Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37384-2000

November 15, 2002

TVA-SQN-TS-02-01 10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Gentlemen:

In the Matter of) Docket Nos. 50-327
Tennessee Valley Authority) 50-328

SEQUOYAH NUCLEAR PLANT (SQN) - UNITS 1 AND 2 - TECHNICAL SPECIFICATION (TS) CHANGE NO. 02-01 - NOMINAL TRIP SETPOINTS FOR REACTOR PROTECTION SYSTEM (RPS) AND ENGINEERED SAFETY FEATURES (ESF) INSTRUMENTATION AND RELOCATION OF LOSS OF POWER AND RADIATION MONITORING INSTRUMENTATION REQUIREMENTS

In accordance with the provisions of 10 CFR 50.90, TVA is submitting a request for an amendment to SQN's licenses DPR-77 and 79 to change the TSs for Units 1 and 2. The proposed change will revise the trip setpoint column of the RPS and ESF instrumentation tables to utilize a nominal setpoint value and revise the associated Bases discussions. The column will be relabeled "Nominal Trip Setpoint" with the inequalities removed from applicable values. The term "trip setpoint" has been evaluated throughout the TSs and has been revised to "nominal trip setpoint" as necessary and the use of the term "nominal" has been eliminated as appropriate. This change is being requested in response to NRC concerns regarding the use of inequalities for RPS and ESF nominal trip setpoint values. This concern was identified in NRC

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Inspection Report Nos. 50-327 and 50-328/95-26. This change is also consistent with NRC proposed and approved Technical Specification Task Force (TSTF) Item TSTF-355. In addition, revisions are being made to the RPS underfrequency reactor coolant pump (RCP) nominal trip setpoint and allowable value, the RPS undervoltage RCP allowable value, and the ESF containment purge air exhaust monitor radioactivity high allowable value. The loss of power and radiation monitoring instrumentation will be relocated to new limiting conditions for operation sections consistent with the intent of the requirements in the latest version of the standard TSs (NUREG-1431, Revision 2). The relocated requirements for the radiation monitoring instrumentation will also utilize the recommendations of NRC approved TSTF-161 by placing the applicability requirements in the associated table. Included in this relocation is the addition of a maximum value for the 6.9-killovolt shutdown board loss of voltage and degraded voltage sensors to protect against inadvertent actuation of the emergency diesel generators. This revision is consistent with NRC proposed and approved TSTF-365.

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the change is exempt from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). The SQN Plant Operations Review Committee and the SQN Nuclear Safety Review Board have reviewed this proposed change and determined that operation of SQN Units 1 and 2 in accordance with the proposed change will not endanger the health and safety of the public. Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and attachments to the Tennessee State Department of Public Health.

Enclosure 1 to this letter provides the description and evaluation of the proposed change. This includes TVA's determination that the proposed change does not involve a significant hazards consideration, and is exempt from environmental review. Enclosure 2 contains copies of the appropriate TS pages from Units 1 and 2 marked-up to show the proposed change.

There are no new regulatory commitments being made by this submittal. TVA does not have any specific schedule requirements for this request and processing can be pursued as necessary. TVA requests that the revised TS be made effective within 45 days of NRC approval. This letter is being submitted in accordance with NRC Regulatory Issue Summary 2001-05. If you have any questions about this change, please telephone me at (423) 843-7170 or J. D. Smith at (423) 843-6672.

Sincerely,

Pedro Salas
Licensing and Industry Affairs Manager

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 15 day of November, 2002

Enclosures
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ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 and 2
DOCKET NOS. 327 AND 328

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE TS 02-01
DESCRIPTION AND EVALUATION OF THE PROPOSED CHANGE

I. DESCRIPTION OF THE PROPOSED CHANGE

The proposed TS change will rename the Trip Setpoint column of TS Tables 2.2-1 and 3.3-4, remove the inequality signs for the trip setpoint values as appropriate, and revise the inequality representation for the allowable values (Avs) as needed. The new title for the Trip Setpoint column will be Nominal Trip Setpoint. Bases discussions clarify operable conditions for the functions and prescribe conditions where the setpoints may be set more conservatively. This revision also includes the revision of other locations in the TSs that currently use the term "trip setpoint" and need to be changed to "nominal trip setpoint" to be consistent with the table title. The Bases have been revised as necessary to support these changes. The term "nominal" will be removed from the average temperature at rated thermal power (T') definition in Table 2.2-1, Note 1 and from the lift setting requirement in Section 3.4.12 and the associated Figure 3.4-4.

The current trip setpoints will now be represented by a nominal value that will not include an inequality sign. This change does not alter the value of the trip setpoint except as noted below. Avs that are currently represented with a numerical value and a tolerance expressed as a plus or minus, are revised to utilize a representation with inequalities that retains the current limits.

Additional changes are proposed to the TS instrumentation tables that involve the revision of a trip setpoint, two Avs, and a required minimum channels operable. Specifically, the nominal trip setpoint for the reactor coolant pump (RCP) underfrequency reactor trip in TS Table 2.2-1 has been changed from 56.0 Hertz (Hz) to 57.0 Hz. The Avs for the RCP underfrequency and undervoltage function in TS Table 2.2-1 have been revised. The underfrequency value has been changed from greater than or equal to 55.9 Hz to greater than or equal to 56.3 Hz. The undervoltage Av has been changed from greater than or equal to 4739 volts to greater than or equal to 4952 volts. The required minimum channels operable for the auxiliary feedwater (AFW) loss of power start load shed timer in TS Table 3.3-1 has been revised from 2 per shutdown board to 1 per shutdown board. This revision also modifies Action 35 of TS Table 3.3-1 to accommodate this revision to the required channels.

The requirements for the containment ventilation isolation (CVI), loss of power instrumentation, and associated actions in the engineered safety features (ESF) tables have been relocated to new limiting conditions for operation (LCOs) in the instrumentation section of the SQN TSs. In addition, the radiation monitoring instrumentation LCO has been relocated to new LCOs or are already included in other TSs. With these revisions there are four new LCOs that include specifications for CVI instrumentation, auxiliary building gas treatment system (ABGTS) actuation instrumentation, control room emergency ventilation system (CREVS) actuation instrumentation, and loss of power emergency diesel generator (EDG) start instrumentation. New TS Bases sections are provided for each of the new LCOs consistent with the latest standard TSs (NUREG-1431). This revision deletes the current requirements for the reactor coolant system (RCS) leak detection in the radiation monitoring specification based on redundant requirements being located in TS 3.4.6.1. This change will also require a revision to Surveillance Requirement (SR) 4.4.6.1.a to define the frequency of the leakage detection instrumentation tests that previously referred to the radiation monitoring specification.

These relocated specifications utilize revised LCO requirements, actions, and surveillances that are more consistent with NUREG-1431. In addition, TS limiting values for the radiation monitoring instrumentation have been revised from a trip setpoint to an Av representation. The Av for the CVI function has been increased in the proposed revision from the current requirement in the ESF instrumentation section. These values are based on the latest SQN analysis for limiting actuation values for the CVI, ABGTS, and CREVS. The proposed revision includes the necessary changes to the TS index for the relocated specifications.

II. REASON FOR THE PROPOSED CHANGE

This revision of the trip setpoint phrase and column title, the trip setpoint inequality signs, the Av inequality representation, the term "nominal" for limiting values, and the Bases, is being proposed to support a request by NRC that TVA discontinue the use of inequalities for representing nominal trip setpoint values. This request is the result of representing setpoints that are intended to be a nominal value, with margin above and below the value, and implying that they are limits by utilizing inequality signs. This change is similar to TS changes that have been approved for the Vogtle Electric Generating Plant and Millstone Nuclear Power Station, Unit No. 3, and the initial TSs for the Watts Bar Nuclear Plant. In addition, this change is consistent with the NRC approved Technical Specification Task Force (TSTF) Item TSTF-355.

The RCP underfrequency setpoint was revised to support the accuracy of currently installed instrumentation. The underfrequency instrumentation was modified without identifying the need to revise the associated TS requirements. This error has been evaluated in accordance with the SQN Corrective Action Program. The Av was revised in accordance with the setpoint methodology as required for the associated setpoint change. This provides a more appropriate value that supports the safety limit for this function. These changes have been conservatively applied in the plant and are consistent with current TS requirements.

In addition, the Av for the RCP undervoltage function has been revised to incorporate the required method for evaluating this function. The current Av is based on the TVA setpoint methodology. TVA's position is to use the Westinghouse Electric Company setpoint methodology for instrumentation functions that were originally included in the Westinghouse setpoint analysis for SQN. Since this function meets this criteria, TVA is revising the Av to a value consistent with the Westinghouse methodology. TVA evaluated the use of the TVA methodology in accordance with the Corrective Action Program because of procedural requirements that were not met for this protection function. This evaluation identified one other function that did not utilize the appropriate setpoint methodology for a portion of the analysis. The correction of this error did not result in any change to the setpoint or the Av.

The change in minimum channels operable for the AFW loss of power timers is to provide a more appropriate requirement in consideration of the plant design. This timer function supports the actuation of the loss of power start of the AFW pumps. This function is provided by both trains of power and the voltage sensors for each train are arranged in a two-out-of-three logic scheme. Using redundant timers in each train of this function after the detection of low voltage provides a conservative design but is in excess of the required design for mitigation features. Therefore, these timers should not have to meet single failure requirements in the TSs and only one timer is required to satisfy the loss of power start function. The associated action is modified to provide the appropriate wording for this change in required channels.

The current requirements for CVI, ABGTS, CREVS, and EDG loss of power start instrumentation is contained in various sections of the ESF instrumentation and radiation monitoring instrumentation specifications. Many of the requirements in the radiation monitoring specification provide for monitoring but does not adequately address the actuation of accident mitigation functions. The latest version of NUREG-1431 recommends specific LCOs for these functions that are designed to specifically address the mitigation requirements. The proposed revision adds new LCOs and associated Bases similar to the NUREG-1431 recommendations to improve the control of TS required features and provide consistency with the NUREG. The Av revision for the containment purge air exhaust monitor radioactivity high function increases the value for this function currently found in the ESF instrumentation specification. TVA evaluated the accuracy calculations and determined that margin existed such that the Av could be increased without impacting the safety limit. This change is proposed to incorporate available margin into the TSs in accordance with the latest TVA calculations.

The current TS requirement for RCS leakage detection refers to the radiation monitoring LCO for the frequency of surveillance performance. Since this portion of the LCO is proposed for deletion, the frequency for the channel check, channel calibration, and channel functional test is being added to the leak detection SR. This change will ensure the appropriate interval for surveillance performance without the need to refer to other LCOs.

III. SAFETY ANALYSIS

Revision to Nominal Trip Setpoints

The title change to "nominal trip setpoint" and the removal of the inequality signs, along with the associated Bases changes, is not a change in the current application of the TSs. The SQN setpoint methodology considers the values in the trip setpoint column to be a nominal value and the calibration procedures have implemented the requirements in this manner. This is an administrative change that is intended to resolve a concern associated with using an inequality sign with a nominal value. In addition to the setpoint change, the representation of the Avs has been revised to exclusively use inequalities in place of plus and minus allowances. This change also does not change the application of the TSs. The classification of the overtemperature delta temperature T′ parameter and the low temperature overpressure protection power operated relief valve (PORV) lift settings as nominal values is not accurate with the evolution of the nominal setting philosophy utilized for RPS and ESF instrumentation. The T′ and PORV lift setting values are limiting parameters for TS compliance and should not be described as nominal values. The description of these values, as limits with the appropriate inequalities, is the most accurate method for their representation.

Bases discussions provide guidance on the proper use of the nominal trip setpoint representation by indicating conditions that maintain the operability of the function and the acceptability to set functions in the conservative direction. This guidance does not alter the current application of the TSs or the intent of the TSs. Therefore, this change to the nominal trip setpoint representation will not impact plant safety because this revision of the TSs does not change the intent or application of the requirements.

<u>Reactor Coolant Pump Underfrequency Trip Setpoint and Allowable Value Revisions</u>

The setpoint revision for the RCP underfrequency function was required to address the accuracy of replacement instrumentation. TVA failed to identify this revision when the modification was implemented. This failure has been addressed by the TVA Corrective Action Program. TVA Calculation SQN-EEB-MS-TI28-0076, Revision 4, provides the basis for the revised setpoint value. The proposed setpoint was evaluated within the calculation to ensure that erroneous reactor trips resulting from normal frequency fluctuations would not occur and that the lower safety limit of 55.8 Hz would not be impacted. An upper operational limit of 58.5 Hz was chosen primarily because the normal continuous operating frequency is 59.5 to 60.5 Hz.

In accordance with SQN's Westinghouse setpoint methodology, the channel statistical allowance (CSA) for an instrumentation loop is defined by the following equation:

$$CSA = EA + \{(PMA)^2 + (PEA)^2 + (SCA+SMTE+SD)^2 + (SPE)^2 + (STE)^2 + (RCA+RMTE+RCSA+RD)^2 + (RTE)^2\}^{1/2}$$

The error terms for the above equation as defined by SQN's Westinghouse setpoint methodology are; environmental allowance (EA), process measurement accuracy (PMA), primary element accuracy (PEA), sensor calibration accuracy (SCA), sensor measurement and test equipment accuracy (SMTE), sensor drift (SD), sensor pressure effects (SPE), sensor temperature effects (STE), rack calibration accuracy (RCA), rack drift (RD), rack temperature effects (RTE), rack measurement and test equipment accuracy (RMTE), and rack calibration setting accuracy (RCSA).

Since this loop only involves the relay, the above terms are evaluated for applicability. The error terms defined in the equation for the primary element and sensor are not applicable since the relay directly monitors the RCP frequency. As documented within the accuracy calculation, the relay is not subjected to harsh environmental parameters of radiation and temperature from a design basis accident. Therefore, the EA term of the equation is not applicable.

From TVA Calculation SQN-EEB-MS-TI28-0076, Revision 4, the resulting rack effects (RE) portion of the CSA equation for the relay is:

$$RE = \pm\{(RCA+RMTE+RD+RCSA)^2+RTE^2\}^{1/2}$$
$$RE = \pm\{(0.008+(0.05+0.05)+0.553+0.05)^2+0.008^2\}^{1/2}$$
$$RE = \pm 0.711 \text{ Hz}$$

Therefore, the error around the setpoint is 57 ± 0.711 Hz or 57.711 Hz to 56.289 Hz. These results do not impact the lower safety limit of 55.8 Hz nor challenge the normal operational frequency of 59.5 to 60.5 Hz. The results of this calculation provide adequate verification that the installed underfrequency instrumentation will actuate within the required accident analysis assumptions to support accident mitigation. Current TVA procedures conservatively utilize the proposed 57 Hz setpoint requirement to properly maintain the associated safety limit.

The Av for this function has been revised to be compatible with the proposed setpoint. This Av is defined by the Westinghouse methodology as:

$$Av = \text{Setpoint-the lowest of the values } T_1 \text{ or } T_2$$

T_1 and T_2 are referred to as the "trigger values" defined by SQN's Westinghouse setpoint methodology. The T_1 method involves the values used in the statistical calculation as follows:

$$T_1 = (RCA+RMTE+RD+RCSA)$$

T_1 = (0.008+0.1+0.553+0.05) Hz
T_1 = 0.771 Hz

The T_2 method extracts these values from the calculation and compares these numbers statistically against the total allowance as follows:

$T_2 = TA-(\{A+(S)^2\}^{1/2}+EA)$
where;
$A = (PMA)^2+(PEA)^2+(SPE)^2+(STE)^2+(RTE)^2$
$S = (SCA+SMTE+SD)$
TA = Total Allowance = Setpoint-Reactor Trip Safety Limit = 57 Hz-55.8 Hz = 1.2 Hz
Therefore,
$T_2 = TA-\{(PMA)^2+(PEA)^2+(SCA+SMTE+SD)^2+(SPE)^2+(STE)^2 +(RTE)^2\}^{1/2}-EA$

As previously stated, this loop only involves a relay. The error terms defined in the equation for the process error and sensor are not applicable since the relay directly monitors the RCP frequency. The relay is located in an auxiliary building area not subjected to harsh environmental parameters of radiation and temperature from a design basis accident. Therefore, the EA term of the equation is not applicable. This only leaves the RTE term in the equation as follows:

$T_2 = 1.2-\{(0.008)^2\}^{1/2} = 1.192$ Hz

The above value for T_1 was found to be the most restrictive or lowest of the two values and therefore, utilized to determine Av as follows:

Av = Setpoint-T_1
Av = 57 Hz-0.711 Hz
Av = 56.289 Hz or 56.3 Hz conservatively rounded up

The revised Av continues to provide assurance that the safety limit for the underfrequency reactor trip function is not impacted. TVA has verified that past calibrations for this function, with the proposed setpoint, have satisfied the new Av.

Reactor Coolant Pump Undervoltage Allowable Value Revision

During the setpoint evaluation for the underfrequency function, TVA identified an inconsistency in the calculation method used for the RCP undervoltage function. This method utilized a relaxed formula for calculating the Av in accordance with a methodology developed by TVA instead of the Westinghouse methodology. The TVA methodology allows two methods for calculating the Av with the one that was used for this function being less conservative than the Westinghouse method. The Av has been recalculated using the Westinghouse setpoint methodology since the loop was included in the original Westinghouse analysis. TVA's position is to use the Westinghouse methodology for instrumentation of this type. The use of TVA's methodology for this function has been evaluated by the SQN Corrective Action Program.

TVA evaluated the Av for the RCP undervoltage within TVA Calculation SQN-EEB-27DAT that has been revised to resolve this concern. The error terms for this function are defined by SQN's Westinghouse setpoint methodology in the same manner as described for the underfrequency relay. These terms are utilized, along with the setpoint that has not changed, to determine the Av which is defined as:

Av = Setpoint-the lowest of the values T_1 or T_2

T_1 and T_2 values were evaluated as previously described for the underfrequency function. The T_1 determination is as follows:

T_1 = (RCA+RMTE+RD+RCSA)
T_1 = (0.5+0.2+0.2+0.5)% of Setpoint
T_1 = 1.4% of Setpoint or 0.014x5022 volts alternating current (VAC) = 70.3 VAC

The T_2 evaluation resulted in a value of 311.76 volts and is less restrictive than the T_1 value. Therefore, the T_1 value was used to determine the Av as follows:

Av = Setpoint-T_1
Av = 5022-70.3 VAC
Av = 4951.7 VAC or 4952 VAC conservatively rounded up

The setpoint value and associated safety limit are not affected by this change of the Av. SQN's calibration procedures have been evaluated and verified to be in compliance with the proposed Av.

