD
2. DNB
3. Axial Offset
4. Azimuthal Power Imbalance" | 15 EFPD

Item # (Revised Item #)	**NRC Issue/Comment** [regarding audit version of TS Subsections 3.3.1 through 3.3.14]	**Path Forward** [(Task responsibility if other than AREVA)]	**Audit Report Summary: Closure Tasks** (Task responsibility if other than BPTS staff)
1 (34)[1]	[Generic TS 3.3.9, "ESF Control Instrumentation"] – Discussion on Condition Statements: need to segregate [Conditions for] Auto and Manual [SAS ESF] Functions and [ACTION] Conditions for EFWS and MSRCV [SAS ESF Functions] in Table 3.3.9-1. – Conditions and Required Actions [for ACTIONS] B, C and D should reflect more than one logic [input] division inoperable [i.e., "B. One **or more** required Logic Input division**s** in the same Function inoperable." "C. One **or more** required Logic Input division**s** in the same Function inoperable." "D. One **or more** required Manual division**s** inoperable. OR One **or more** required Control Logic division**s** inoperable."] – Restoration Actions and Completion Times (72 hours) are not needed. – [Required Action] Notes should state 'Only applicable to 'the appropriate Functions; include reference to LCOs.	**Agreed**- • Revised Table 3.3.9-1 to segregate [Conditions for] Auto and Manual [SAS ESF] Functions and [ACTION] Conditions for EFWS and MSRCV [SAS ESF Functions]. • Revised Conditions and Required Actions B, C and D to reflect more than one [input] logic division inoperable, point to revised Functions and [•]delete [unnecessary] restoration Actions and Completion Times (72 hours). • Revised Note to state 'Only applicable to' and point to the appropriate functions.	Verify DCD generic TS 3.3.9 and bases, as revised, are acceptable. Specifically review: A. LCO/Function List and Table 3.3.9-1. Note that function numbering may have changed. B. Applicabilities C. ACTIONS. Note that Condition numbering may be changed. D. SRs E. Bases

[1] On March 26, 2013, AREVA provided a revised version of the table which had reordered and renumbered the items as follows: General Items, 3.3.1 Items, 3.3.2 Items, 3.3.3 Items, 3.3.4 Items, 3.3.5 Items, 3.3.6 Items, 3.3.7 Items, 3.3.8 Items, 3.3.9 Items, 3.3.10 Items, 3.3.11 Items, 3.3.12 Items, 3.3.13 Items, and 3.3.14 Items. For each audit action item, the revised number is given in parentheses below the audit number.

Item # (Revised Item #)	**NRC Issue/Comment** [regarding audit version of TS Subsections 3.3.1 through 3.3.14]	**Path Forward** [(Task responsibility if other than AREVA)]	**Audit Report Summary: Closure Tasks** (Task responsibility if other than BPTS staff)
2 (38)	[Generic TS 3.3.10, "Essential Auxiliary Support (EAS) Control Instrumentation"] Discussion on LCO 3.3.10, Required Actions; need to correct LCO references from 3.7.22 to 3.5.5; need to add 'One or more required Control Logic divisions' to Condition statements and delete Required Actions stating 'Initiate action to restore…' and Completion Times.	**Agreed-** • Corrected LCO references from 3.7.22 to 3.5.5 throughout Required Actions • Added 'One or more required Control Logic divisions' to Condition statements • Deleted Required Actions stating 'Initiate action to restore…' and Completion Times.	Verify that LCO 3.3.10 ACTIONS • reference LCO 3.5.5; • Conditions include 'One or more required Control Logic divisions inoperable'; and • Include no unnecessary restoration actions.
3 (37)	[Generic TS 3.3.10, "EAS Control Instrumentation"] Discussion on Table 3.3.10-1: need to revise Function 10 Required Actions column to reflect revised Required Actions. Need to split Function 4 into two parts. Need to add '& 2.b' to Function 2.a.	**Agreed-** • Revised Function 10 Required Actions column to reflect revised Required Actions. • Move Function 4.c and make it 6.e • Added '& 2.b' to Function 2.a.	Verify Table 3.3.10-1 specifies: • correct Conditions for Fn 10; • Fn 6.e • Includes Fn 2.b to reference for Fn 2.a
4 (9)	[general] Make standard approach: **Change all Condition A statements** to read 'One or more Functions with one or more required divisions inoperable'.	**Agreed –** Changed all Condition A statements to read 'One or more Functions with one or more required divisions inoperable'.	Verify that all Section 3.3 ACTIONS Condition A statements say "One or more Functions with one or more required divisions inoperable."
5 (26)	[Generic TS LCO 3.3.4, "Containment Isolation Instrumentation"] Incorrect Conditions in Table 3.3.4-1, Manual 2.b	**Agreed** - Changed Manual 2.b Condition to D,E	Verify Table 3.3.4-1 specifies correct Conditions for Fn 2.b.
6 (27)	[generic TS 3.3.5, "CVCS Isolation Instrumentation"] Editorial Comment - Table 3.3.5-1 need to remove footnote x	**Agreed –** Deleted Footnote x.	Verify Table 3.3.5-1 omits Footnote x.
7 (28)	[generic TS 3.3.5, "CVCS Isolation Instrumentation"] Incorrect reference to LCO 3.6.3 in LCO 3.3.5 Action F.1.2 and G.1.2; we do not lose Containment Isolation	**Agreed** - Deleted LCO 3.6.3 from Action F.1.2 and G.1.2; we do not lose Containment Isolation.	Verify LCO 3.3.5 ACTIONS F and G are revised to omit reference to LCO 3.6.3. Verify appropriate Conditions are specified for each function listed in table 3.3.5-1.