<u>Containment Purge and Exhaust Radiation Monitor Allowable Value Revision</u>

The Av revision for the containment purge air exhaust radioactivity high function is being proposed to properly represent function limits and operability conditions. TVA has been satisfying the more conservative Av that is currently in place. TVA Calculation 1,2-RE-90-130/131, Revision 0, evaluated this function and determined that sufficient margin existed to increase the Av without impacting the safety limit. TVA used a setpoint methodology in this calculation that was developed by TVA for instrumentation that was not included in the original Westinghouse setpoint analysis. The TVA setpoint methodology includes two methods for determining an acceptable Av similar to the T_1 and T_2 evaluations in the SQN's Westinghouse methodology. The TVA calculations representing the two methods are:

Av(max) = Safety Limit - (LAn - LAnf)

Av(min) = Setpoint + LAnf

Where LAnf is defined as the Loop Normal Measurable Accuracy and includes the errors that may be detected during a calibration. These error terms include Drift, Component Accuracy, Calibration Accuracy, and Calibration Uncertainties.

Whereas, the LAn term also incorporates these terms in addition to terms that are not detectable during a calibration such as Process Measurement Errors. TVA's methodology allows the use of either result or a value between the limiting Avs. For the high radiation containment purge function, a value between the limiting Avs was used. TVA has chosen to use an intermediate value based on the past history of the function.

From TVA calculation 1,2-RE-90-130/131, Revision 0, the Containment Purge Air Exhaust Radiation Monitor Safety Limit is:

Safety Limit(LWR Containment Purge) = 1.96×10^6 cpm

Safety Limit(UPR Containment Purge) = 1.58×10^5 cpm

The smaller of the Safety Limits (1.58×10^5 cpm) for the bistable (BS) will be analyzed for conservatism.

$+LAnf_{BS}$ = +0.581 V (+123.2% of reading)

$+LAn_{BS}$ = +0.726 V (+172.6% of reading)

+Av is defined as follows:

+Av = Safety Limit - (LAn_{BS} - $LAnf_{BS}$ + Margin)

Where Margin is defined as 0.182 volts or 25% of LAn_{BS} for conservatism. Converting the Safety Limit to volts:

$$\text{Safety Limit(volts)} = \frac{Log[Input(cpm)] - 1}{\left[\frac{\#of\ Decades}{Voltage\ Span}\right]}$$

$$\text{Safety Limit (volts)} = \frac{Log[1.58 x 10^5] - 1}{\left[\frac{6}{10}\right]}$$

Safety Limit (volts) = 6.998 volts

Therefore;

+Av (volts) = 6.998 - (0.726 - 0.581 + 0.182)
+Av (volts) = 6.671 volts

Converting to counts per minute (cpm);

$$\text{+Av (cpm)} = 10^{\left[\frac{Output(volts)\ X\ \#of\ Decades}{VoltageSpan} + 1\right]}$$

$$\text{+Av (cpm)} = 10^{\left[\frac{6.671\ X\ 6}{10} + 1\right]}$$

+Av (cpm) = 1.00 x 10^5cpm(rounded down for conservatism)

This evaluation verified that the setpoint was acceptable without change. Therefore, implementation of the proposed Av revision will not impact plant safety functions and the actuations associated with the high radiation containment purge function will continue to support accident mitigation assumptions.

Auxiliary Feedwater and Emergency Diesel Generator Loss-of-Power Timers

The minimum channels operable requirement change for the AFW and 6.9-killovolt shutdown board loss of power timers is to provide a more appropriate requirement in consideration of the plant design. These timers function to support the actuation of the loss of power start of the AFW pumps and the EDGs. This function is provided by both trains of shutdown power and the voltage sensors for each train are arranged in a two-out-of-three logic scheme. Using redundant timers in each redundant train of this function, after the detection of low voltage, provides a conservative design but is in excess of the requirements for mitigation features. Therefore, multiple timers in each train should not have to meet single failure requirements in the TSs and only one timer is required to satisfy the loss of power start functions. Single failure criteria is satisfied by having actuation capability from either redundant train in the event of a loss of power condition. The associated action for the AFW and diesel generator start on loss of power is modified to provide the appropriate wording for this change in required channels. While these changes reduce the current redundancy capability, the remaining provisions for the loss of power timers continue to fully satisfy all accident mitigation requirements associated with AFW and EDG starts and maintain single failure requirements. This change is also consistent with NUREG-1431 recommendations because multiple timers are not addressed for either of these functions.

Allowable Value for Fuel Storage Pool Area Radiation Monitors

The revision to utilize an Av column in the new LCOs for CVI, ABGTS, and CREVS does not impact the trip setpoints for these functions or the operability limits. The Av is a better indicator of function operability and TVA's setpoint methodology and plant procedures provide the appropriate setpoints to maintain the instrumentation within this allowance. The Avs utilized were developed with the same methodology as the Av for the containment purge air exhaust radioactivity high function previously discussed. The following Av results were determined using this methodology:

From TVA Calculation 0-RE-90-102/103, Revision 1, the Fuel Storage Pool Area Radiation Monitor Safety Limit is 375.49 mR/hr. Converting the Safety Limit to volts;

$$\text{Safety Limit (volts)} = 2 \times [\log(375.49)+1]$$

$$\text{Safety Limit (volts)} = 7.149 \text{ volts}$$

$$+Av = \text{Safety Limit} - (LAn_{BS} - LAnf_{BS+} + \text{Margin});$$

Where Margin is defined as 0.158 volts or ≅ 25% of LAn_{BS+} for conservatism.

$$+Av = 7.149 - (0.632 - 0.618 + 0.158) \text{ volts}$$

$$+Av = 6.977 \text{ volts}$$

Converting to mR/hr:

$$+Av \text{ (mR/hr)} = 10^{[(6.977 \times 5)/10] - 1}$$

$$+Av \text{ (mR/hr)} = 307 \text{ mR/hr (rounded down for conservatism)}$$

Allowable Value for Control Room Intake Radiation Monitors

From TVA Calculation 0-RE-90-125/126, Revision 0, the Control Room Intake Radiation Monitor Safety Limit for the bistable control function (transfer from normal to emergency mode) is 6.82×10^4 counts per minute (cpm). The loop bistable errors are:

$+LAnf_{BS}$ = +0.581 V (+123.2% of reading)

$+LAn_{BS}$ = +0.726 V (+172.6% of reading)

+Av is defined as follows:

+Av = Safety Limit - (LAn_{BS} - $LAnf_{BS}$ + Margin)

Where margin is defined as 0.182 volts or 25% of $+LAn_{BS}$ for conservatism. Converting the Safety Limit to volts:

$$\text{Safety Limit (volts)} = \frac{Log[Input(cpm)] - 1}{\left[\frac{\#of\ Decades}{Voltage\ Span}\right]}$$

$$\text{Safety Limit (volts)} = \frac{Log[6.82 x 10^4] - 1}{\left[\frac{6}{10}\right]}$$

Safety Limit (volts) = 6.390 volts

Therefore;

+Av (volts) = 6.390 - (0.726 - 0.581 + 0.182)

+Av (volts) = 6.063 V

Converting to cpm;

$$+Av\ (cpm) = 10^{\left[\frac{Output(volts)\ X\ \#of\ Decades}{Voltage\ Span} + 1\right]}$$

$$+Av\ (cpm) = 10^{\left[\frac{6.063\ X\ 6}{10} + 1\right]}$$

+Av (cpm) = 4.34×10^4 (rounded down for conservatism)

The implementation of this change to utilize the Av in place of an alarm/trip setpoint will continue to ensure proper operability settings for these functions and will not impact nuclear safety.

Containment Ventilation Isolation Instrumentation

The modification of the new LCOs to be more consistent with NUREG-1431 revised several aspects of the requirements. For the new LCO 3.3.3.11, "Containment Ventilation Isolation Instrumentation," the applicability requirements have been changed to focus the required modes and conditions to be those in which the function is credited for accident mitigation. Current applicability includes Modes 1, 2, 3, 4, and 6. These requirements are maintained with one exception, the Mode 6 application is being changed to during movement of irradiated fuel in containment. This change is acceptable because the CVI function is only credited in Mode 6 for a fuel handling accident which is only postulated to occur during movement of irradiated fuel. The containment attribute is based on the CVI only protecting against accidents that originate in containment.

The new LCO utilizes a table to describe the applicable functions and has included the safety injection function that is not specifically in the current requirements. This addition clarifies the signals that support the CVI actuation function and retains the current requirements. The LCO table also utilizes a required channels field in place of the previous minimum channels operable and has increased the required channels for the containment purge air and exhaust radiation monitor during movement of irradiated fuel to two channels. This increase in required channels is to ensure the necessary redundancy for the initiation of accident mitigation functions is maintained. This is a conservative, more restrictive change to the current requirements that supports nuclear safety functions. The requirement for one radiation monitoring channel to be operable in Modes 1 through 4 is retained consistent with the current specifications even though they are not credited for actuation in these modes.

The CVI actions have been revised to provide measures that more appropriately address the inoperable conditions. Specifically, in place of the current requirements to be in hot standby within 12 hours and closing containment purge and exhaust valves when in Modes 1 through 4 for inoperable radiation monitors, the proposed actions will require entry into TS 3.6.3 for inoperable containment purge and exhaust isolation valves. If the CVI instrumentation inoperability involves manual initiation or automatic actuation logic functions, the proposed actions will require entry into TS 3.6.3 for inoperable containment ventilation isolation valves. For inoperable functions during fuel movement, the current action to enter TS 3.9.9, if both radiation monitors are inoperable, is revised to require entry in TS 3.9.4 for containment building penetrations consistent with NUREG-1431. The requirements of TS 3.9.4 provide equivalent isolation actions for flow paths that communicate with outside atmospheres and has the same applicability. The action is also expanded to include any of the associated CVI instrumentation and includes a 4-hour interval to enter TS 3.9.4 if only one monitor is inoperable. The revised actions for Modes 1 through 4 are acceptable because they require entry into the CIV specification that addresses the function that has been degraded by the CVI actuation inoperability. The current 12-hour shutdown requirement is not necessary if containment integrity can be satisfied in accordance with the requirements of TS 3.6.3. TS 3.6.3 provides equivalent actions to the closure of the purge and exhaust valves by isolating each affected flow path with at least one device that can not inadvertently open. Therefore, the new requirements are equivalent, more appropriate, or more restrictive to improve the overall assurance that inoperable CVI instrumentation does not adversely impact nuclear safety.

The actions for inoperable instrumentation during fuel movement is the same as currently required with two exceptions. The new actions require entry into TS 3.9.4 if only one radiation monitor is inoperable. Current requirements do not specifically recognize the need to address only one inoperable monitor except to return the setpoint to within limits within four hours or declare the channel inoperable. This exception is not necessary with the addition of the more restrictive action. This new action has a four-hour time limit to enter TS 3.9.4 and is necessary because the radiation monitors provide the only qualified and credited function to initiate a CVI during fuel movement inside containment. This ensures single failure criteria is maintained for accident mitigation and is a more conservative position for nuclear safety.

These new CVI actions include a provision to allow separate entry into the actions for each of the functions listed in the associated LCO table. This change is consistent with NUREG-1431 and does not impact the intent of the provisions to properly maintain the CVI actuation requirements. Additionally, TVA is retaining the current exception to TS 3.0.4 that allows entry into this LCO without having to meet LCO requirements. This provision is not contained in the latest version of NUREG-1431 but is consistent with the current licensing basis for SQN that includes this provision not only for the CVI instrumentation but also for the CIV requirements for Modes 1 through 4 in TS 3.6.3. This exclusion to TS 3.0.4 will not adversely impact nuclear safety. However, the current exception to TS 3.0.3 is eliminated consistent with NUREG-1431 because the exception is not necessary to properly maintain the safety function and does not result in additional burden to plant operation.

The SRs for the new CVI LCO maintain the same channel check, calibration, and functional test requirements with the addition of the need to be in frequency for movement of irradiated fuel. This is a conservative addition to the current requirements. The current response time SRs are maintained consistent with the current licensing basis. This surveillance is more restrictive than the NUREG-1431 recommendations and provides assurance that the system will actuate within the necessary time limits to support the safety function.

<u>Auxiliary Building Gas Treatment System Actuation Instrumentation</u>

The new LCO 3.3.3.12, "Auxiliary Building Gas Treatment System Actuation Instrumentation," has revised LCO requirements that are similar to those proposed for the CVI LCO. The LCO will use a required channels field in place of the minimum channels operable field and the addition of functions for manual initiation and containment isolation Phase A. These changes improve the identification of the functions that support the ABGTS actuation function and is a more conservative representation. The required channel provision for the fuel pool area radiation monitors maintains the current one channel requirement but clarifies that it must be in the same train as the required ABGTS train. This provision is not consistent with NUREG-1431 which requires two channels. The basis for remaining at one channel is that during periods of fuel movement in the fuel pool area, only one train of ABGTS is required to be operable. The associated fuel pool radiation monitors are designed to only actuate ABGTS in the same train. Therefore, only the radiation monitor that is matched to the required ABGTS train is necessary to satisfy the accident mitigation function. Maintaining the current one channel provision with the train specific requirement enhances the LCO to ensure the proper radiation monitor is operable.

The current applicability requirement for the radiation monitors is based on fuel in the storage pool and the proposed revision is to be during movement of irradiated fuel in the fuel handling area. This change is acceptable because the only activity that can result in the postulated fuel handling accident, that this instrumentation protects against, is the movement of irradiated fuel in the storage pool area. The current requirement is overly conservative and is not necessary based on the lack of potential for an event that requires ABGTS actuation without fuel movement. Therefore, the proposed change in applicability is acceptable and does not impact nuclear safety. The applicability for the manual initiation function is added and ensures the availability of manual actuation when the unit is in operation and during movement of irradiated fuel. This is a conservative addition that will enhance the safety function because the manual initiation function was not previously included in any specific TS provision.

The current SQN actions for ABGTS instrumentation only addresses the total loss of both fuel pool radiation monitors. The proposed actions for ABGTS address not only the fuel pool monitors but also the manual actuation and containment Phase A isolation instrumentation in Modes 1 through 4 and during fuel movement. The current actions for loss of all ABGTS instrumentation requires 24-hour surveys of the area with portable instrumentation for an indefinite period of time. This action is of little value in Modes 1 through 4 since a fuel handling event is not possible unless fuel movement is in progress. The proposed actions for Modes 1 through 4 do not require these surveys for the loss of a single function and train but do limit the inoperability to 7 days followed by the shutdown of the unit if an ABGTS train cannot be placed in operation to satisfy single failure considerations. This action is more conservative since the current requirements are not applicable for the loss of a single function and do not address the potential for actuation in the event of containment isolation. For two trains of inoperability, the proposed actions require immediate initiation of one ABGTS train and entry of applicable actions of TS 3.7.8, "Auxiliary Building Gas Treatment System," for one train. Alternatively, both trains of ABGTS can be placed in operation or the unit must be shut down. These actions are more conservative than the current requirement to conduct 24-hour surveys and is a more effective means of ensuring that the ABGTS safety function is available if needed for accident mitigation in Modes 1 through 4.

The proposed action for inoperable ABGTS functions during movement of irradiated fuel is to immediately place a train of ABGTS in operation. This action is for the loss of both trains similar to the current requirement. The immediate initiation of ABGTS provides a better level of protection against the potential fuel handling accident than the current survey provision. Since this action actually satisfies the safety function in place of only providing a means to detect the need to initiate this function, nuclear safety is enhanced and the proposed change is acceptable. The proposed actions retain the exception to TS 3.0.4 and drop the TS 3.0.3 exception like the CVI LCO as well as the separate entry provision for the Modes 1 through 4 actions. These provisions are acceptable based on the previous discussions for similar CVI actions.

The proposed SRs are the same as currently utilized for the radiation monitors and include the addition of a functional test requirement for the manual initiation function. This functional test requirement is to be performed on a refueling outage frequency that is consistent with manual testing requirements in SQN's TSs and NUREG-1431. This addition is conservative and ensures the necessary components of the ABGTS actuation instrumentation are available for the mitigation of postulated accidents. SRs for the containment isolation Phase A function is covered in the ESF specification.

Control Room Emergency Ventilation System Actuation Instrumentation

The new LCO 3.3.3.13, "Control Room Emergency Ventilation System Actuation Instrumentation," retains most of the current requirements for the radiation monitors. As with the previous new LCOs, the LCO requirements are included in a table that utilizes a required channel column and adds the manual initiation and safety injection functions. These additions provide a more conservative representation of the functions that serve to actuate CREVS. The LCO is the same as current requirements for the control room radiation monitors with two channels and the applicability requirements are unchanged.

The actions for the CREVS have been slightly modified to provide consistency with NUREG-1431. The proposed action for one inoperable channel or train in Modes 1 through 4 requires one train of CREVS to be placed in operation within 7 days or initiate unit shutdown. The current LCO requires the train associated with an inoperable radiation monitor be started. This limitation is not required because placing either train in operation accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation. The action for two channels or trains inoperable in Modes 1 through 4 is the same as current requirements but differ from NUREG-1431. The NUREG does not provide the one-hour allowance before taking the required actions. This provision is consistent with the current SQN licensing basis and does not adversely impact safety functions. Action requirements for each of the conditions include a provision to have separate entry into the applicable actions for each function. This is acceptable because there are multiple actuation functions now in place of the previous single function and CREVS actuation capability will continue to be properly maintained. As previously discussed, the exception to TS 3.0.4 is retained consistent with current requirements and the TS 3.0.3 exception is eliminated.

The actions for inoperable CREVS instrumentation in Modes 5 and 6 have been revised for consistency with NUREG-1431. The action for one channel or train inoperable is to place a train of CREVS in service for the same reasons previously discussed for Modes 1 through 4. However, if a train cannot be placed in operation within seven days, the alternative is to initiate action to restore a train to service. This change eliminates the need to initiate a unit shutdown that is not applicable in Modes 5 and 6. This does not negatively impact the safety function and provides a conservative course of action to protect against a waste gas decay tank accident. The action for two channels or trains inoperable maintains the current requirement to delay actions for one hour as discussed for the Modes 1 through 4 action.

The actions that apply during movement of irradiated fuel assemblies have incorporated the same changes that utilize the actuation of either train of CREVS and a one-hour delay for actions that apply with two channels or trains inoperable. The basis for these changes are the same as previously discussed. Additionally, the action for failure to place one train of CREVS in service within seven days for one inoperable channel or train is to suspend movement of irradiated fuel. This action is more appropriate than unit shutdown since the only credible accident that requires actuation of CREVS is a fuel handling accident. Unit shutdown could apply if movement of fuel is concurrent with power operation of one unit, then both sets of actions would apply. In this case, suspension of fuel movement is necessary in addition to the unit shutdown. This change provides a more appropriate response to the loss of actuation functions during fuel movement and eliminates the potential for a postulated accident.

The SRs for CREVS actuation are the same as currently required with the addition of the manual initiation and safety injection functions. This addition ensures that the other means for initiating CREVS are available and capable of performing the required actuation. The surveillance frequencies for the new functions are consistent with current requirements for manual and safety injection functions. The control room radiation monitor surveillance frequency has not been changed by the proposed revision.

Reactor Coolant System Leakage Detection Surveillance Frequency

The current radiation monitoring LCO, that has primarily been relocated to new LCOs, contains surveillance frequency requirements for the RCS leakage detection radiation monitoring instrumentation. These requirements are not applicable to any of the proposed LCOs and are being incorporated into TS 3.4.6.1, "Leakage Detection Instrumentation." The only unique leakage detection requirement contained in the current radiation monitoring section was to provide specific surveillance interval limits for the monitors. The LCO, applicability, action, and surveillance testing requirements are already contained in TS 3.4.6.1. The surveillance frequency portion is not contained in TS 3.4.6.1 and relies on the provisions of TS 3.3.3.1, which is proposed to be deleted. The proposed change will incorporate the frequency requirements into the leakage detection specification without change. This change maintains the exact same requirements and therefore, will not affect any safety function.

Loss of Power Diesel Generator Start Instrumentation

The new LCO 3.3.3.14, "Loss of Power Diesel Generator Start Instrumentation," is the result of requirements moved from the ESF instrumentation specification and TS Tables 3.3-3, 3.3-4, and 4.3-2. The LCO requirements have been incorporated into a table consistent with NUREG-1431 and utilizes information for applicability, required channels, nominal trip setpoint, and Avs. The required channel requirements for the voltage sensors are not changed. The timer requirements are changed from two required channels to one. This is based on the previous discussion regarding the AFW and EDG start actuation functions for these timers. This change is consistent with NUREG-1431 in that the number of timers are not specifically addressed and no implication of timer redundancy is stated. The applicability requirements have not been changed by the proposed revision.

The Avs for the loss of power functions has been enhanced in accordance with NUREG-1431 and TSTF Item 365. NRC proposed and approved a change to the NUREG that would add upper limits to the loss of voltage and degraded voltage limits. TVA has incorporated this provision to provide better control of the voltage sensor settings and ensure the accident mitigation capabilities. This change provides better assurance that unintended actuation of the AFW and EDG start circuitry will not occur. These new limits were developed using TVA setpoint methodology similar to that used in determining the Av for the containment purge air exhaust radioactivity high function previously discussed. The only significant difference for the degraded voltage relay function is that a 25% margin allowance was incorporated into the upper analytical limit (UAL) determination instead of being considered within the allowable value equation resulting in an equivalent level of conservatism. For the loss of voltage relay function, an intermediate value between the maximum and minimum Av was used since sufficient margin did not exist between the relay setpoint and the UAL to allow incorporation of a 25% LAn margin within the calculation of the Av.

From TVA Calculation 27DAT, Revision 5, the degraded voltage relay dropout UAL was determined by using the following equation:

UAL = Setpoint + LAn + Margin

Where the setpoint is 6456 volts, the loop accuracy (LAn) composed of the transformer and relay is 55.77 volts and margin is defined as 25% of LAn for conservatism. Therefore;

UAL = 6456 + 55.77 + 13.94 volts

UAL = 6526 volts (rounded up)

The Av was determined by the TVA setpoint methodology using the following equation:

Av = UAL - (LAn - LAnf)

Where LAnf is defined as the relay normal measurable accuracy of 52.29 volts. The above equation represents a determination of the maximum allowable value since a margin of 25% LAn has already been incorporated within the determination of the above UAL value. Therefore;

Av = 6526 - (55.77 - 52.29) volts

Av = 6522.5 volts

Based on the above, the TS Av for the 6.9-kV shutdown board degraded voltage is 6522.5 volts.

In conjunction with this change, a lower time limit for the degraded voltage time delay has been added. Currently, only a maximum allowable value is utilized and this change will ensure that unintended actuations for degraded voltage will not occur when not necessary. This is not a change to the analysis and only adds the value that has been verified and used even though not previously included in the TSs. The time delay functions for the other timers currently have upper and lower limits and retain these limits in the proposed changes.

From TVA Calculation 27DAT, Revision 5, the loss of voltage relay Av was determined by using the TVA methodology for the maximum and minimum allowable values. The intermediate value was chosen which is conservative compared to using maximum allowable value. The maximum and minimum Avs were determined utilizing the following TVA setpoint methodology equations:

For a decreasing setpoint maximum Av determination;

$$Av_{(max)} = UAL + (LAn - LAnf)$$

For a decreasing setpoint minimum Av determination;

$$Av_{(min)} = Setpoint - LAnf$$

The above equation for $Av_{(max)}$;

$$Av_{(max)} = UAL - (LAn - Lanf_{relay})$$

$$Av_{(max)} = 5700 - (159.45 - 158.59)$$

$$Av_{(max)} = 5699.14 \text{ Volts}$$

$$Av_{(min)} = Setpoint + LAnf_{relay}$$

$$Av_{(min)} = 5520 + 159.45$$

$$Av_{(min)} = 5678.59 \text{ Volts}$$

The intermediate Av value is determined as follows;

$$Av_{(int)} = \frac{Av(\max) + Av(\min)}{2}$$

$$Av_{(int)} = \frac{5699.14 + 5678.59}{2}$$

$$Av_{(int)} = 5688.9 \text{ Volts}$$

Based on the above, the 6.9-kV shutdown board loss of voltage Av will be defined as 5688 Volts (rounded down for conservatism).

The action requirements have been revised to accommodate the change in required number of timers. This utilizes an action for one inoperable voltage sensor out of the three required and does not address the timers. This action provides a six-hour interval to return the sensor to operable conditions or declare the associated EDG inoperable. This action differs from NUREG-1431, which requires the channel to be tripped within six hours. This action is not utilized because the voltage sensors are not capable of being individually tripped without performing wiring changes in the field. The additional risk of performing this action is not justified and requiring the channel to be returned to operable status instead of placing the function in a partial trip arrangement is an acceptable alternative for this condition. This action will provide an equivalent or more conservative action to ensure the proper actuation of EDG starts. A second action addresses the loss of more than one voltage sensor and all timers. This action is consistent with the current SQN requirements and NUREG-1431.

As with the other proposed new LCOs, a provision is being added to allow separate entry into the actions for each function. As previously discussed, this provision does not impact the ability to initiate the start of the EDGs when needed for accident mitigation and provides consistency with NUREG-1431. An exclusion to TS 3.0.4 provisions is maintained when shutdown power sources are required consistent with the current licensing basis. An additional action is being added to this LCO that is not addressed in the current SQN specifications or NUREG-1431. This action is a reminder that some of these voltage sensors and timers provide a start function for the AFW pumps and requires the evaluation of applicable action in the ESF instrumentation specification. By adding this action to the LCO for EDG start instrumentation, any inoperability that could also affect the AFW system will also be considered as applicable. This is a conservative change that will help to ensure the entry into all applicable TS requirements.

SRs for the loss of power diesel start instrumentation has not been altered from the current requirements for channel calibrations and functional tests. These requirements differ slightly from the NUREG because of specific SQN plant design. In particular, there is not any indication on the voltage sensors or timers to allow performance of a channel check and therefore, a channel check is not applicable. Channel calibration and functional tests are consistent with the NUREG requirements and utilize the same refueling and monthly frequencies, respectively. The current response time SRs are maintained consistent with the current licensing basis. This surveillance is more restrictive than the NUREG-1431 recommendations and provides assurance that the system will actuate within the necessary time limits to support the safety function.

Conclusion

The proposed changes provide acceptable limits to ensure all accident mitigation and safety functions are available and capable of performing their intended function. In many cases the proposed changes implement more conservative requirements in response to identified non-conservative TS requirements or to enhance the ability to maintain safety functions. Changes that relax or retain current licensing basis requirements and are less restrictive that those in NUREG-1431 are acceptable based on the discussions provided. Overall, the proposed changes are acceptable and adequately maintain required safety functions.

IV. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

TVA has concluded that operation of Sequoyah Nuclear Plant (SQN) Units 1 and 2 in accordance with the proposed change to the technical specifications (TSs) does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91(a)(1), of the three standards set forth in 10 CFR 50.92(c).

The proposed TS change will rename the Trip Setpoint column of reactor protection and engineered safety feature (ESF) TS tables to be Nominal Trip Setpoint, remove the inequality signs for the trip setpoint values as appropriate, and revise the inequality representation for the allowable values (Avs) as needed. Bases discussions clarify operable conditions for the functions and prescribe conditions where the setpoints may be set more conservatively. This revision also includes the revision of other TSs that currently use the term "trip setpoint" or "nominal" that needs to be changed to be consistent with the table title. Additional changes are proposed to the TS instrumentation tables that involve the revision of a trip setpoint, two Avs, and a required minimum channels operable.

The requirements for the containment ventilation isolation (CVI), loss of power instrumentation, and associated actions in the ESF tables have been relocated to new limiting conditions for operation (LCOs) in the instrumentation section of the SQN TSs. In addition, the radiation monitoring instrumentation LCO has been relocated to new LCOs or are already included in other TSs. With these revisions there are four new LCOs that include specifications for CVI instrumentation, auxiliary building gas treatment system (ABGTS) actuation instrumentation, control room emergency ventilation system (CREVS) actuation instrumentation, and loss of power emergency diesel generator (EDG) start instrumentation. TS limiting values for the radiation monitoring instrumentation have been revised from a trip setpoint to an Av representation. The Av for the CVI function has been increased in the proposed revision from the current requirement in the ESF instrumentation section. The proposed revision includes the necessary changes to the TS index and Bases for the affected specifications.

A. <u>The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.</u>

The proposed revisions for the nominal trip setpoint representation are administrative changes that will not impact the application of the reactor trip or ESF actuation system instrumentation requirements. This is based on the setpoint requirements being applied without change, as well as the Avs, in accordance with the setpoint methodology. The removal of the inequalities associated with the trip setpoint values will be more appropriate for the use of nominal setpoint values but will not differ in application from the setpoint methodology utilized by TVA. The revision of the radiation monitoring instrumentation table to use an Av will continue to provide appropriate operability limits. Deletion of the nominal terminology associated with overtemperature delta temperature average temperature at rated thermal power (T′) and reactor coolant system power operated relief valve (PORV) lift settings provides a better representation of the limits associated with these values. In addition, this change will not alter plant equipment or operating practices. Therefore, the implementation of these changes will not increase the probability or consequences of an accident.

The revision of the reactor coolant pump (RCP) underfrequency trip setpoint and the Avs for the RCP underfrequeny and undervoltage and the containment purge radiation high has been evaluated and the results are documented in approved calculations. These calculations verify that the revised values are acceptable in accordance with appropriate calculation methodologies and that they will continue to support the accident analysis. This is based on margin being available in the accuracy determinations that could be used without impacting the intended functions of this instrumentation and maintains the established safety limits. These revisions will not require changes to the instrumentation settings currently being used or the methods for maintaining them. The offsite dose potential will not be impacted because this instrumentation will continue to adequately provide the designed safety functions to limit the release of radioactivity. Therefore, the proposed revision of these values will not significantly increase the probability or consequences of an accident.

The relocation and enhancement of current radiation monitoring and loss of voltage functions to new LCOs does not alter the intended functions of these systems or physically alter these systems. While some requirements have change from current limitations, these changes have provided more appropriate criteria to ensure that the accident mitigation functions are maintained properly and are available. Changes to Avs have been evaluated in accordance with TVA setpoint methodology and have been verified to acceptably protect the associated safety limits. Format changes provide a clearer representation of the requirements and provide more consistency with the standard TSs in NUREG-1431. These changes continue to support or improve the required safety functions and therefore, will not increase the possibility or consequence of an accident.

B. **The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.**

The revision of the nominal trip setpoint representation and elimination of the nominal nomenclature, as well as the revised setpoint value and Avs, and the relocated LCOs will not alter the plant configuration or functions. The revised setpoint and the proposed operability limits will continue to provide acceptable initiation of safety functions for the mitigation of postulated accidents as required by the design basis. The primary function of the reactor protection system, the ESF actuation system, and the new actuation function LCOs is to initiate accident mitigation functions. These functions are not considered to be initiators of postulated accidents. The PORVs provide accident mitigation functions and could be the source of a loss of coolant accident. However, a clarification of how to apply the actuation setpoints without a change to the setpoints will not impact accident generation. The proposed changes do not create the possibility of a new or different kind of accident because the design functions are not altered and the proposed values meet the accident analysis requirements for accident mitigation.

C. **The proposed amendment does not involve a significant reduction in a margin of safety.**

The setpoint and Av revisions proposed in this request were evaluated and found to be acceptable based on operating margin available in the accuracy determinations. The reassignment of this excess margin to the setpoint and Av will not impact the safety limits required for the associated functions. The nominal trip setpoint representation change and the elimination of inappropriate nominal indications does not alter the TS functions or their application and will not require changes to design settings. The relocated requirements to new LCOs provide appropriate limits and enhancements to the actuation functions. Plant systems will continue to be actuated for those plant conditions that require the initiation of accident mitigation functions. The margin of safety is not significantly reduced because the proposed changes to the Av and setpoint representations will not change design functions and the initiation of accident mitigation functions for appropriate plant conditions will not be adversely impacted.

V. ENVIRONMENTAL IMPACT CONSIDERATION

The proposed change does not involve a significant hazards consideration, a significant change in the types of or significant increase in the amounts of any effluents that may be released offsite, or a significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY
SEQUOYAH PLANT (SQN)
UNITS 1 and 2

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE TS 02-01
MARKED PAGES

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II. **MARKED PAGES**

See attached.

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Technical Specifications are required by 10 CFR 50.36 to contain Limiting Safety System Settings (LSSS) defined by the regulation as ". . . settings for automatic protective devices . . . so chosen that automatic protective action will correct the abnormal situation before a Safety Limit (SL) is exceeded." The analytic limit is the limit of the process variable at which a safety action is initiated, as established by the safety analysis, to ensure that a SL is not exceeded. Any automatic protection action that occurs on reaching the analytic 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 analytic limit to account for instrument loop uncertainties related to the setting at which the automatic protective action would actually occur.

The Nominal Trip Setpoint is a predetermined setting for a protective device chosen to ensure automatic actuation prior to the process variable reaching the analytic limit and thus ensuring that the SL would not be exceeded. As such, the Nominal Trip Setpoint 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). In this manner, the Nominal Trip Setpoint plays an important role in ensuring that SLs are not exceeded. As such, the Nominal Trip Setpoint meets the definition of an LSSS in accordance with Regulatory Guide 1.105 and could be used to meet the requirements that they be contained in the technical specifications.

Technical specifications contain values related to the OPERABILITY of equipment required for safe operation of the facility. OPERABLE is defined in the technical specifications as ". . . being capable of performing its safety function(s)." For automatic protective devices, the required safety function is to ensure that a SL is not exceeded and therefore the LSSS as defined by 10 CFR 50.36 is the same as the OPERABILITY limit for these devices. However, use of the Nominal Trip Setpoint to define OPERABILITY in technical specifications and its corresponding designation as the LSSS required by 10 CFR 50.36 would be an overly restrictive requirement if it were applied as an OPERABILITY limit for the "as found" value of a protective device setting during a surveillance. 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, an automatic protective device with a setting that has been found to be different from the Nominal Trip Setpoint due to some drift of the setting 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 Nominal Trip Setpoint and thus the antomatic protective action would still have ensured that the SL would not be exceeded with the "as found" setting of the protective device. Therefore, the device would still be OPERABLE since it would have performed its safety function and the only corrective action required would be to reset the device to the Nominal Trip Setpoint to account for further drift during the next surveillance interval.

Use of the Nominal Trip Setpoint to define "as found" OPERABILITY and its designation as the LSSS under the expected circumstances described above would result in actions required by both the rule and technical specifications that are clearly not warranted. 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. This value needs to be specified in the technical specifications in order to define OPERABILITY of the devices and is designated as the Allowable Value which, as stated above, is the same as the LSSS.

The Allowable Value specified in Table 2.2-1, although conservative, serves as the LSSS such that a channel is OPERABLE if the trip setpoint is found not to exceed the Allowable Value during the CHANNEL FUNCTIONAL TEST. As such, the Allowable Value differs from the Nominal Trip Setpoint by an amount primarily equal to the expected instrument loop uncertainties, such as drift, during the surveillance interval. In this manner, the actual setting of the device will still meet the LSSS definition and ensure that a Safety Limit is not exceeded at any given point of time as long as the device has not drifted beyond that expected during the surveillance interval. Note that, although the channel is "OPERABLE" under these circumstances, the trip setpoint should be left adjusted to a value within the established trip setpoint calibration tolerance band, in accordance with uncertainty assumptions stated in the referenced setpoint methodology (as-left criteria), and confirmed to be operating within the statistical allowances of the uncertainty terms assigned. If the actual setting of the device is found to have exceeded the Allowable Value the device 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.