Item # (Revised Item #)	**NRC Issue/Comment** [regarding audit version of TS Subsections 3.3.1 through 3.3.14]	**Path Forward** [(Task responsibility if other than AREVA)]	**Audit Report Summary: Closure Tasks** (Task responsibility if other than BPTS staff)
8 (11)	[general] Questions about LCOs and SRs for safety-related manual switches; especially for ESF functions with auto actuation • System level- goes thru Actuation Logic (ALU)- SICS • Component level- straight to PACS- SICS	**Agreed** - No change per discussion with NRC.	Determine which actuated components have both system-level and component level manual switch functions specified by the associated instrumentation LCO. Verify the rationale for not specifying either or both of these in the LCO for otherwise specified functions.
9 (24)	[Generic TS LCO 3.3.4, "Containment Isolation Instrumentation"] Need to change Table 3.3.4-1, Manual Function, Required Number from 4 to 2 divisions per penetration.	**Agreed -** No Change to LCO. Clarify in Bases how the Actuation logic aligns with the mechanical system design.	Verify bases for Specification 3.3.4 explains how the Actuation logic aligns with the mechanical system design for any containment penetration flow path design configuration; i.e., one or two CIVs, closed or open system.
10 (54)	[GTS 3.3.2, "ESFAS Instrumentation," and 3.3.13, "Diverse Actuation Instrumentation"] Prioritization of ESFAS auto (manual) actuation and DAS auto (manual) actuation	**Agreed** - No change to TS. I&C to discuss with NRC- deferred to I&C Ch 7 Audit	ICE1 & BPTS: Review prioritization of ESFAS signals and DAS signals as performed by PACS during DCD Ch 7 review.
11 (10)	[General] Need discussion on set/reset memory block and how to be tested	**Agreed** - No change to TS. I&C to discuss with NRC; 1/30: I&C provided discussion. I&C will revise FSAR/10315. RAI 505, Q 07.01-44.	ICE1: Review FSAR/10315. RAI 505, Q 07.01-44 during DCD Ch 7 review. BPTS: Review permissives developed from sensor inputs that go out of range while the unit is within the Applicability of the instrument functions they enable, and which use a set/reset memory block to maintain the enabling signal.

Item # (Revised Item #)	**NRC Issue/Comment** [regarding audit version of TS Subsections 3.3.1 through 3.3.14]	**Path Forward** [(Task responsibility if other than AREVA)]	**Audit Report Summary: Closure Tasks** (Task responsibility if other than BPTS staff)
12 (43)	[Generic TS 3.3.13, "Diverse Actuation Instrumentation (DAS)"] Is ATWS adequately covered in the DAS TS?	**Agreed** - No change to TS. I&C/Safety Analysis discussed D3 Report with NRC how ATWS is handled within DAS. See Item # 16-45.	Review how ATWS is addressed by AREVA in the EPR DCD and generic TS instrumentation specifications. Also, review audit action item 44 (45).
13 (2)	[General] Discussion during LCO 3.3.5 on whether Shutdown Modes & Operating Modes be split out?	**Agreed** - No change.	No followup needed.
14 (6)	[General] Discussion on Voting Logic regarding loss of sensor and loss of ALU as it relates to Functions	**Agreed** - No change.	No followup needed.
15 (1)	[General] Discussion during LCO 3.3.5 on combining condition statements/actions	**Agreed** - No change.	No followup needed.
16 (32)	[Generic TS 3.3.8, "Emergency Diesel Generator (EDG) Actuation Instrumentation"] Need discussion on divisional pair needs to be more explicit.	**Agreed** - No change. Discussed one/two diesels out in different divisions (3.8.1/3.8.2).	Verify bases for Specifications 3.8.1 and 3.8.2 clearly describe EDG DCS actuation logic design and its implications on ACTIONS.
17 (12)	[General] *Will eventually need to put "This Page Intentionally Blank" in TS*	**Agreed** - No change. No resolution needed.	No followup needed.
18 (31)	[Generic TS 3.3.8, "EDG) Actuation Instrumentation"] Discussion of EDG start, what is involved? Start signal, load on bus, or what?	**Agreed** - No change. T4, response time includes all time from start of required safety function to function being met.	No followup needed.

Item # (Revised Item #)	**NRC Issue/Comment** [regarding audit version of TS Subsections 3.3.1 through 3.3.14]	**Path Forward** [(Task responsibility if other than AREVA)]	**Audit Report Summary: Closure Tasks** (Task responsibility if other than BPTS staff)
19 (14)	[Generic TS 3.3.1, "RT Instrumentation"] Clarify ADOT SR for RT on SIS Actuation [Function 24] (clean up in Bases also)	**Agreed** - Revised footnote [k] per NRC discussion. [Note that Functions 24 and 25 of the Audit Copy of Table 3.3.1-1 are renumbered 25 and 26 in Table 3.3.1-1 of the Review Copy.] **Agreed** - Revised footnote [k] per NRC discussion.	1. Verify which SIS Actuation Input & Acquisition Logic functions support LCO 3.3.1 Fn 25, RT on SIS Actuation – Automatic. Verify that Applicabilities are consistent. 2. Review Input & Acquisition Logic function of LCO 3.3.2 Fn 2.a, EFWS Actuation on Low-Low SG Level (Affected SG) and its support for LCO 3.3.1 Fn 26, RT on EFWS Actuation – Low-Low SG Level. Verify that Applicabilities are consistent. 3. Verify that LCO 3.3.2 default ACTIONS result in exiting Applicability of both ESF fns and supported RT Fns 25 and 26. 4. Discuss with AREVA whether RT is initiated by Function 3.3.2.2.b, EFWS Actuation – Manual. 5. Verify which SRs govern testing of the **RT Actuation Logic** of Fns 3.3.1.25 and 3.3.1.26: • SRs 3.3.1.8 and 3.3.1.9 for Fn 3.3.1.30; or • SRs 3.3.2.4 and 3.3.2.5 for Fn 3.3.2.20.