INSERT 2

A channel is OPERABLE with an actual trip setpoint value outside its calibration tolerance band provided the trip setpoint value is conservative with respect to its associated Allowable Value and the channel is readjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A trip setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions. The conservative direction is established by the direction of the inequality applied to the Allowable Value. It is consistent with the setpoint methodology for the as-left trip setpoint to be outside the established calibration tolerance band but in the conservative direction with respect to the Nominal Trip Setpoint. An exception to readjusting the channel to within the established calibration tolerance band, is the Power Range Neutorn Flux Low and High Trip Setpoints, the Intermediate Range Neutron Flux Trip Setpoint, and the Intermediate Range Neutron Flux - (P-6) Enable Block Source Range Reactor Trip. These setponts can be set more conservative than the Nominal Trip Setpoint value, in accordance with the setpoint methodology, to provide additional conservatism.

INSERT 3 (Unit 1)

INSERT 3 (Unit 2)

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

SECTION

3/4 2 POWER DISTRIBUTION LIMITS

3/4 3 INSTRUMENTATION

Add Insert 3

2 2 LIMITING SAFETY SYSTEM SETTINGS

REACTOR TRIP SYSTEM INSTRUMENTATION SETPOINTS

2.2 1 The reactor trip system instrumentation and interlocks setpoints shall be set consistent with the Trip Setpoint values shown in Table 2 2-1

⇑ ***Nominal***

APPLICABILITY As shown for each channel in Table 3 3-1

ACTION

With a reactor trip system instrumentation or interlock setpoint less conservative than the value shown in the Allowable Values column of Table 2 2-1, declare the channel inoperable and apply the applicable ACTION statement requirement of Specification 3 3 1 until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value

⇑ ***Nominal***

TABLE 2 2-1

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	*NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
1. Manual Reactor Trip	Not Applicable	Not Applicable
2. Power Range Neutron Flux	Low Setpoint ≤ 25% of RATED THERMAL POWER High Setpoint - ≤ 109% of RATED THERMAL POWER	Low Setpoint - ≤ 27.4% of RATED THERMAL POWER High Setpoint - ≤ 111.4% of RATED THERMAL POWER
3. Power Range Neutron Flux High Positive Rate	≤ 5% of RATED THERMAL POWER with a time constant ≥ 2 second	≤ 6 3% of RATED THERMAL POWER with a time constant ≥ 2 second
4. Power Range Neutron Flux, High Negative Rate	≤ 5% of RATED THERMAL POWER with a time constant ≥ 2 second	≤ 6 3% of RATED THERMAL POWER with a time constant ≥ 2 second
5 Intermediate Range, Neutron Flux	≤ 25% of RATED THERMAL POWER	≤ 45 20% of RATED THERMAL POWER
6 Source Range Neutron Flux	≤ 10^5 counts per second	≤ 1 45 x 10^5 counts per second
7 Overtemperature ΔT	See Note 1	See Note 3
8 Overpower ΔT	See Note 2	See Note 4
9 Pressurizer Pressure--Low	≥ 1970 psig	≥ 1964.8 psig
10 Pressurizer Pressure--High	≤ 2385 psig	≤ 2390 2 psig
11 Pressurizer Water Level--High	≤ 92% of instrument span	≤ 92 7% of instrument span
12 Loss of Flow	≥ 90% of design flow per loop*	≥ 89 6% of design flow per loop*

*Design flow is 90,045 (87,000 X 1 035) gpm per loop

TABLE 2 2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓ *NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
13. Steam Generator Water Level--Low-Low		
a RCS Loops ΔT Equivalent to Power ≤ 50% RTP	RCS Loop ΔT variable input ≤ 50% RTP	RCS Loop ΔT variable input ≤ trip setpoint + 2 5% RTP ⇑ *nominal*
Coincident with		
Steam Generator Water Level -- Low-Low (Adverse) and	≥ 15 0% of narrow range instrument span	≥ 14 4% of narrow range instrument span
Containment Pressure - EAM or	≤ 0.5 psig	≤ 0 6 psig
Steam Generator Water Level -- Low-Low (EAM) with	≥ 10 7% of narrow range instrument span	≥ 10 1% of narrow range instrument span
A time delay (T_S) if one Steam Generator is affected or	≤ T_S (Note 5)	≤ (1.01) T_S (Note 5)
A time delay (T_M) if two or more Steam Generators are affected	≤ T_M (Note 5)	≤ (1 01) T_M (Note 5)
b. RCS Loop ΔT Equivalent to Power > 50% RTP		
Coincident with		
Steam Generator Water Level -- Low-Low (Adverse) and	≥ 15 0% of narrow range instrument span	≥ 14 4% of narrow range instrument span
Containment Pressure (EAM) or	≤ 0 5 psig	≤ 0.6 psig
Steam Generator Water Level -- Low-Low (EAM)	≥ 10 7% of narrow range instrument span	≥ 10.1% of narrow range instrument

TABLE 2.2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓***NOMINAL*** TRIP SETPOINT	ALLOWABLE VALUES
14 Deleted		
15 Undervoltage-Reactor Coolant Pumps	≥ 5022 volts-each bus	**4952** ≥ ~~4739~~ volts-each bus
16 Underfrequency-Reactor Coolant Pumps	**57.0** ≥ ~~56.0~~ Hz - each bus	**56.3** ≥ ~~55.9~~ Hz - each bus
17. Turbine Trip		
A. Low Trip System Pressure	≥ 45 psig	≥ 43 psig
B. Turbine Stop Valve Closure	≥ 1% open	≥ 1% open
18 Safety Injection Input from ESF	Not Applicable	Not Applicable
19 Intermediate Range Neutron Flux - (P-6) Enable Block Source Range Reactor Trip	≥ 1 x 10-5% of RATED THERMAL POWER	≥ 6 x 10-6% of RATED THERMAL POWER
20 Power Range Neutron Flux (not P-10) Input to Low Power Reactor Trips Block P-7	≤ 10% of RATED THERMAL POWER	≤ 12.4% of RATED THERMAL POWER

TABLE 2 2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓*NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
21. Turbine Impulse Chamber Pressure - (P-13) Input to Low Power Reactor Trips Block P-7	≤ 10% Turbine Impulse Pressure Equivalent	≤ 12.4% Turbine Impulse Pressure Equivalent
22 Power Range Neutron Flux - (P-8) Low Reactor Coolant Loop Flow, and Reactor Trip	≤ 35% of RATED THERMAL POWER	≤ 37.4% of RATED THERMAL POWER
23. Power Range Neutron Flux - (P-10) - Enable Block of Source, Intermediate, and Power Range (low setpoint) Reactor Trips	≥ 10% of RATED THERMAL POWER	≥ 7.6% of RATED THERMAL POWER
24 Reactor Trip P-4	Not Applicable	Not Applicable
25 Power Range Neutron Flux - (P-9) - Blocks Reactor Trip for Turbine Trip Below 50% Rated Power	≤ 50% of RATED THERMAL POWER	≤ 52 4% of RATED THERMAL POWER

NOTATION

NOTE 1:

$$\text{Overtemperature } \Delta T \left(\frac{1 + \tau_4 S}{1 + \tau_5 S}\right) \leq \Delta T_0 \left\{K_1 - K_2 \left(\frac{1 + \tau_1 S}{1 + \tau_2 S}\right)[T - T'] + K_3 (P - P') - f_1(\Delta I)\right\}$$

Where:

$\frac{1 + \tau_4 S}{1 + \tau_5 S}$ = Lead-lag compensator on measured ΔT

τ_4, τ_5 = Time constants utilized in the lead-lag controller for ΔT, $\tau_4 \geq 5$ secs, $\tau_5 \leq 3$ sec.

ΔT_0 = Indicated ΔT at RATED THERMAL POWER

K_1 ≤ 1.15

K_2 ≥ 0 011

TABLE 2 2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS
NOTATION (Continued)

NOTE 1 (Continued)

$\frac{1 + \tau_1 S}{1 + \tau_2 S}$	=	The function generated by the lead-lag controller for T_{avg} dynamic compensation
τ_1, & τ_2	=	Time constants utilized in the lead-lag controller for T_{avg}, $\tau_1 \geq 33$ secs., $\tau_2 \leq 4$ secs
T	=	Average temperature °F
T'	$\leq$	578.2°F (Nominal T_{avg} at RATED THERMAL POWER)
K_3	=	0 00055
P	=	Pressurizer pressure, psig
P'	=	2235 psig (Nominal RCS operating pressure)
S	=	Laplace transform operator (sec^{-1})

and f_1 (ΔI) is a function of the indicated difference between top and bottom detectors of the power-range nuclear ion chambers; with gains to be selected based on measured instrument response during plant startup tests such that

(i) for q_t - q_b between QTNL* and QTPL* f_1 (ΔI) = 0 (where q_t and q_b are percent RATED THERMAL POWER in the top and bottom halves of the core respectively, and $q_t + q_b$ is total THERMAL POWER in percent of RATED THERMAL POWER)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS
NOTATION (Continued)

NOTE 1 (Continued)

(ii) ⇓ nominal
for each percent that the magnitude of (q_t - q_b) exceeds QTNL*, the ΔT trip set point shall be automatically reduced by QTNS* of its value at RATED THERMAL POWER

(iii) ⇓ nominal
for each percent that the magnitude of (q_t - q_b) exceeds QTPL*, the ΔT trip set-point shall be automatically reduced by QTPS* of its value at RATED THERMAL POWER.

NOTE 2

Overpower $$\Delta T\left(\frac{1+\tau_4 S}{1+\tau_5 S}\right) \leq \Delta T_0 \left\{K_4 - K_5\left(\frac{\tau_3 S}{1+\tau_3 S}\right) T - K_6 \ (T - T'') - f_2 \ (\Delta I)\right\}$$

Where

$\frac{1+\tau_4 S}{1+\tau_5 S}$	=	as defined in Note 1
τ_4, τ_5	=	as defined in Note 1
ΔT_0	=	as defined in Note 1
K_4	≤	1 087
K_5	≥	0 02/°F for increasing average temperature and 0 for decreasing average temperature
$\frac{\tau_3 S}{1 + \tau_3 S}$	=	The function generated by the rate-lag controller for T_{avg} dynamic compensation

* QTNL, QTPL, QTNS, and QTPS are specified in the COLR per Specification 6 9 1.14

TABLE 2 2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS
NOTATION (Continued)

NOTE 2 (Continued)

τ_3	=	Time constant utilized in the rate-lag controller for T_{avg}, $\tau_3 \geq 10$ secs
K_6	$\geq$	0 0011 for $T > T''$ and $K_6 \geq 0$ for $T \leq T''$
T	=	as defined in Note 1
T''	=	Indicated T_{avg} at RATED THERMAL POWER (Calibration temperature for ΔT instrumentation, $\leq$ 578 2°F)
S	=	as defined in Note 1

and $f_2(\Delta I)$ is a function of the indicated difference between top and bottom detectors of the power-range nuclear ion chambers, with gains to be selected based on measured instrument response during plant startup tests such that:

(i) for $q_t - q_b$ between QPNL* and QPPL* $f_2(\Delta I) = 0$ (where q_t and q_b are percent RATED THERMAL POWER in the top and bottom halves of the core respectively, and $q_t + q_b$ is total THERMAL POWER in percent of RATED THERMAL POWER)

(ii) ⇓ nominal
for each percent that the magnitude of $(q_t - q_b)$ exceeds QPNL* the ΔT trip setpoint shall be automatically reduced by QPNS* of its value at RATED THERMAL POWER

(iii) ⇓ nominal
for each percent that the magnitude of $(q_t - q_b)$ exceeds QPPL* the ΔT trip setpoint shall be automatically reduced by QPPS* of its value at RATED THERMAL POWER

nominal ⇓ ⇓ set
NOTE 3 The channel's maximum trip setpoint shall not exceed its computed trip point by more than 1.9 percent ΔT span

nominal ⇓ ⇓ set
NOTE 4 The channel's maximum trip setpoint shall not exceed its computed trip point by more than 1 7 percent ΔT span

*QPNL, QPPL, QPNS, and QPPS are specified in the COLR per Specification 6 9.1 14.

These limiting heat flux conditions are higher than those calculated for the range of all control rods fully withdrawn to the maximum allowable control rod insertion assuming the axial power imbalance is within the limits of the f_1 (Delta I) function of the Overtemperature Delta T trip. When the axial power imbalance is not within the tolerance, the axial power imbalance effect on the Overtemperature Delta T trips will reduce the setpoints to provide protection consistent with core safety limits.

2 1.2 REACTOR COOLANT SYSTEM PRESSURE

The restriction of this Safety Limit protects the integrity of the Reactor Coolant System from overpressurization and thereby prevents the release of radionuclides contained in the reactor coolant from reaching the containment atmosphere.

The reactor pressure vessel and pressurizer are designed to Section III of the ASME Code for Nuclear Power Plant which permits a maximum transient pressure of 110% (2735 psig) of design pressure. The Reactor Coolant System piping, valves and fittings, are designed to ANSI B 31 1 1967 Edition, which permits a maximum transient pressure of 120% (2985 psig) of component design pressure The Safety Limit of 2735 psig is therefore consistent with the design criteria and associated code requirements

The entire Reactor Coolant System is hydrotested at 3107 psig, 125% of design pressure, to demonstrate integrity prior to initial operation

2.2 1 REACTOR TRIP SYSTEM INSTRUMENTATION SETPOINTS

⇓ *Nominal*

The Reactor Trip Setpoint Limits specified in Table 2.2-1 are the values at which the Reactor Trips

⇓ *Nominal*

are set for each functional unit. The Trip Setpoints have been selected to ensure that the reactor core and reactor coolant system are prevented from ~~exceeding~~ their safety limits during normal operation and design basis anticipated operational occurrences and to assist the Engineered Safety Features Actuation System in

⇓ *Nominal*

mitigating the consequences of accidents. Operation with a trip set less conservative than its Trip Setpoint

Nominal ⇓

but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is equal to or less than the ~~drift~~ allowance assumed for each trip in the

⇑ *rack*

safety analyses

Add Insert 1

Add Insert 2

INSTRUMENTATION

3/4 3 2 ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3 2 1 The Engineered Safety Feature Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their trip setpoints set consistent with the values shown in ~~the Trip Setpoint~~ ⇑ Nominal column of Table 3 3-4

APPLICABILITY: As shown in Table 3.3-3.

ACTION

a. With an ESFAS instrumentation channel or interlock trip setpoint less conservative than the value shown in the Allowable Values column of Table 3 3-4, declare the channel inoperable and apply the applicable ACTION requirement of Table 3 3-3 until the channel is restored to OPERABLE status with the trip setpoint adjusted consistent with ~~the Trip Setpoint~~ ⇑ Nominal value.

b With an ESFAS instrumentation channel or interlock inoperable, take the ACTION shown in Table 3.3-3.

SURVEILLANCE REQUIREMENTS

4 3 2.1 1 Each ESFAS instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4 3-2

4.3 2.1 2 The logic for the interlocks shall be demonstrated OPERABLE during the automatic actuation logic test. The total interlock function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by interlock operation

4.3 2.1 3 The ENGINEERED SAFETY FEATURES RESPONSE TIME of each ESFAS function shall be verified to be within the limit at least once per 18 months Each verification shall include at least one train such that both trains are verified at least once per 36 months and one channel per function such that all channels are verified at least once per N times 18 months where N is the total number of redundant channels in a specific ESFAS function as shown in the "Total No of Channels" Column of Table 3.3-3.

TABLE 3 3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
b. Phase "B" Isolation					
1) Manual	2	1**	2	1, 2, 3, 4	20
2) Automatic Actuation Logic	2	1	2	1, 2, 3, 4	15
3) Containment Pressure-High-High	4	2	3	1, 2, 3	18
~~c Containment Ventilation Isolation~~					
~~1) Manual~~	~~2~~	~~1~~	~~2~~	~~1, 2, 3, 4~~	~~19*~~
~~2) Automatic Isolation Logic~~	~~2~~	~~1~~	~~2~~	~~1, 2, 3, 4~~	~~15~~
~~3) Containment Purge Air Exhaust Monitor Radioactivity-High~~	~~2~~	~~1~~	~~1~~	~~1, 2, 3, 4~~	~~19*~~

**Two switches must be operated simultaneously for actuation

TABLE 3 3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
e. Loss of Power Start					
1. Voltage Sensors	3/shutdown board**	2/shutdown board**	3/shutdown board**	1, 2, 3	35
2. Load Shed Timer	2/shutdown board**	1/shutdown board**	⇓ 1 ~~2~~/shutdown board**	1, 2, 3	35
f Trip of Main Feedwater Pumps Start Motor-Driven Pumps and Turbine Driven Pump	1/pump	1/pump	1/pump	1, 2	20*
g Auxiliary Feedwater Suction Pressure- Low	3/pump	2/pump	3/pump	1, 2, 3	21*
h Auxiliary Feedwater Suction Transfer Time Delays					
1 Motor-Driven Pump	1/pump	1/pump	1/pump	1, 2, 3	21*
2 Turbine-Driven Pump	2/pump	1/pump	2/pump	1, 2, 3	21*

**Unit 1 shutdown boards only

TABLE 3 3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
⇓ ***7. This Specification has been deleted.***					
~~7 LOSS OF POWER~~					
~~a 6 9 kv Shutdown Board -- Loss of Voltage~~					
~~1 Voltage Sensors~~	~~3/shutdown board~~	~~2/shutdown board~~	~~3/shutdown board~~	~~1, 2, 3, 4 5####, 6####~~	34
~~2 Diesel Generator Start and Load Shed Timer~~	~~2/shutdown board~~	~~1/shutdown board~~	~~2/shutdown board~~	~~1, 2, 3, 4 5####, 6####~~	34
~~b 6 9 kv Shutdown Board Degraded Voltage~~					
~~1 Voltage Sensors~~	~~3/shutdown board~~	~~2/shutdown board~~	~~3/shutdown board~~	~~1, 2, 3, 4 5####, 6####~~	34
~~2. Diesel Generator Start and Load Shed Timer~~	~~2/shutdown board~~	~~1/shutdown board~~	~~2/shutdown board~~	~~1, 2, 3, 4 5####, 6####~~	34
~~3 SI/Degraded Voltage Logic Enable Timer~~	~~2/shutdown board~~	~~1/shutdown board~~	~~2/shutdown board~~	~~1, 2, 3, 4~~	34
8 ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS					
a. Pressurizer Pressure-P-11/Not P-11	3	2	2	1, 2, 3	22a
b Deleted					
c. Steam Generator Level P-14	3/loop	2/loop any loop	3/loop	1, 2	22c

TABLE 3 3-3 (Continued)

TABLE NOTATION

#Trip function may be bypassed in this MODE below P-11 (Pressurizer Pressure Block of Safety Injection) setpoint.

##Trip function automatically blocked above P-11 and may be blocked below P11 when Safety Injection on Steam Line Pressure-Low is not blocked

####When Associated Diesel Generator is required to be OPERABLE by LCO 3 8.1 2, "AC Sources-Shutdown." The Provisions of Specification 3 0.4 are not applicable.

*The provisions of Specification 3 0.4 are not applicable

ACTION STATEMENTS

ACTION 15 - With the number of OPERABLE Channels one less than the Total Number of Channels, be in at least HOT STANDBY within 12 hours and in COLD SHUTDOWN within the following 30 hours; however, one channel may be bypassed for up to 4 hours for surveillance testing per Specification 4 3.2 1.1 provided the other channel is OPERABLE.

ACTION 16 - Deleted

ACTION 17 - With the number of OPERABLE Channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied

a. The inoperable channel is placed in the tripped condition within 6 hours

b The Minimum Channels OPERABLE requirements is met, however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4 3 2.1 1.

ACTION 18 - With the number of OPERABLE Channels one less than the Total Number of Channels, operation may proceed provided the inoperable channel is placed in the bypassed condition within 6 hours and the Minimum Channels OPERABLE requirement is met, one additional channel may be bypassed for up to 4 hours for surveillance testing per Specification 4 3.2 1 1.

⇓ ***Deleted***

ACTION 19 - ~~With less than the Minimum Channels OPERABLE, operation may continue provided the containment purge supply and exhaust valves are maintained closed.~~

ACTION 20 - With the number of OPERABLE Channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours

TABLE 3 3-3 (Continued)

ACTION 21 - With less than the Minimum Number of Channels OPERABLE, declare the associated auxiliary feedwater pump inoperable, and comply with the ACTION requirements of Specification 3 7.1.2

ACTION 22 - With less than the Minimum Number of Channels OPERABLE, declare the interlock inoperable and verify that all affected channels of the functions listed below are OPERABLE or apply the appropriate ACTION statement(s) for those functions Functions to be evaluated are:

a Safety Injection
  Pressurizer Pressure
  Steam Line Pressure
  Negative Steam Line Pressure Rate

b Deleted

c. Turbine Trip
  Steam Generator Level High-High
  Feedwater Isolation
  Steam Generator Level High-High

ACTION 23 - With the number of OPERABLE channels one less than the Total Number of Channels, be in at least HOT STANDBY within 6 hours and in at least HOT SHUTDOWN within the following 6 hours, however, one channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3 2 1.1

ACTION 24 - With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within 6 hours and in at least HOT SHUTDOWN within the following 6 hours

ACTION 25 - With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or declare the associated valve inoperable and take the ACTION required by Specification 3.7 1.5

⇓ ***Deleted***

ACTION 34 - ~~a With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 6 hours or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated diesel generator set made inoperable by the channel~~

~~b With the number of OPERABLE channels less than the Total Number of Channels by more than one, restore all but one channel to OPERABLE status within 1 hour or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated diesel generator set made inoperable by the channels~~

TABLE 3.3-3 (Continued)

ACTION 35 -

a. With the number of OPERABLE channels one less than the Total
⇓ ***for voltage sensors***
Number of Channels, restore the inoperable channel to OPERABLE status within 6 hours or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated auxiliary feedwater pump made inoperable by the channel.

b. With the number of OPERABLE channels less than the Total Number
⇓ ***for voltage sensors or timers***
of Channels by more than one, restore all but one channel to OPERABLE status within 1 hour or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated auxiliary feedwater pump made inoperable by the channels

ACTION 36 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours.

b. For the affected protection set, the Trip Time Delay for one affected steam generator (T_S) is adjusted to match the Trip Time Delay for multiple affected steam generators (T_M) within 4 hours

c. The Minimum Channels OPERABLE requirement is met, however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3 2.1.1.

ACTION 37 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided that within 6 hours, for the affected protection set, the Trip Time Delays (T_S and T_M) threshold power level for zero seconds time delay is adjusted to 0% RTP.

ACTION 38 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided that within 6 hours, for the affected protection set, the Steam Generator Water Level - Low-Low (EAM) channels trip setpoint is adjusted to the same value as Steam Generator Water Level - Low-Low (Adverse).

TABLE 3 3-4

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓*NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
1. SAFETY INJECTION, TURBINE TRIP AND FEEDWATER ISOLATION		
a. Manual Initiation	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c Containment Pressure—High	≤ 1.54 psig	≤ 1.6 psig
d. Pressurizer Pressure--Low	≥ 1870 psig	≥ 1864.8 psig
e. Deleted		
f Steam Line Pressure—Low	≥ 600 psig steam line pressure (Note 1)	≥ 592 2 psig steam line pressure (Note 1)

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	*NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
2. CONTAINMENT SPRAY		
a. Manual Initiation	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Containment Pressure--High-High	~~≤~~2.81 psig	≤ 2.9 psig
3. CONTAINMENT ISOLATION		
a. Phase "A" Isolation		
1. Manual	Not Applicable	Not Applicable
2. From Safety Injection Automatic Actuation logic	Not Applicable	Not Applicable
b. Phase "B" Isolation		
1. Manual	Not Applicable	Not Applicable
2. Automatic Actuation Logic	Not Applicable	Not Applicable
3 Containment Pressure--High-High	~~≤~~2.81 psig	≤ 2.9 psig
~~c. Containment Ventilation Isolation~~		
~~1. Manual~~	~~Not Applicable~~	~~Not Applicable~~
~~2. Automatic Isolation Logic~~	~~Not Applicable~~	~~Not Applicable~~

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓*NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
~~3. Containment Purge Air Exhaust Monitor Radioactivity-High~~	~~≤ 8.5 x 10^{-3} μCi/cc~~	~~≤ 8.5 x 10^{-3} μCi/cc~~
4. STEAM LINE ISOLATION		
a Manual	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Containment Pressure--High-High	≤ 2.81 psig	≤ 2.9 psig
d Steam Line Pressure--Low	≥ 600 psig steam line pressure (Note 1)	≥ 592 2 psig steam line pressure (Note 1)
e Negative Steam Line Pressure Rate—High	≤ 100 0 psi (Note 2)	≤ 107.8 psi (Note 2)
5. TURBINE TRIP AND FEEDWATER ISOLATION		
a. Steam Generator Water level-- High-High	≤ 81% of narrow range instrument span each steam generator	≤ 81.7% of narrow range instrument span each steam generator
b Automatic Actuation Logic	N A	N.A.

TABLE 3 3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓***NOMINAL*** TRIP SETPOINT	ALLOWABLE VALUES
6. AUXILIARY FEEDWATER		
a. Manual	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Main Steam Generator Water Level--Low-Low		
i. RCS Loop ΔT Equivalent to Power ≤ 50% RTP	RCS Loop ΔT variable input ≤ 50% RTP	RCS Loop ΔT ***nominal*** ⇓ variable input ≤ trip setpoint +2.5% RTP
Coincident with Steam Generator Water Level-- Low-Low (Adverse) and	≥ 15 0% of narrow range instrument span	≥14.4% of narrow range instrument span
Containment Pressure-EAM or	≤ 0.5 psig	≤ 0.6 psig
Steam Generator Water Level--Low-Low (EAM) with	≥ 10.7% of narrow range instrument span	≥ 10.1% of narrow instrument span
A time delay (T_S) if one Steam Generator is affected or	≤ T_S (Note 5, Table 2.2-1)	≤ (1.01) T_S (Note 5, Table 2.2-1)
A time delay (T_m) if two or more Steam Generators are affected	≤ T_m (Note 5, Table 2.2-1)	≤ (1.01) T_m (Note 5, Table 2.2-1)

TABLE 3 3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓***NOMINAL*** TRIP SETPOINT	ALLOWABLE VALUES
ii. RCS Loop ΔT Equivalent to Power > 50% RTP		
Coincident with Steam Generator Water Level-- Low-Low (Adverse) and	≥ 15.0% of narrow range instrument span	≥ 14.4% of narrow range instrument span
Containment Pressure (EAM) or	≤ 0.5 psig	≤ 0.6 psig
Steam Generator Water Level-- Low-Low (EAM)	≥ 10.7% of narrow range instrument span	≥ 10.1% of narrow range instrument span
d S.I.	See 1 above (all SI Setpoints)	
e. Loss of Power Start	⇓ ***Refer to Function 1 of***	***Table 3.3-17 for setpoints***
1. Voltage Sensors	~~≥ 5520 volts~~ ***and allowable values.***	~~≥ 5331 volts~~
2. Load Shed Timer	~~1 25 seconds~~	~~1 25 ±0 25 seconds~~
f Trip of Main Feedwater Pumps	N A.	N.A
g Auxiliary Feedwater Suction Pressure-Low	≥ 3.21 psig (motor driven pump) ≥ 13 9 psig (turbine driven (pump)	≥ 2.44 psig (motor driven pump) ≥ 12 psig (turbine driven pump)
h Auxiliary Feedwater Suction Transfer Time Delays	4 seconds (motor driven pump)	≤ ***4.4 seconds*** ≥ ***3.6 seconds*** ~~4 seconds +0 4~~ (motor driven pump) ~~seconds~~
	5.5 seconds (turbine driven pump)	≤ ***6.05 seconds*** ≥ ***4.95 seconds*** ~~5 5 seconds +0 55 seconds~~(turbine driven pump)

TABLE 3 3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓*NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
⇓ *7. This Specification has been deleted.*		
~~7. LOSS OF POWER~~		
~~a 6 9 kv Shutdown Board Undervoltage~~		
~~Loss of Voltage~~		
~~1 Voltage Sensors~~	~~≥ 5520 volts~~	~~≥ 5331 volts~~
~~2 Diesel Generator Start and Load Shed Timer~~	~~1.25 seconds~~	~~1.25 ± 0 25 seconds~~
~~b 6 9 kv Shutdown Board Degraded Voltage~~		
~~1 Voltage Sensors~~	~~6456 volts~~	~~≥ 6403 5 volts (dropout)~~ ~~≤ 6595 5 volts (reset)~~
~~2 Diesel Generator Start and Load Shed Timer~~	~~≤ 300 seconds~~	~~≤ 370 seconds~~
~~3 SI/Degraded Voltage Logic Enable Timer~~	~~9 5 seconds~~	~~9 5 ± 2 0 seconds~~
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS		
a Pressurizer Pressure		
1. Not P-11, Automatic Unblock of Safety Injection on Increasing Pressure	≤ 1970 psig	≤ 1975.2 psig
2 P-11, Enable Manual Block of Safety Injection on Decreasing Pressure	≥ 1962 psig	≥ 1956.8 psig

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓***NOMINAL*** TRIP SETPOINT	ALLOWABLE VALUES
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS (Continued)		
b. Deleted		
c. Deleted		
d. Steam Generator Level Turbine Trip, Feedwater Isolation P-14	(See 5. above)	
9. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP		
a RWST Level - Low	130" from tank base	***≤ 132.71" from tank base*** ⇓ ***≥ 127.29"*** ~~130" ± 2.71"~~ from tank base
COINCIDENT WITH Containment Sump Level - High	30" above elev. 680'	***≤ 31.68" above elev. 680'*** ⇓ ***≥ 28.32"*** ~~30" ± 1.68"~~ above elev. 680'
AND Safety Injection	(See 1 above for all Safety Injection Setpoints/Allowable Values)	
b. Automatic Actuation Logic	N.A	N A

Note 1: Time constants utilized in the lead-lag controller for Steam Pressure - Low are $\tau_1 \geq 50$ seconds and $\tau_2 \leq 5$ seconds

Note 2: Time constant utilized in the rate-lag controller for Negative Steam Line Pressure Rate - High is $\tau \geq 50$ seconds

TABLE 4 3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
3) CONTAINMENT ISOLATION				
a. Phase "A" Isolation				
1) Manual	N A	N.A.	R	1, 2, 3, 4
2) From Safety Injection Automatic Actuation Logic	N A	N.A	M(1)	1, 2, 3, 4
b Phase "B" Isolation				
1) Manual	N.A.	N.A.	R	1, 2, 3, 4
2) Automatic Actuation Logic	N.A.	N.A.	M(1)	1, 2, 3, 4
3) Containment Pressure-- High-High	S	R	Q	1, 2, 3
~~c Containment Ventilation Isolation~~				
~~1) Manual~~	~~N A~~	~~N A~~	~~R~~	~~1, 2, 3, 4~~
~~2) Automatic Isolation Logic~~	~~N A~~	~~N A~~	~~M(1)~~	~~1, 2, 3, 4~~
~~3) Containment Purge Air Exhaust Monitor Radio-activity-High~~	~~S~~	~~R~~	~~Q~~	~~1, 2, 3, 4~~

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE REQUIRED
c Main Steam Generator Water Level--Low-Low				
1. Steam Generator Water Level--Low-Low (Adverse)	S	R	Q	1, 2, 3
2. Steam Generator Water Level--Low-Low (EAM)	S	R	Q	1, 2, 3
3. RCS Loop ΔT	S	R	Q	1, 2, 3
4. Containment Pressure (EAM)	S	R	Q	1, 2, 3
d. S.I.	See 1 above (all SI surveillance requirements)			
e Loss of Power Start				
1. Voltage Sensors	N A	R	M	1, 2, 3
2. Load Shed Timer	N A	R	N.A.	1, 2, 3
f Trip of Main Feedwater Pumps	N A	N.A.	R	1, 2
g. Auxiliary Feedwater Suction Pressure-Low	N A.	R	N A	1, 2, 3
h Auxiliary Feedwater Suction Transfer Time Delays	N A.	R	N A	1, 2, 3

⇓ 7. ***This Specification has been deleted.***

~~7 LOSS OF POWER~~

~~a 6.9 kv Shutdown Board -~~				
~~Loss of Voltage~~				
~~1. Voltage Sensors~~	~~N A~~	~~R~~	~~M~~	~~1, 2, 3, 4, 5#, 6#~~
~~2 Diesel Generator Start and Load Shed Timer~~	~~N A~~	~~R~~	~~N A~~	~~1, 2, 3, 4, 5#, 6#~~

TABLE 4 3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE REQUIRED
~~b 6 9 kv Shutdown Board - Degraded Voltage~~				
~~1 Voltage Sensors~~	~~N A~~	~~R~~	~~M~~	~~1, 2, 3, 4, 5#, 6#~~
~~2 Diesel Generators Start and Load Shed Timer~~	~~N A~~	~~R~~	~~N A~~	~~1, 2, 3, 4, 5#, 6#~~
~~3 SI/Degraded Voltage Logic Enable Timer~~	~~N A~~	~~R~~	~~N A~~	~~1, 2, 3, 4~~
8 ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS				
a Pressurizer Pressure, P-11/Not P-11	N.A.	R(2)	N A.	1, 2, 3
b Deleted				
c. Steam Generator Level, P-14	N.A	R(2)	N A.	1, 2
9. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP				
a. RSWT Level - Low	S	R	Q	1, 2, 3, 4
COINCIDENT WITH Containment Sump Level - High	S	R	Q	1, 2, 3, 4
AND Safety Injection	(See 1 above for all Safety Injection Surveillance Requirements)			
b. Automatic Actuation Logic	N A.	N A	M(1)	1, 2, 3, 4

RADIATION MONITORING INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

⇓ ***This Specification has been deleted.***

3.3.3.1 ~~The radiation monitoring instrumentation channels shown in Table 3 3-6 shall be OPERABLE with their alarm/trip setpoints within the specified limits~~

~~APPLICABILITY: As shown in Table 3 3-6~~

~~ACTION~~

~~a With a radiation monitoring channel alarm/trip setpoint exceeding the value shown in Table 3.3-6, adjust the setpoint to within the limit within 4 hours or declare the channel inoperable~~

~~b With one or more radiation monitoring channels inoperable, take the ACTION shown in Table 3 3-6~~

~~c The provisions of Specifications 3 0 3 and 3 0 4 are not applicable~~

~~SURVEILLANCE REQUIREMENTS~~

~~4 3 3 1 Each radiation monitoring instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4 3-3~~

TABLE 3 3-6

RADIATION MONITORING INSTRUMENTATION

This Table has been deleted.
⇓ (Pages 3/4 3-40 and 3/4 3-41 are deleted)

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ALARM/TRIP SETPOINT	MEASUREMENT RANGE	ACTION
1 AREA MONITOR					
a Fuel Storage Pool Area	1	*	≤ 200 mR/hr	10^{-1} – 10^{4} mR/hr	26
2 PROCESS MONITORS					
a Containment Purge Air	1	1, 2, 3, 4 & 6	≤ 8 5x 10^{-3} μCi/cc	10 – 10^{7} cpm	28
b Containment					
i Gaseous Activity					
RCS Leakage Detection	1	1, 2, 3 & 4	N/A	10 – 10^{7} cpm	27
ii Particulate Activity					
RCS Leakage Detection	1	1, 2, 3 & 4	N/A	10 – 10^{7} cpm	27
c Control Room Isolation	2	ALL MODES and during movement of irradiated fuel assemblies	≤ 400 cpm**	10 – 10^{7} cpm	29

* With fuel in the storage pool or building

** Equivalent to 1.0 x 10^{-5} μCi/cc

TABLE 3.3-6 (Continued)

ACTION STATEMENTS

ACTION 26 - With the number of OPERABLE channels less than required by the Minimum Channels OPERABLE requirement, perform area surveys of the monitored area with portable monitoring instrumentation at least once per 24 hours.

ACTION 27 - With the number of OPERABLE channels less than required by the Minimum Channels OPERABLE requirement, comply with the ACTION requirements of Specification 3.4.6.1.