Item # (Revised Item #)	**NRC Issue/Comment** [regarding audit version of TS Subsections 3.3.1 through 3.3.14]	**Path Forward** [(Task responsibility if other than AREVA)]	**Audit Report Summary: Closure Tasks** (Task responsibility if other than BPTS staff)
20 (19)	[Generic TS 3.3.2, "ESFAS Instrumentation"] Discussion on Function 6 (Main Steam Relief Isolation Valve Opening); need to reduce power to <50% in order to meet requirements in LCO 3.7.4 for overpressure protection.	**Agreed-** Added additional action in Condition U to reduce power to < 50% in 4 hours.	Verify that review version of LCO 3.3.2 ACTION U has such a Required Action. Also check default actions for: Fn 6.a w/Conditions are B,D,U; Fn 6.c w/Conditions are F,H,U; Fn 5.c w/Conditions are F,H,U; Fn 9.b w/Conditions are B,D,U; Fn 18 w/Conditions are F,H,V. Fns 8.d, 14.c, 16.a, 19.a w/Conditions F,H,R.
21 (17)	[Generic TS 3.3.1, "RT Instrumentation"] Discussion on RT Contactors and Sets regarding entry multiple times.	**Agreed-** Added Note for Separate Entry allowed for each RT Contactor Set to Condition F and changed 'a' to 'any' in Condition G. (Bases discussion?)	Verify DCD generic TS 3.3.1 and Bases, as revised, are acceptable. Specifically review ACTIONS & Bases for Fns 28 & 29; note that Condition numbering may be changed.
22 (7)	[General] Discussion on Voting Logic- What does Verify mean? How does this apply to 'other' divisions?	**Agreed-** Changed Action statements throughout to read "Verify Actuation Logic voting is modified."	Verify DCD generic TS Section 3.3 applicable Required Actions are revised as stated.
23 (16)	[Generic TS 3.3.1, "RT Instrumentation"] Discussion on Condition Q; completion times should be reversed (low to high).	**Agreed-** changed Completion times to reflect low to high.	Verify DCD generic TS 3.3.1 and Bases are revised as stated. Specifically review ACTIONS & Bases for Fns 7, 13, 14, 19, 23, 24, and 26; and Fns 1, 2, 3, 4, 5, 6, 10, 12, and 15. Note that Condition numbering may be changed.

Item # (Revised Item #)	**NRC Issue/Comment** [regarding audit version of TS Subsections 3.3.1 through 3.3.14]	**Path Forward** [(Task responsibility if other than AREVA)]	**Audit Report Summary: Closure Tasks** (Task responsibility if other than BPTS staff)
24 (15)	[Generic TS 3.3.1, "RT Instrumentation"] Discussion on Condition L; Mode 3 is incorrect. -(QA 3.3.3?)	**Agreed-** changed to Mode 1 and changed completion time to 2 hours.	Verify DCD generic TS 3.3.1 and Bases are revised as stated. Specifically review ACTIONS & Bases for Fn 11, "RCS Flow Rate Low-Low in One Loop." Note that Condition numbering may be changed.
25 (40)	[Generic TS 3.3.10, "Essential Auxiliary Support (EAS) Control Instrumentation"] Discussion on Required Actions; Incorrect LCO references for 3.7.22.	**Agreed**- corrected LCO references from 3.7.22 to 3.5.5 to reflect EBS system.	Verify DCD generic TS 3.3.10 and Bases are revised as stated. Specifically review ACTIONS & Bases . . .
26 (5)	[general] Discussion on use of 'required' in Condition and Action statements.	**Agreed-** Deleted 'required' since all 4 divisions are required. GLOBAL change to be made throughout where applicable.	Verify no unnecessary instances of "required" in ACTIONS.
27 (4)	[general] [Generic TS 3.3.3, "Permissive Instrumentation"] Discussion on Permissives Action X - Notes for 'Required Action' formatting issues: • Action number should be listed with Note indented beside it. • Need to add <u>only</u> to Note before applicable.	**Agreed-** For single Notes- align with Required Action. These will be corrected throughout TS.	Verify correct format and language for required action notes.
28 (52)	[general] [DCD Tier 2 Chapter 7] Discussion on how Memory Set/Reset logic works and how it is tested	**Agreed-** I&C provided explanation. Refined explanation [is] needed in Chapter 7. Bases need to discuss memory set/reset block in conjunction with latching (discussion of Pzr [Pressurizer] Pressure).	BPTS: Verify bases describes latching and how memory set and reset logic block works. ICE1: Verify Ch 7 describes testing

Item # (Revised Item #)	**NRC Issue/Comment** [regarding audit version of TS Subsections 3.3.1 through 3.3.14]	**Path Forward** [(Task responsibility if other than AREVA)]	**Audit Report Summary: Closure Tasks** (Task responsibility if other than BPTS staff)
29 (51)	[general] [DCD Tier 2 Chapter 7] Discussion on ADOT SRs. Concern is whether or not the testing identified in ANP-10315 is adequate;	**Agreed-** I&C provided testing methodology; this is related to Chapter 7 and RAI 110; outcome will feed into TS when Agreed and, if required, TS will be updated.	ICE1: Verify Ch 7 describes ADOT and determine if testing is adequate. BPTS: Verify adequacy of bases changes if such changes are needed.
30 (42)	[Generic TS LCO 3.3.13, "Diverse Actuation Instrumentation"] Discussion on LCO 3.3.13 Condition statements; need to add 'One required Logic Input division inoperable' and revise Required Action.	**Agreed-** need to add 'One required Logic Input division inoperable' and revise Required Action.	Verify 3.3.13 ACTIONS and Table 3.3.13-1 are acceptable. Verify Bases are acceptable.
31 (50)	[Generic TS LCO 3.3.14, "Self-Powered Neutron Detectors (SPNDs)"] Discussion on Condition A: need to change Completion Time for Required Action A.3 to 6 hours [from 8 hours]. Need to review High Linear Power Density Trip. Need to change Required Actions to delete A.2 and change A.3 to reflect the Functions that are affected in LCO 3.3.1, then renumber to A.2. Need to delete six SPNDs (only up to five).	**Agreed-** need to change Completion Time for Required Action A.3 to 6 hours. Need to review High Linear Power Density Trip. Need to change Required Actions to delete A.2 and change A.3 to reflect the Functions that are affected in LCO 3.3.1, then renumber to A.2. Need to delete six SPNDs (only up to five) in Condition Statement A.	Verify that 3.3.14 ACTION A reflects the agreed to changes and is acceptable.
32 (47)	[Generic TS LCO 3.3.14, "SPNDs"] Discussion on Applicability; need to change Power to [≥] 10% [instead of ≥ 20%].	**Agreed-** need to change Power to [≥] 10%.	Verify that 3.3.14 Applicability reflects the agreed to changes and is acceptable.

Item # (Revised Item #)	**NRC Issue/Comment** [regarding audit version of TS Subsections 3.3.1 through 3.3.14]	**Path Forward** [(Task responsibility if other than AREVA)]	**Audit Report Summary: Closure Tasks** (Task responsibility if other than BPTS staff)
33 (49)	[Generic TS LCO 3.3.14, "SPNDs"] Discussion on Condition B: Need to change Required Action B to be in Mode 1 with THERMAL POWER < 10 % RTP; Need to change power level to Mode 1 with P2 inhibited; Need to change seven to six SPNDs.	**Agreed-** need to change Required Action B to be in Mode 1 with THERMAL POWER < 10 % RTP; Need to change power level to Mode 1 with P2 inhibited; Need to change seven to six SPNDs in Condition Statement B.	Verify that 3.3.14 ACTION B reflect the agreed to changes and is acceptable.
34 (20)	[Generic TS LCO 3.3.2, "ESFAS Instrumentation"] Footnote y is not referenced in Table 3.3.2-1	**Agreed**- Need to delete footnote y in Table 3.3.2-1	Verify that footnote y is removed from Table 3.3.2-1.
35 (36)	[Generic TS LCO 3.3.9, "ESF Control Instrumentation"] Discussion on EFWS Level Control and Pump Flow Protection: Error noted in 51-9060507	**Agreed-** Need to revise 51-9060507 to include [references to] both [FSAR] Figures 7.3-4 [, EFWS SG Level Control and Pump Flow Protection,] and 7.3-12 [, MSRCV Control]	Verify that 51-9060507 is revised as agreed.
36 (48)	[Generic TS LCO 3.3.14, "SPNDs"] Discussion on SR 3.3.14.2: Need to revise SR 3.3.14.2 to delete reference to Table 3.3.1-1 and monitoring.	**Agreed-** Need to revise SR 3.3.14.2 to delete reference to Table 3.3.1-1 and monitoring.	Verify that SR 3.3.14.2 is revised as agreed.
37 (46)	[Generic TS LCO 3.3.14, "SPNDs"] Discussion on SR 3.3.14.3 [Update constants contained in COLR for monitoring the following parameters. 1. LPD; 2. DNB; 3. Axial Offset; 4. Azimuthal Power Imbalance]: Need to revise SR 3.3.14.3 to update constants in the COLR, 'in accordance with Specification 5.5.17.[']	**Agreed-** Need to revise SR 3.3.14.3 to update constants in the COLR, 'in accordance with Specification 5.5.17.[']	Verify that SR 3.3.14.2 is revised as agreed.
38 (25)	[Generic TS LCO 3.3.4, "Containment Isolation Instrumentation"] Discussion on Manual Containment Isolation in Modes 5, [and] 6	**Agreed**- No change, relative to LCO 3.9.7	No followup needed.