ACTION 28 - With the number of OPERABLE channels less than required by the Minimum Channels OPERABLE requirement, comply with the ACTION requirements of Specification 3.9.9 (MODE 6) and 3.3.2.1 (MODES 1, 2, 3, and 4).

ACTION 29 - a. With one channel inoperable, place the associated control room emergency ventilation system (CREVS) train in recirculation mode of operation within 7 days or be at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With two channels inoperable, within 1 hour initiate and maintain operation of one CREVS train in the recirculation mode of operation and enter the required Actions for one CREVS train made inoperable by inoperable CREVS actuation instrumentation.

Or

place both trains in the recirculation mode of operation within one hour.

If the completion time of Action 29b cannot be met in Modes 1, 2, 3, and 4, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

If the completion time of Action 29b cannot be met during the movement of irradiated fuel assemblies, suspend core alterations and suspend movement of irradiated fuel assemblies.

If the completion time of Action 29b cannot be met in Modes 5 and 6, initiate action to restore one CREVS train.

TABLE 4 3-3

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

⇓ ***This Table has been deleted***

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE REQUIRED
1 AREA MONITOR				
a Fuel Storage Pool Area	S	R	Q	*
2 PROCESS MONITORS				
a Containment Purge Air Exhaust	S	R	Q	1, 2, 3, 4 & 6
b. Containment				
i Gaseous Activity RCS Leakage Detection	S	R	Q	1, 2, 3, & 4
ii Particulate Activity RCS Leakage Detection	S	R	Q	1, 2, 3, & 4
c Control Room Isolation	S	R	Q	ALL MODES

*With fuel in the storage pool or building

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CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3.11 The Containment Ventilation Isolation Instrumentation for each function in Table 3.3-14 shall be OPERABLE

APPLICABILITY: According to Table 3.3-14

ACTION:

MODES 1, 2, 3, and 4

a. With one or more functions inoperable with one or more manual or automatic actuation trains inoperable, immediately enter applicable conditions and actions of Specification 3.6.3, "Containment Isolation Valves," for containment ventilation isolation valves made inoperable by isolation instrumentation.

b. With the required radiation monitoring channel inoperable, immediately enter applicable conditions and actions of Specification 3 6.3, "Containment Isolation Valves," for containment purge and exhaust isolation valves made inoperable by isolation instrumentation.

c. Separate condition entry is allowed for each function.

d. The provisions of Specification 3 0.4 are not applicable.

e. One train of automatic actuation logic may be bypassed and Action a. may be delayed for up to 4 hours for surveillance testing provided the other train is OPERABLE

During movement of irradiated fuel assemblies within containment

a. With one radiation monitoring channel inoperable, restore the affected channel to OPERABLE status within 4 hours or enter applicable conditions and actions of Specification 3.9 4, "Containment Building Penetrations," for containment ventilation isolation valves made inoperable by isolation instrumentation.

b. With one or more functions inoperable with one or more manual or automatic actuation trains inoperable, immediately enter applicable conditions and actions of Specification 3 9.4, "Containment Building Penetrations," for containment ventilation isolation valves made inoperable by isolation instrumentation.

c. With two radiation monitoring channels inoperable, immediately enter applicable conditions and actions of Specification 3 9.4, "Containment Building Penetrations," for containment ventilation isolation valves made inoperable by isolation instrumentation.

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ACTION (Continued)

d. Separate condition entry is allowed for each function.

e. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4 3.3.11.1 Each Containment Ventilation Isolation Instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 4.3-10.

4.3.3.11.2 The ENGINEERED SAFETY FEATURES RESPONSE TIME of each Containment Ventilation Isolation Instrumentation function shall be verified to be within the limit at least once per 18 months. Each verification shall include at least one train such that both trains are verified at least once per 36 months. The Safety Injection function response time is addressed in Specification 3.3.2.

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TABLE 3 3-14

CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION

FUNCTION	APPLICABLE MODES OR CONDITIONS	REQUIRED CHANNELS	ALLOWABLE VALUE	MEASUREMENT RANGE
1. Manual Initiation	1, 2, 3, & 4, **	2	NA	NA
2. Automatic Actuation Logic	1, 2, 3, & 4, **	2	NA	NA
3 Containment Purge Air Exhaust Radiation Monitors	1, 2, 3, & 4	1	≤ 100,000 cpm	$10 - 10^7$ cpm
4. Containment Purge Air Exhaust Radiation Monitors	**	2	≤ 100,000 cpm	$10 - 10^7$ cpm
5 Safety Injection	#	#	#	#

TABLE 4 3-10

CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTION	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE REQUIRED
1. Manual Initiation	N.A.	N A	R	1, 2, 3, & 4, **
2 Automatic Actuation Logic	N. A	N A	M*	1, 2, 3, & 4, **
3. and 4. Containment Purge Air Exhaust Radiation Monitors	S	R	Q	1, 2, 3, & 4, **
5 Safety Injection	#	#	#	#

* Each train or logic channel shall be tested at least every 62 days on a STAGGERED TEST BASIS.

** During movement of irradiated fuel assemblies within containment

Refer to Specification 3.3 2, "Engineered Safety Feature Actuation System Instrumentation," Function 1 for all initiating functions and requirements.

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INSTRUMENTATION

AUXILIARY BUILDING GAS TREATMENT SYSTEM (ABGTS) ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3 3.12 The ABGTS Actuation Instrumentation for each function in Table 3.3-15 shall be OPERABLE.

APPLICABILITY: According to Table 3.3-15

ACTION

MODES 1, 2, 3, and 4

a With one or more functions with one channel or train inoperable, place one ABGTS train in operation within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b With one or more functions with two channels or trains inoperable, immediately place one ABGTS train in operation and enter applicable conditions and actions of Specification 3.7.8, "Auxiliary Building Gas Treatment System," for one train made inoperable by inoperable actuation instrumentation or immediately place both ABGTS trains in emergency radiation protection mode; Otherwise, be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. Separate condition entry is allowed for each function.

d The provisions of Specification 3.0.4 are not applicable.

During movement of irradiated fuel assemblies in the fuel handling area

a. With one or more functions with two channels or trains inoperable, immediately place one ABGTS train in operation or immediately suspend movement of irradiated fuel assemblies in the fuel handling area

b. The provisions of Specifications 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4 3 3.12.1 Each ABGTS Actuation Instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 4.3-11.

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TABLE 3 3-15

AUXILIARY BUILDING GAS TREATMENT SYSTEM ACTUATION INSTRUMENTATION

FUNCTION	APPLICABLE MODES OR CONDITIONS	REQUIRED CHANNELS	ALLOWABLE VALUE	MEASUREMENT RANGE
1. Manual Initiation	1, 2, 3, & 4, **	2	NA	NA
2. Fuel Storage Pool Area Radiation Monitors	**	1 (Same Train as Required ABGTS)	≤ 307 mR/hr	10^{-1} - 10^{4} mR/hr
3. Containment Isolation Phase "A"	#	#	#	#

TABLE 4 3-11

AUXILIARY BUILDING GAS TREATMENT SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTION	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE REQUIRED
1. Manual Initiation	N A.	N.A.	R	1, 2, 3, & 4, **
2 Fuel Storage Pool Area Radiation Monitors	S	R	Q	**
3. Containment Isolation Phase "A"	#	#	#	#

** During movement of irradiated fuel assemblies in the fuel handling area.

Refer to Specification 3.3 2, "Engineered Safety Feature Actuation System Instrumentation," Function 3.a for all initiating functions and requirements

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INSTRUMENTATION

CONTROL ROOM EMERGENCY VENTILATION SYSTEM (CREVS) ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3.13 The CREVS Actuation Instrumentation for each function in Table 3.3-16 shall be OPERABLE.

APPLICABILITY: According to Table 3.3-16

ACTION:

MODES 1, 2, 3, and 4

a. With one or more functions with one channel or train inoperable, place one CREVS train in recirculation mode of operation within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With one or more functions with two channels or trains inoperable, within one (1) hour place one CREVS train in recirculation mode operation and enter applicable conditions and actions of Specification 3.7.7, "Control Room Emergency Ventilation System," for one train made inoperable by inoperable actuation instrumentation or within one (1) hour place both CREVS trains in emergency radiation protection mode; Otherwise, be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours

c. Separate condition entry is allowed for each function

d. The provisions of Specification 3 0.4 are not applicable.

MODES 5 and 6

a. With one or more functions with one channel or train inoperable, place one CREVS train in recirculation mode of operation within 7 days or immediately initiate action to restore one CREVS train to OPERABLE status

b. With one or more functions with two channels or trains inoperable, within one (1) hour place one CREVS train in recirculation mode operation and enter applicable conditions and actions of Specification 3 7.7, "Control Room Emergency Ventilation System," for one train made inoperable by inoperable actuation instrumentation or within one (1) hour place both CREVS trains in emergency radiation protection mode; Otherwise, immediately initiate action to restore the CREVS trains to OPERABLE status.

c. Separate condition entry is allowed for each function

d. The provisions of Specifications 3.0.4 are not applicable.

ACTION (Continued)

During movement of irradiated fuel assemblies

a With one or more functions with one channel or train inoperable, place one CREVS train in recirculation mode of operation within 7 days or immediately suspend movement of irradiated fuel assemblies

b With one or more functions with two channels or trains inoperable, within one (1) hour place one CREVS train in recirculation mode operation and enter applicable conditions and actions of Specification 3.7.7, "Control Room Emergency Ventilation System," for one train made inoperable by inoperable actuation instrumentation or within one (1) hour place both CREVS trains in emergency radiation protection mode; Otherwise, immediately suspend movement of irradiated fuel assemblies.

c. Separate condition entry is allowed for each function.

d The provisions of Specifications 3.0.4 are not applicable

SURVEILLANCE REQUIREMENTS

4.3.3.13.1 Each CREVS Actuation Instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 4.3-12.

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TABLE 3 3-16

CONTROL ROOM EMERGENCY VENTILATION SYSTEM ACTUATION INSTRUMENTATION

FUNCTION	APPLICABLE MODES OR CONDITIONS	REQUIRED CHANNELS	ALLOWABLE VALUE	MEASUREMENT RANGE
1. Manual Initiation	1, 2, 3, 4, 5, & 6**	2	NA	NA
2. Control Room Intake Radiation Monitors	1, 2, 3, 4, 5, & 6**	2	≤ 43,400 cpm	10 - 10^7 cpm
3. Safety Injection	#	#	#	#

TABLE 4.3-12

CONTROL ROOM EMERGENCY VENTILATION SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTION	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE REQUIRED
1. Manual Initiation	N.A	N.A.	R	1, 2, 3, 4, 5, & 6, **
2. Control Room Intake Radiation Monitors	S	R	Q	1, 2, 3, 4, 5, & 6, **
3 Safety Injection	#	#	#	#

** During movement of irradiated fuel assemblies.

Refer to Specification 3.3.2, "Engineered Safety Feature Actuation System Instrumentation," Function 1 for all initiating functions and requirements.

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LOSS OF POWER (LOP) DIESEL GENERATOR (DG) START INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3 3.14 The LOP DG start instrumentation for each function in Table 3.3-17 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4,
When associated DG is required to be OPERABLE by LCO 3.8 1.2, "AC Sources - Shutdown."

ACTION:

a. With the number of OPERABLE channels one less than the Required Channels for voltage sensors, restore the inoperable channel to OPERABLE status within 6 hours or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated DG set made inoperable by the channel

b. With the number of OPERABLE channels less than the Required Channels by more than one for voltage sensors or with the number of OPERABLE channels one less than the Required Channels for timers, restore all but one channel of voltage sensors and at least one timer for each function to OPERABLE status within 1 hour or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated DG set made inoperable by the channels

c. Separate entry is allowed for each function.

d. Enter applicable Actions of LCO 3.3.2, "Engineered Safety Feature Actuation System Instrumentation," for Auxiliary Feedwater Loss of Power Start Instrumentation made inoperable by LOP DG Start Instrumentation.

SURVEILLANCE REQUIREMENTS

4.3 3.14.1 Each LOP DG Start Instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 4.3-13

4.3.3.14.2 The ENGINEERED SAFETY FEATURES RESPONSE TIME of each LOP DG Start Instrumentation function shall be verified to be within the limit at least once per 18 months. Each verification shall include at least one train such that both trains are verified at least once per 36 months and one channel per function such that all channels are verified at least once every N times 18 months where N is the total number of redundant channels.

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TABLE 3 3-17

LOSS OF POWER DIESEL GENERATOR START INSTRUMENTATION

FUNCTIONAL UNIT	APPLICABLE MODES OR CONDITIONS	REQUIRED CHANNELS	NOMINAL TRIP SETPOINT	ALLOWABLE VALUES
1. 6.9 kv Shutdown Board - Loss of Voltage				
a Voltage Sensors	1, 2, 3, 4, #	3/Shutdown Board	5520	≥ 5331 volts and ≤ 5688 volts
b. Diesel Generator Start and Load Shed Timer	1, 2, 3, 4, #	1/Shutdown Board	1.25 seconds	≥ 1.00 seconds and ≤ 1.50 seconds
2. 6.9 kv Shutdown Board - Degraded Voltage				
a. Voltage Sensors	1, 2, 3, 4, #	3/Shutdown Board	6456 volts	≥ 6403.5 volts and ≤ 6522.5 volts
b Diesel Generator Start and Load Shed Timer	1, 2, 3, 4, #	1/Shutdown Board	300 seconds	≥ 218.6 seconds and ≤ 370 seconds
c SI/Degraded Voltage Logic Enable Timer	1, 2, 3, 4	1/Shutdown Board	9.5 seconds	≥ 7.5 seconds and ≤ 11.5 seconds

When associated DG is required to be OPERABLE by LCO 3.8 1.2, "AC Sources - Shutdown." The provision of Specification 3.0.4 are not applicable.

New Page

TABLE 4 3-13

LOSS OF POWER DIESEL GENERATOR START INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE REQUIRED
1. 6.9 kv Shutdown Board - Loss of Voltage				
a. Voltage Sensors	N.A.	R	M	1, 2, 3, 4, #
b. Diesel Generator Start and Load Shed Timer	N.A.	R	N.A.	1, 2, 3, 4, #
2 . 6 9 kv Shutdown Board - Degraded Voltage				
a. Voltage Sensors	N.A.	R	M	1, 2, 3, 4, #
b. Diesel Generators Start and Load Shed Timer	N.A.	R	N.A	1, 2, 3, 4, #
c. SI/Degraded Voltage Logic Enable Timer	N.A.	R	N.A.	1, 2, 3, 4

When associated DG is required to be OPERABLE by LCO 3.8.1.2, "AC Sources - Shutdown."

REACTOR COOLANT SYSTEM

3/4 4 6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.4.6.1 The following Reactor Coolant System leakage detection instrumentation shall be OPERABLE:

a Two lower containment atmosphere radioactivity monitoring (gaseous and particulate), and

b. The containment pocket sump level monitor.

APPLICABILITY: MODES 1, 2, 3 and 4

ACTION:

a. With both containment pocket sump monitors inoperable, operation may continue for up to 30 days provided SR 4.4.6.2.1 is performed once per 24 hours*; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. The provisions of Specification 3.0.4 are not applicable.

b. With either or both the gaseous or particulate lower containment atmosphere radioactivity monitors inoperable, operation may continue for up to 30 days provided grab samples of the lower containment atmosphere are analyzed once per 24 hours or SR 4.4.6.2.1 is performed once per 24 hours*; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. The provisions of Specification 3.0 4 are not applicable.

c. With both containment pocket sump monitors and both lower containment atmosphere radioactivity monitors inoperable, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4 4.6.1 The leakage detection instrumentation shall be demonstrated OPERABLE by:

a. Performance of the lower containment atmosphere gaseous and particulate monitor
⇓***at least once per 12 hours*** ***at least once per 18 months***
CHANNEL CHECK, CHANNEL CALIBRATION ~~and~~ CHANNEL FUNCTIONAL TEST at ~~the frequencies specified in Table 4 3-3,~~ and
⇑ ***least once per 92 days,***

b. Performance of containment pocket sump level monitor CHANNEL CALIBRATION at least once per 18 months.

* Surveillance performance not required until 12 hours after establishment of steady state operation.

This specification affected by previously submitted TS Change 00-14

REACTOR COOLANT SYSTEM

3/4.4 12 LOW TEMPERATURE OVER PRESSURE PROTECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.12 At least one of the following Overpressure Protection Systems shall be OPERABLE:

a. Two power operated relief valves (PORVs) with a ~~nominal~~ lift setting less than or equal to that shown in Figure 3.4-4, or

b. The Reactor Coolant System (RCS) depressurized with an RCS vent of greater than or equal to 3 square inches

APPLICABILITY: MODE 4, MODE 5 and MODE 6 with the reactor vessel head on.