Item # (Revised Item #)	**NRC Issue/Comment** [regarding audit version of TS Subsections 3.3.1 through 3.3.14]	**Path Forward** [(Task responsibility if other than AREVA)]	**Audit Report Summary: Closure Tasks** (Task responsibility if other than BPTS staff)
39 (8)	[general] More discussion on what to call Input & Acquisition Logic	**Agreed**- No change [to the term, Input & Acquisition Logic division].	Verify this "Input & Acquisition Logic" terminology is used consistently throughout the generic TS and bases, as well as in generic TS Section 3.3.
40 (22)	[GTS 3.3.3, "Permissive Instrumentation"] Discussion on Permissives: why 3 out of 4 voting logic versus 2 out of 4 voting logic ([Permissive]P7).	**Agreed**- No change. I&C explained; Basis is in Design Rules in Tech Report (ANP-10309).	Verify that 3.3.3 ACTIONS Bases correctly describes how actuation voting logic should be modified when one or more voting inputs are inoperable.
41 (4)	[general] Discussion on how to write NOTES in Required Action column; whether or not to span the NOTE [across the whole column width] or indent [the NOTE after the Required Action's alpha-numeric designator to span just the width of the required action statement.]	**Agreed-** Notes will be revised to be in alignment when only 1 Required Action is applicable, will span when more than one.	Verify proper placement and format of all required action notes in generic TS.
42 (13)	[generic TS 3.3.1, "RT Instrumentation"; and 3.3.3, "Permissive Instrumentation"] Discussion on why 2 hour completion time to be in Mode 1 with P2 inhibited.	**Agreed-** probably too aggressive a time late in core life due to Xenon buildup; therefore, changed [completion time] to 4 hours.	After getting buy-in from SRSB, verify 2-hour completion time for Required Actions 3.3.1 F.1 3.3.1 N.1 3.3.3 E.1 3.3.14 B.1
43 (29)	[generic TS 3.3.6, "RCP Trip Instrumentation"] Footnote a in Table 3.3.6-1 is not applicable (Re-write 3.3.6?)	**Agreed**- Reference footnote a [added] in Table Function 1.b	Verify Table 3.3.6-1 is revised as agreed.

Item # (Revised Item #)	**NRC Issue/Comment** [regarding audit version of TS Subsections 3.3.1 through 3.3.14]	**Path Forward** [(Task responsibility if other than AREVA)]	**Audit Report Summary: Closure Tasks** (Task responsibility if other than BPTS staff)
44 (45)	[generic TS 3.3.13, "Diverse Actuation Instrumentation" Discussion on how ATWS is covered in DAS.	**Agreed-** ~~Reversed~~ [Revised] Conditions E and F [;] Required Actions to reflect correct Modes ([and] power levels [in terms of D2 and D3 being inhibited]).	Verify Specification 3.3.13 Required Actions E.1 and F.1 are revised as agreed.
45 (35)	[generic TS 3.3.2, ESFAS Instrumentation," and 3.3.9, "ESF Control Instrumentation"] Discussion on EFWS Actuation Modes: Table 3.3.9-1 does not show 2 divisions required in Mode 4 [for EFWS pump flow protection – Manual].	**Agreed**- Split Mode in Tables 3.3.2-1 and 3.3.9-1 for Manual that shows only 2 divisions required in Mode 4; also changed Condition statements.	Verify that Tables 3.3.2-1 and 3.3.9-1 specify that manual EFWS actuation Function 2.b and pump flow protection control Function 1.b, respectively, require 2 divisions to be operable in MODE 4 when SGs are relied upon for heat removal. Verify Conditions and required actions are appropriate.
46 (41)	[Generic TS 3.3.10, "Essential Auxiliary Support (EAS) Control Instrumentation"] SAS control shows 4 divisions for MCR air heater; should be 2 divisions	**Agreed**- Revise LCO 3.3.10 [Function 5.b] to reflect [specify] 2 divisions.	Verify that Table 3.3.10-1 Function 5.b, "Main Control Room Air Conditioning System" – "CREF Heater Control for Outside Inlet Air," has 2 divisions specified.
47 (30)	[GTS 3.3.7, "Control Room Emergency Filtration (CREF) Instrumentation"] Provide a list of CREFS actuated equipment, by division, covered in the Actuation Logic, Table ~~3.3.9-1~~ [3.3.7-1] Function 2.	**Agreed-** No change requi[r]ed. [AREVA] provided info[rmation] using [FSAR] Figures 2.6.1-1, 2, [and] 3 to show signals provided by each division to the actuated devices.	Review listed figures (in FSAR or other document?] against Specifications 3.3.7 and 3.7.10, "Control Room Emergency Filtration (CREF)."
48 (39)	[GTS 3.3.10, "EAS Control Instrumentation"] AREVA review CCWS Emergency Temperature Control	**Agreed**- Revise LCO 3.3.10 to add CCWS Emergency Temperature Control	Verify Specification 3.3.10 includes CCWS Emergency Temperature control function.
49 (18)	[GTS 3.3.1, "Reactor Trip Instrumentation"] Discussion on Function 22.b, SG Hi Level; how to exit Condition M.	**Agreed**- Revise LCO ~~3.3.2~~ [3.3.1] to correct end for Function ~~22.b~~ [23].	Verify that renumbered Function 23, SG Level High, has appropriate and acceptable default action requirements to exit Applicability.

Item # (Revised Item #)	**NRC Issue/Comment** [regarding audit version of TS Subsections 3.3.1 through 3.3.14]	**Path Forward** [(Task responsibility if other than AREVA)]	**Audit Report Summary: Closure Tasks** (Task responsibility if other than BPTS staff)
50 (21)	[GTS 3.3.3, "Permissive Instrumentation"] Discussion on Applicable Modes in Table 3.3.3-1 for P16 and P18?	**Agreed**- Revise LCO 3.3.3 to correct Applicable Modes in Table 3.3.3-1 for P16 and P18.	Verify that Table 3.3.3-1 specifies correct Applicability for P16 and P18.
51 (33)	PS actuation or trip setpoint control program as part of Design Certification Application	**Agreed**- Revise LCO 3.3.9 & 3.3.10 to ~~add~~ address shared sensors with PS.	Verify SRs reference SCP?
52 (23)	[Generic TS 3.3.4, "Containment Isolation Instrumentation"] Discussion on why 72 hrs [completion time] for Containment Isolation LCO 3.3.4, Action D?	AREVA to review and revise Table as necessary.[2]	Review 3.3.4 ACTIONS. Verify consistency with LCO 3.6.3 ACTIONS.
53 (44)	[Generic TS 3.3.13, "DAS"] Discussion on DAS Functions: Need to review RAI 484 response and precedence. [RAI Letter 484 (eRAI 5724) Question 16-322]	AREVA to review RAI [letter] 484 response and precedence.	Review response to RAI [letter] 484 Question 16-322 when received.
54 (53)	[Generic TS 3.3.5, "CVCS Isolation Instrumentation"] How is the manual ADM Calculation Switch tested at the APU level? Is this covered by the SOT; do we need SOT revision?	[AREVA] I&C to determine- will cover in Ch[apter] 7 Audit	ICE1 & BPTS: Review during followup audit on I&C.

[2] AREVA's renumbered audit action item table, provided March 26, 2013, indicates "**Agreed**- No change required."