ACTION:

a. With one PORV inoperable, in MODE 4 either:

   1. Restore the inoperable PORV to operable status within 7 days, or

   2. Depressurize and vent the RCS through at least a 3 square inch vent within the next 8 hours, or

   3. Ensure pressurizer level is maintained less than or equal to 30 percent

b. With one PORV inoperable in MODES 5 or 6, either (1) restore the PORV to operable status within 24 hours, or (2) complete depressurization and venting of the RCS through at least a 3 square inch vent within a total of 32 hours

c. With both PORVs inoperable, depressurize and vent the RCS through at least a 3 square inch vent within 8 hours

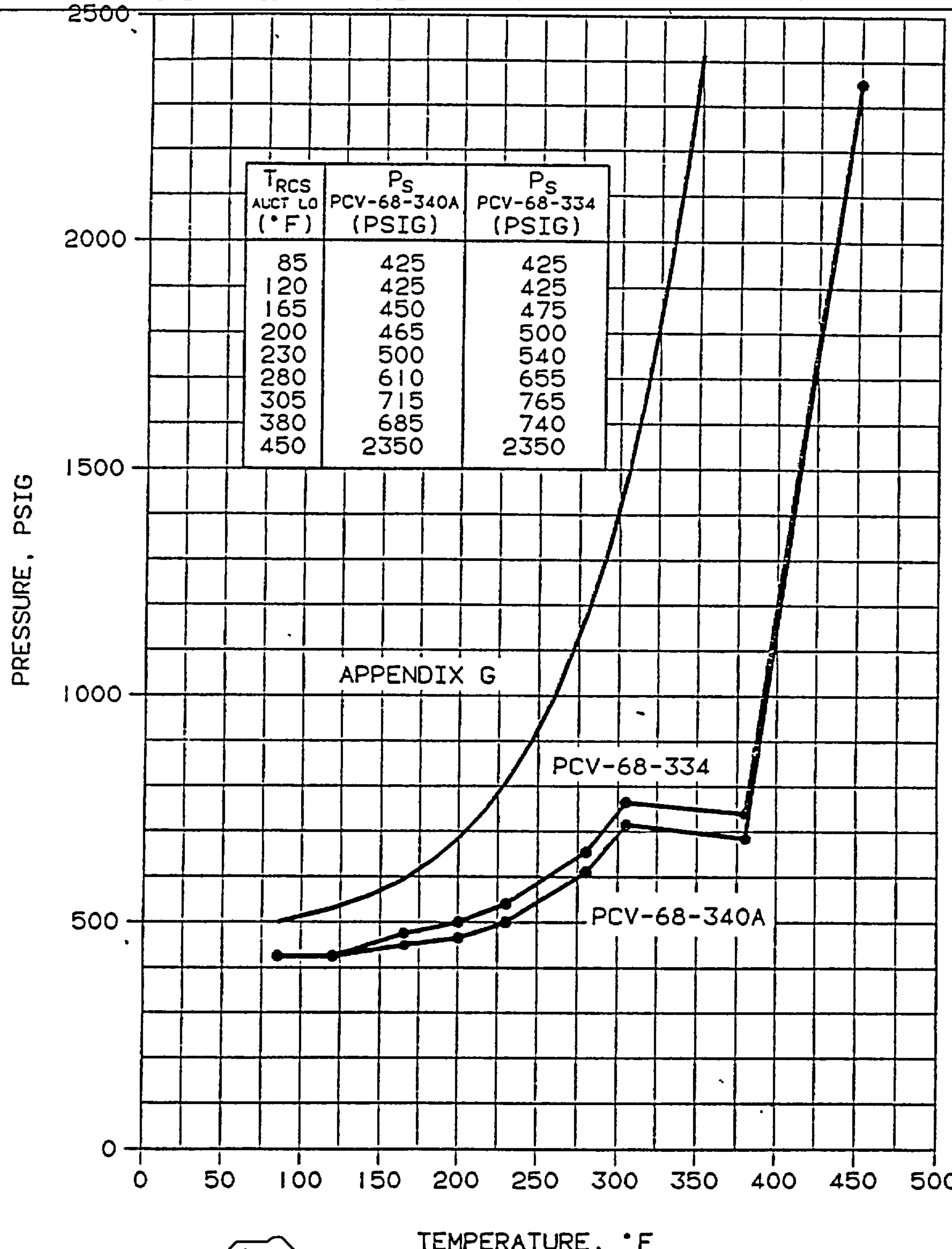
d. With the RCS vented per ACTIONS a, b, or c, verify the vent pathway at least once per 31 days when the pathway is provided by a valve(s) that is locked, sealed, or otherwise secured in the open position, otherwise, verify the vent path every 12 hours.

e. When RCS temperature is less than 350° F, both safety injection pumps and one centrifugal charging pump shall be made incapable of automatic injection into the RCS Should any of these pumps be found actually capable of automatic injection, return the pump(s) to incapable status within 12 hours or depressurize and vent RCS through at least a 3 square inch vent within the next 8 hours.

f. In the event either the PORVs or the RCS vent(s) are used to mitigate an RCS pressure transient, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days. The report shall describe the circumstances initiating the transient, the effect of the PORVs or RCS vent(s) on the transient, and any corrective action necessary to prevent recurrence.

g. The provisions of Specification 3.0.4 are not applicable.

This figure affected by previously submitted TS Change 00-14



T_{RCS} AUCT LO (°F)	P_S PCV-68-340A (PSIG)	P_S PCV-68-334 (PSIG)
85	425	425
120	425	425
165	450	475
200	465	500
230	500	540
280	610	655
305	715	765
380	685	740
450	2350	2350

PORV ~~NOMINAL~~ LIFT SETTINGS - APPLICABLE UP TO 16 EFPY

FIGURE 3.4-4

3/4.3 1 and 3/4.3 2 PROTECTIVE AND ENGINEERED SAFETY FEATURES (ESF) INSTRUMENTATION

The OPERABILITY of the protective and ESF instrumentation systems and interlocks ensure that 1) the associated ESF action and/or reactor trip will be initiated when the parameter

⇓ ***nominal trip***

monitored by each channel or combination thereof reaches its setpoint, 2) the specified coincidence logic is maintained, 3) sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance, and 4) sufficient system functional capability is available for protective and ESF purposes from diverse parameters

The OPERABILITY of these systems is required to provide the overall reliability, redundancy and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the accident analyses

Add Insert 2

The Engineered Safety Features System interlocks perform the functions indicated below on increasing the required parameter, consistent with the setpoints listed in Table 3 3-4:

⇑ ***nominal trip***

P-11 Defeats the manual block of safety injection actuation on low pressurizer pressure.

P-14 Trip of all feedwater pumps, turbine trip, closure of feedwater isolation valves and inhibits feedwater control valve modulation.

On decreasing the required parameter the opposite function is performed at reset setpoints.

The surveillance requirements specified for these systems ensure that the overall system functional capability is maintained comparable to the original design standards. The periodic surveillance tests performed at the minimum frequencies are sufficient to demonstrate this capability.

The surveillance for the comparison of the incore to the excore Axial Flux Difference is required only when reactor power is ≥ 15 percent The 96 hour delay in the first performance of the surveillance after reaching 15 percent reactor thermal power (RTP), following a refueling outage, is to achieve a higher power level and approach Xenon stability. The surveillance is typically performed when the RTP is ≥ 30 percent to ensure the results of the evaluation are more accurate and the adjustments more reliable. The frequency of 31 EFPD is to allow slow changes in neutron flux to be better detected during the fuel cycle.

3/4 3 3 MONITORING INSTRUMENTATION

3/4 3 3.1 RADIATION MONITORING INSTRUMENTATION

⇓ ***This Specification has been deleted.***

~~The OPERABILITY of the radiation monitoring channels ensures that 1) the radiation levels are continually measured in the areas served by the individual channels and 2) the alarm or automatic action is initiated when the radiation level trip setpoint is exceeded~~

~~Relative to the control room instrumentation isolation function, one set of process radiation monitors acts to automatically initiate control room isolation The actuation instrumentation consists of redundant radiation monitors. A high radiation signal from the detector will initiate its associated train of the Control Room Emergency Ventilation System (CREVS) The CREVS is also automatically actuated by a safety injection (SI) signal from either unit The SI function is discussed in LCO 3 3 2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation." In addition, the control room operator can manually initiate CREVS~~

3/4.3 3 2 MOVABLE INCORE DETECTORS

The OPERABILITY of the movable incore detectors with the specified minimum complement of equipment ensures that the measurements obtained from use of this system accurately represent the spatial neutron flux distribution of the reactor core. The OPERABILITY of this system is demonstrated by irradiating each detector used and determining the acceptability of its voltage curve

For the purpose of measuring $F_Q(X,Y,Z)$ or $F_{\Delta H}(X,Y)$ a full incore flux map is used Quarter-core flux maps, as defined in WCAP-8648, June 1976, may be used in recalibration of the excore neutron flux detection system, and full incore flux maps or symmetric incore thimbles may be used for monitoring the QUADRANT POWER TILT RATIO when one Power Range Channel is inoperable.

B 3/4.3 INSTRUMENTATION

B 3/4.3.3 11 Containment Ventilation Isolation Instrumentation

BASES

BACKGROUND

Containment Ventilation Isolation Instrumentation closes the containment isolation valves in the Containment Purge System This action isolates the containment atmosphere from the environment to minimize releases of radioactivity in the event of an accident. The Reactor Building Purge System may be in use during reactor operation and with the reactor shutdown.

Containment Ventilation Isolation is initiated by a safety injection (SI) signal or by manual actuation. The Bases for LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," discuss initiation of SI signals

Redundant and independent gaseous radioactivity monitors measure the radioactivity levels of the containment purge exhaust, each of which will initiate its associated train of automatic Containment Ventilation Isolation upon exceeding the alarm/trip setpoint.

APPLICABLE SAFETY ANALYSES

The containment isolation valves for the Reactor Building Purge System close within five seconds following the DBA. The containment ventilation isolation radiation monitors act as backup to the SI signal to ensure closing of the purge air system supply and exhaust valves. They are also the primary means for automatically isolating containment in the event of a fuel handling accident during shutdown. Containment isolation in turn ensures meeting the containment leakage rate assumptions of the safety analyses, and ensures that the calculated accidental offsite radiological doses are below 10 CFR 100 (Ref 1) limits

The Containment Ventilation Isolation instrumentation satisfies Criterion 3 of the NRC Policy Statement.

LCO

The LCO requirements ensure that the instrumentation necessary to initiate Containment Ventilation Isolation, listed in Table 3.3-14, is OPERABLE.

1. <u>Manual Initiation</u>

   The LCO requires two channels OPERABLE. The operator can initiate Containment Ventilation Isolation at any time by using either of two switches in the control room. Either switch actuates both trains. This action will cause actuation of all components in the same manner as any of the automatic actuation signals. These manual switches also initiate a Phase A isolation signal

BASES

LCO (continued)

The LCO for Manual Initiation ensures the proper amount of redundancy is maintained in the manual actuation circuitry to ensure the operator has manual initiation capability.

Each channel consists of one selector switch and the interconnecting wiring to the actuation logic cabinet.

2. Automatic Actuation Logic

The LCO requires two trains of Automatic Actuation Logic OPERABLE to ensure that no single random failure can prevent automatic actuation. Automatic Actuation Logic consists of all circuitry housed within the actuation subsystems, including the initiating relay contacts responsible for actuating Containment Ventilation Isolation.

The applicable MODES and specified conditions for the containment ventilation isolation portion of the SI Function is different and less restrictive than those for the SI role. If one or more of the SI Functions becomes inoperable in such a manner that only the Containment Ventilation Isolation Function is affected, the Conditions applicable to the SI Functions need not be entered. The less restrictive Actions specified for inoperability of the Containment Ventilation Isolation Functions specify sufficient compensatory measures for this case.

3. Containment Radiation

The LCO specifies required channels of radiation monitors to ensure that the radiation monitoring instrumentation necessary to initiate Containment Ventilation Isolation remains OPERABLE. In Modes 1 through 4, the radiation monitors provide a supplemental function to the Safety Injection signal for the isolation of containment and only requires the OPERABILITY of one channel of radiation monitors. During the movement of irradiated fuel assemblies within containment, the radiation monitors provide the primary isolation function for containment isolation and both radiation monitors are required to be OPERABLE to provide adequate single failure capability.

For sampling systems, channel OPERABILITY involves more than OPERABILITY of the channel electronics. OPERABILITY may also require correct valve lineups and sample pump operation, as well as detector OPERABILITY, if these supporting features are necessary for trip to occur under the conditions assumed by the safety analyses.

BASES

LCO (continued)

4. Safety Injection (SI)

Refer to LCO 3.3.2, Function 1, for all initiating Functions and requirements

APPLICABILITY

The Manual Initiation, Automatic Actuation Logic, Safety Injection, and Containment Radiation Functions are required OPERABLE in MODES 1, 2, 3, and 4, and during movement of irradiated fuel assemblies within containment. Under these conditions, the potential exists for an accident that could release fission product radioactivity into containment. Therefore, the Containment Ventilation Isolation Instrumentation must be OPERABLE in these MODES

While in MODES 5 and 6 without fuel handling in progress, the Containment Ventilation Isolation Instrumentation need not be OPERABLE since the potential for radioactive releases is minimized and operator action is sufficient to ensure post accident offsite doses are maintained within the limits of Reference 1.

The Applicability for the containment ventilation isolation on the ESFAS Safety Injection Functions are specified in LCO 3.3.2.

ACTIONS

The most common cause of channel inoperability is outright failure or drift sufficient to exceed the tolerance allowed by unit specific calibration procedures Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function. If the Trip Setpoint is less conservative than the tolerance specified by the calibration procedure, the channel must be declared inoperable immediately and the appropriate condition entered.

Action a - MODES 1, 2, 3, and 4

Action a. applies to all Containment Ventilation Isolation Functions and addresses the train orientation of the Solid State Protection System (SSPS) and the master and slave relays for these functions If a train is inoperable, operation may continue as long as the required action for the applicable Conditions of LCO 3.6.3 is met for each valve made inoperable by failure of isolation instrumentation.

Action b - MODES 1, 2, 3, and 4

Action b. addresses the failure of the required radiation monitoring channel. If the required radiation monitor is inoperable, operation may continue as long as the required action for the applicable Conditions of LCO 3.6 3 is met for each containment purge and exhaust isolation valve made inoperable by failure of isolation instrumentation.

BASES

ACTIONS (continued)

Action c - MODES 1, 2, 3, and 4

This action has been added to clarify the application of completion time rules. The conditions of this Specification may be entered independently for each function listed in Table 3.3-14. The completion time(s) of the inoperable channel(s)/train(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function.

Action d - MODES 1, 2, 3, and 4

Action d. allows the entry into applicable modes while relying on the required actions as an exception to the requirements of Specification 3.0.4.

Action e - MODES 1, 2, 3, and 4

Action e. has been added to allow one train of actuation logic to be placed in bypass and to delay entering the required actions for up to four hours to perform surveillance testing provided the other train is OPERABLE. The 4 hour allowance is consistent with the required actions for actuation logic trains in LCO 3.3.2, "Engineered Safety Features Actuation System Instrumentation" and allows periodic testing to be conducted while at power without causing an actual actuation. The delay for entering the required actions relieves the administrative burden of entering the required actions for isolation valves inoperable solely due to the performance of surveillance testing on the actuation logic and is acceptable based on the OPERABILITY of the opposite train.

Action a - Fuel Movement

Action a applies to the failure of one containment purge isolation radiation monitor channel. Since the two containment radiation monitors are both gaseous detectors, failure of a single channel may result in loss of the redundancy. Consequently, the failed channel must be restored to OPERABLE status. The 4 hours allowed to restore the affected channel is justified by the low likelihood of events occurring during this interval, and recognition that one or more of the remaining channels will respond to most events.

If the radiation monitor channel is not returned to OPERABLE status within the 4-hour limit, operation may continue as long as the required action for the applicable conditions of LCO 3.9.4, "Containment Building Penetrations," is met for each valve made inoperable by failure of isolation instrumentation.

Action b - Fuel Movement

Action b. applies to all Containment Ventilation Isolation Functions and addresses the train orientation of the Solid State Protection System (SSPS) and the master and slave relays for these functions. If a train is inoperable, operation may continue as long as the required action for the applicable Conditions of LCO 3 9.4, "Containment Building Penetrations," is met for each valve made inoperable by failure of isolation instrumentation.

BASES

ACTIONS (continued)

Action c. - Fuel Movement

Action c. addresses the failure of multiple radiation monitoring channels If multiple radiation monitors are inoperable, operation may continue as long as the required action for the applicable Conditions of LCO 3.9.4, "Containment Building Penetrations," is met for each valve made inoperable by failure of isolation instrumentation.

Action d - Fuel Movement

This action has been added to clarify the application of completion time rules. The conditions of this Specification may be entered independently for each function listed in Table 3.3-14. The completion time(s) of the inoperable channel(s)/train(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function.

Action e - Fuel Movement

Action e. allows the entry into applicable conditions while relying on the required actions as an exception to the requirements of Specification 3 0.4.

SURVEILLANCE REQUIREMENTS

4 3.3 11.1

Performance of the CHANNEL CHECK once every 12 hours 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. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including 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.

The frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

A CHANNEL FUNCTIONAL TEST is performed on the Automatic Actuation Logic every 31 days The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. Through the semiautomatic tester, all possible

BASES

SURVEILLANCE REQUIREMENTS (continued)

logic combinations, with and without applicable permissives, are tested for each protection function. In addition, the master relay coil is pulse tested for continuity. This verifies that the logic modules are OPERABLE and there is an intact voltage signal path to the master relay coils. This test is performed every 31 days on a STAGGERED TEST BASIS. The Surveillance interval is acceptable based on instrument reliability and industry operating experience.

A CHANNEL FUNCTIONAL TEST is performed every 92 days on each radiation monitor to ensure the entire channel will perform the intended function. The frequency is based on the staff recommendation for increasing the availability of radiation monitors according to NUREG-1366 (Ref. 2) This test verifies the capability of the instrumentation to provide the containment ventilation system isolation. The setpoint shall be left consistent with the current unit specific calibration procedure tolerance.

A CHANNEL FUNCTIONAL TEST of the Manual Initiation function is performed every 18 months. Each Manual Initiation function is tested up to, and including, the master relay coils. In some instances, the test includes actuation of the end device (i e., pump starts, valve cycles, etc)

The frequency is based on the known reliability of the function and the redundancy available, and has been shown to be acceptable through operating experience.

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The Frequency is based on operating experience and is consistent with the typical industry refueling cycle.

REFERENCES

1. Title 10, Code of Federal Regulations, Part 100 11, "Determination of Exclusion Area, Low Population Zone, and Population Center Distance."

2. NUREG-1366, "Improvement to Technical Specification Surveillance Requirements," December 1992.

B 3/4.3 INSTRUMENTATION

B 3/4.3.3.12 Auxiliary Building Gas Treatment (ABGTS) Actuation Instrumentation

BASES

BACKGROUND

The ABGTS ensures that radioactive materials in the fuel building atmosphere following a fuel handling accident or a loss of coolant accident (LOCA) are filtered and adsorbed prior to exhausting to the environment The system initiates filtered exhaust of air from the fuel handling area, ECCS pump rooms, and penetration rooms automatically following receipt of a fuel pool area high radiation signal or a Containment Phase A Isolation signal. Initiation may also be performed manually as needed from the main control room.

High area radiation, monitored by either of two monitors, provides ABGTS initiation. Each ABGTS train is initiated by high radiation detected by a channel dedicated to that train. There are a total of two channels, one for each train High radiation exceeding the monitor's alarm/trip setpoint or a Phase A isolation signal from the Engineered Safety Features Actuation System (ESFAS) initiates auxiliary building isolation and starts the ABGTS. These actions function to prevent exfiltration of contaminated air by initiating filtered ventilation, which imposes a negative pressure on the Auxiliary Building Secondary Containment Enclosure (ABSCE)

APPLICABLE SAFETY ANALYSES

The ABGTS ensures that radioactive materials in the ABSCE atmosphere following a fuel handling accident or a LOCA are filtered and adsorbed prior to being exhausted to the environment. This action reduces the radioactive content in the auxiliary building exhaust following a LOCA or fuel handling accident so that offsite doses remain within the limits specified in 10 CFR 100 (Ref 1).

The ABGTS Actuation Instrumentation satisfies Criterion 3 of the NRC Policy Statement.

LCO

The LCO requirements ensure that instrumentation necessary to initiate the ABGTS is OPERABLE.

1. Manual Initiation

The LCO requires two channels OPERABLE. The operator can initiate the ABGTS at any time by using either of two switches in the control room. This action will cause actuation of all components in the same manner as any of the automatic actuation signals.

BASES

LCO (continued)

The LCO for Manual Initiation ensures the proper amount of redundancy is maintained in the manual actuation circuitry to ensure the operator has manual initiation capability.

Each channel consists of one hand switch and the interconnecting wiring to the actuation logic relays.

2. <u>Fuel Pool Area Radiation</u>

The LCO specifies one required Fuel Pool Area Radiation Monitor during the movement of irradiated fuel assemblies in the fuel handling area to ensure that the radiation monitoring instrumentation necessary to initiate the ABGTS remains OPERABLE. One radiation monitor is dedicated to each train of ABGTS.

For sampling systems, channel OPERABILITY involves more than OPERABILITY of channel electronics. OPERABILITY may also require correct valve lineups, sample pump operation, and filter motor operation, as well as detector OPERABILITY, if these supporting features are necessary for trip to occur under the conditions assumed by the safety analyses.

3. <u>Containment Phase A Isolation</u>

Refer to LCO 3.3.2, Function 3.a, for all initiating functions and requirements.

APPLICABILITY

The manual ABGTS initiation must be OPERABLE in MODES 1, 2, 3, and 4 and when moving irradiated fuel assemblies in the fuel handling area, to ensure the ABGTS operates to remove fission products associated with leakage after a LOCA or a fuel handling accident The Phase A ABGTS Actuation is also required in MODES 1, 2, 3, and 4 to remove fission products caused by post LOCA Emergency Core Cooling Systems leakage.

High radiation initiation of the ABGTS must be OPERABLE in any MODE during movement of irradiated fuel assemblies in the fuel handling area to ensure automatic initiation of the ABGTS when the potential for a fuel handling accident exists.

While in MODES 5 and 6 without fuel handling in progress, the ABGTS instrumentation need not be OPERABLE since a fuel handling accident cannot occur.

The Applicability for the ABGTS actuation on the ESFAS Containment Isolation Phase A Functions are specified in LCO 3.3.2.

ACTIONS

The most common cause of channel inoperability is outright failure or drift sufficient to exceed the tolerance allowed by unit specific calibration procedures. Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function. If the Trip Setpoint is less conservative than the tolerance specified by the calibration procedure, the channel must be declared inoperable immediately and the appropriate Condition entered.

Action a - MODES 1, 2, 3, and 4

Action a. applies to the actuation logic train function from the Phase A Isolation and the manual function Action a applies to the failure of a single actuation logic train or manual channel If one channel or train is inoperable, a period of 7 days is allowed to restore it to OPERABLE status. If the train cannot be restored to OPERABLE status, one ABGTS train must be placed in operation. This accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation. The 7 day completion time is the same as is allowed if one train of the mechanical portion of the system is inoperable as required by Specification 3.7.8.

If the required action to return the ABGTS train to OPERABLE status or place a train of ABGTS in operation within 7 days has not been met and the plant is in MODE 1, 2, 3, or 4. The plant must be brought to a MODE in which the LCO requirements are not applicable. To achieve this status, the plant must be brought to HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours. The allowed completion times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems

Action b - MODES 1, 2, 3, and 4

Action b. applies to the failure of two ABGTS actuation logic signals from the Phase A Isolation or two manual channels. The required action is to place one ABGTS train in operation immediately. This accomplishes the actuation instrumentation function that may have been lost and places the unit in a conservative mode of operation. The applicable conditions and required actions of Specification 3.7.8 must also be entered for the ABGTS train made inoperable by the inoperable actuation instrumentation. This ensures appropriate limits are placed on train inoperability.

Alternatively, both trains may be placed in the emergency radiation protection mode. This ensures the ABGTS Function is performed even in the presence of a single failure.

BASES

ACTIONS (continued)

If the above required actions have not been met and the plant is in MODE 1, 2, 3, or 4 the plant must be brought to a MODE in which the LCO requirements are not applicable. To achieve this status, the plant must be brought to HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours The allowed completion times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems

Action c - MODES 1, 2, 3, and 4

This action has been added to clarify the application of completion time rules The conditions of this Specification may be entered independently for each function listed in Table 3.3-15. The completion time(s) of the inoperable channel(s)/train(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function.

Action d. - MODES 1, 2, 3, and 4

Action d. allows the entry into applicable modes while relying on the required actions as an exception to the requirements of Specification 3 0 4.

Action a. - Fuel Movement

Action a. applies to the failure of two ABGTS actuation logic signals from the Phase A Isolation, two radiation monitors, or two manual channels The required action is to place one ABGTS train in operation immediately. This accomplishes the actuation instrumentation function that may have been lost and places the unit in a conservative mode of operation.

When the above required action has not been met and irradiated fuel assemblies are being moved in the fuel handling area. Movement of irradiated fuel assemblies in the fuel handling area must be suspended immediately to eliminate the potential for events that could require ABGTS actuation. Performance of these actions shall not preclude moving a component to a safe position.

Action b - Fuel Movement

Action b. allows the entry into applicable modes while relying on the required actions as an exception to the requirements of Specification 3.0 4.

New Page

SURVEILLANCE REQUIREMENTS

4 3 3.12 1

Performance of the CHANNEL CHECK once every 12 hours 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. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including 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.

The frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

A CHANNEL FUNCTIONAL TEST is performed every 92 days on each radiation monitor to ensure the entire channel will perform the intended function This test verifies the capability of the instrumentation to provide the ABGTS actuation. The setpoints shall be left consistent with the unit specific calibration procedure tolerance. The frequency of 92 days is based on the known reliability of the monitoring equipment and has been shown to be acceptable through operating experience.

A CHANNEL FUNCTIONAL TEST of the Manual Initiation function is performed every 18 months. Each Manual Initiation function is tested up to, and including, the master relay coils. In some instances, the test includes actuation of the end device (i.e., pump starts, valve cycles, etc.) The frequency is based on operating experience and is consistent with the typical industry refueling cycle.

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy. The frequency is based on operating experience and is consistent with the typical industry refueling cycle

REFERENCES

1. Title 10, Code of Federal Regulations, Part 100.11, "Determination of Exclusion Area, Low Population Zone, and Population Center Distance "

B 3/4.3 INSTRUMENTATION

B 3/4.3.3.13 Control Room Emergency Ventilation System (CREVS) Actuation Instrumentation

BASES

BACKGROUND

The CREVS provides an enclosed control room environment from which the unit can be operated following an uncontrolled release of radioactivity. During normal operation, the Control Building Ventilation System provides control room ventilation. Upon receipt of an actuation signal, the CREVS initiates filtered ventilation and pressurization of the control room.

The actuation instrumentation consists of redundant radiation monitors. A high radiation alarm/trip signal from any monitor will initiate its associated trains of the CREVS The control room operator can also initiate CREVS trains by manual switches in the control room. The CREVS is also actuated by a safety injection (SI) signal.

APPLICABLE SAFETY ANALYSES

The control room must be kept habitable for the operators stationed there during accident recovery and post accident operations

The CREVS acts to terminate the supply of unfiltered outside air to the control room, initiate filtration, and emergency pressurization of the control room These actions are necessary to ensure the control room is kept habitable for the operators stationed there during accident recovery and post accident operations by minimizing the radiation exposure of control room personnel

In MODES 1, 2, 3, and 4, the radiation monitor actuation of the CREVS is a backup for the SI signal actuation. This ensures initiation of the CREVS during a loss of coolant accident or steam generator tube rupture.

The radiation monitor actuation of the CREVS in MODES 5 and 6, during movement of irradiated fuel assemblies and during CORE ALTERATIONS, is the primary means to ensure control room habitability in the event of a fuel handling or waste gas decay tank rupture accident.

The CREVS actuation instrumentation satisfies Criterion 3 of the NRC Policy Statement.

LCO

The LCO requirements ensure that instrumentation necessary to initiate the CREVS is OPERABLE.

1. <u>Manual Initiation</u>

   The LCO requires two channels OPERABLE. The operator can initiate the CREVS at any time by using either of two switches in the control room This action will cause actuation of all components in the same manner as any of the automatic actuation signals.

   The LCO for Manual Initiation ensures the proper amount of redundancy is maintained in the manual actuation circuitry to ensure the operator has manual initiation capability.

   Each channel consists of one hand switch and the interconnecting wiring to the actuation logic relays.

2. <u>Control Room Radiation</u>

   The LCO specifies two required Control Room Air Intake Radiation Monitors to ensure that the radiation monitoring instrumentation necessary to initiate the CREVS remains OPERABLE. One radiation monitor is dedicated to each train of CREVS.

   For sampling systems, channel OPERABILITY involves more than OPERABILITY of channel electronics OPERABILITY may also require correct valve lineups, sample pump operation, and filter motor operation, as well as detector OPERABILITY, if these supporting features are necessary for trip to occur under the conditions assumed by the safety analyses.

3. <u>Safety Injection</u>

   Refer to LCO 3.3.2, Function 1, for all initiating Functions and requirements

APPLICABILITY

The CREVS Functions must be OPERABLE in MODES 1, 2, 3, 4, and during movement of irradiated fuel assemblies. The Functions must also be OPERABLE in MODES 5 and 6 when required for a waste gas decay tank rupture accident, to ensure a habitable environment for the control room operators.

The Applicability for the CREVS actuation on the ESFAS Safety Injection Functions are specified in LCO 3.3 2.

ACTIONS

The most common cause of channel inoperability is outright failure or drift sufficient to exceed the tolerance allowed by the plant specific calibration procedures. Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function. If the Trip Setpoint is less conservative than the tolerance specified by the calibration procedure, the channel must be declared inoperable immediately and the appropriate condition entered.

Action a. - MODES 1, 2, 3, and 4

Action a. applies to the actuation logic train function of the CREVS, the radiation monitor channel functions, and the manual channel functions.

If one train is inoperable, or one radiation monitor channel is inoperable in one or more functions, 7 days are permitted to restore it to OPERABLE status. The 7-day completion time is the same as is allowed if one train of the mechanical portion of the system is inoperable as required by LCO 3.7.7. If the channel/train cannot be restored to OPERABLE status, one CREVS train must be placed in the emergency radiation protection mode of operation. This accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation.

If the required action to return the CREVS train to OPERABLE status or place a train of CREVS in operation within 7 days has not been met and the plant is in MODE 1, 2, 3, or 4, the plant must be brought to a MODE in which the LCO requirements are not applicable. To achieve this status, the plant must be brought to HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours. The allowed completion times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems

Action b - MODES 1, 2, 3, and 4

Action b. applies to the failure of two CREVS actuation trains, two radiation monitor channels, or two manual channels The first required action is to place one CREVS train in the emergency radiation protection mode of operation immediately. This accomplishes the actuation instrumentation function that may have been lost and places the unit in a conservative mode of operation. The applicable actions of LCO 3.7.7 must also be entered for the CREVS train made inoperable by the inoperable actuation instrumentation. This ensures appropriate limits are placed upon train inoperability.

Alternatively, both trains may be placed in the emergency radiation protection mode. This ensures the CREVS function is performed even in the presence of a single failure.

BASES

ACTIONS (continued)

If the above required actions have not been met and the plant is in MODE 1, 2, 3, or 4 the plant must be brought to a MODE in which the LCO requirements are not applicable. To achieve this status, the plant must be brought to HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours. The allowed completion times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems

Action c - MODES 1, 2, 3, and 4

This action has been added to clarify the application of completion time rules. The conditions of this Specification may be entered independently for each function listed in Table 3.3-16. The completion time(s) of the inoperable channel(s)/train(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function.

Action d. - MODES 1, 2, 3, and 4

Action d. allows the entry into applicable modes while relying on the required actions as an exception to the requirements of Specification 3.0 4.

Action a - MODES 5 and 6

Action a. applies to the actuation logic train function of the CREVS, the radiation monitor channel functions, and the manual channel functions.

If one train is inoperable, or one radiation monitor channel is inoperable in one or more functions, 7 days are permitted to restore it to OPERABLE status The 7-day completion time is the same as is allowed if one train of the mechanical portion of the system is inoperable as required by LCO 3.7.7. If the channel/train cannot be restored to OPERABLE status, one CREVS train must be placed in the emergency radiation protection mode of operation. This accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation.

If the required action to return the CREVS train to OPERABLE status or place a train of CREVS in operation within 7 days has not been met and the plant is in MODE 5 or 6, actions must be initiated to restore the inoperable train to OPERABLE status immediately to ensure adequate isolation capability in the event of a waste gas decay tank rupture.

BASES

ACTIONS (continued)

Action b - MODES 5 and 6

Action b. applies to the failure of two CREVS actuation trains, two radiation monitor channels, or two manual channels. The first required action is to place one CREVS train in the emergency radiation protection mode of operation immediately This accomplishes the actuation instrumentation function that may have been lost and places the unit in a conservative mode of operation. The applicable actions of LCO 3 7.7 must also be entered for the CREVS train made inoperable by the inoperable actuation instrumentation. This ensures appropriate limits are placed upon train inoperability.

Alternatively, both trains may be placed in the emergency radiation protection mode. This ensures the CREVS function is performed even in the presence of a single failure.

If the above required actions have not been met and the plant is in MODE 5 or 6, actions must be initiated to restore the inoperable trains to OPERABLE status immediately to ensure adequate isolation capability in the event of a waste gas decay tank rupture.

Action c - MODES 5 and 6

This action has been added to clarify the application of completion time rules. The conditions of this Specification may be entered independently for each function listed in Table 3.3-16. The completion time(s) of the inoperable channel(s)/train(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function.

Action d - MODES 5 and 6

Action d allows the entry into applicable modes while relying on the required actions as an exception to the requirements of Specification 3.0.4.

Action a - Fuel Movement

Action a. applies to the actuation logic train function of the CREVS, the radiation monitor channel functions, and the manual channel functions.

If one train is inoperable, or one radiation monitor channel is inoperable in one or more functions, 7 days are permitted to restore it to OPERABLE status. The 7-day completion time is the same as is allowed if one train of the mechanical portion of the system is inoperable as required by LCO 3.7.7. If the channel/train cannot be restored to OPERABLE status, one CREVS train must be placed in the emergency radiation protection mode of operation. This accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation.

If the required action to return the CREVS train to OPERABLE status or place a train of CREVS in operation within 7 days has not been met when irradiated fuel assemblies are being moved, movement of irradiated fuel assemblies must be suspended immediately to reduce the risk of accidents that would require CREVS actuation

Action b - Fuel Movement

Action b. applies to the failure of two CREVS actuation trains, two radiation monitor channels, or two manual channels. The first required action is to place one CREVS train in the emergency radiation protection mode of operation immediately. This accomplishes the actuation instrumentation function that may have been lost and places the unit in a conservative mode of operation. The applicable actions of LCO 3.7.7 must also be entered for the CREVS train made inoperable by the inoperable actuation instrumentation. This ensures appropriate limits are placed upon train inoperability.

Alternatively, both trains may be placed in the emergency radiation protection mode This ensures the CREVS function is performed even in the presence of a single failure.

If the above required actions have not been met when irradiated fuel assemblies are being moved, movement of irradiated fuel assemblies must be suspended immediately to reduce the risk of accidents that would require CREVS actuation

Action c - Fuel Movement

This action has been added to clarify the application of completion time rules The conditions of this Specification may be entered independently for each function listed in Table 3.3-16. The completion time(s) of the inoperable channel(s)/train(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function.

Action d. - Fuel Movement

Action d. allows the entry into applicable modes while relying on the required actions as an exception to the requirements of Specification 3.0.4.

BASES

SURVEILLANCE REQUIREMENTS

4 3 3 13.1

Performance of the CHANNEL CHECK once every 12 hours 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. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including 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

The frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

A CHANNEL FUNCTIONAL TEST is performed every 92 days on each radiation monitor to ensure the entire channel will perform the intended function. This test verifies the capability of the instrumentation to provide the CREVS actuation. The setpoints shall be left consistent with the unit specific calibration procedure tolerance The frequency of 92 days is based on the known reliability of the monitoring equipment and has been shown to be acceptable through operating experience.

A CHANNEL FUNCTIONAL TEST of the Manual Initiation function is performed every 18 months. Each Manual Initiation function is tested up to, and including, the master relay coils. In some instances, the test includes actuation of the end device (i.e., pump starts, valve cycles, etc.). The frequency is based on operating experience and is consistent with the typical industry refueling cycle.

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy. The frequency is based on operating experience and is consistent with the typical industry refueling cycle.

REFERENCES

None.

B 3/4.3 INSTRUMENTATION

B 3/4.3.3.14 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

BASES

BACKGROUND

The DGs provide a source of emergency power when offsite power is either unavailable or is insufficiently stable to allow safe unit operation Undervoltage protection will generate an LOP start if a loss-of-voltage or degraded voltage condition occurs in the switchyard. There are four LOP start signals, one for each 6.9 kV Shutdown Board

Three degraded voltage relays (one per phase) are provided on each 6.9 kV Shutdown Board for detecting a sustained undervoltage condition. The relays are combined in a two-out-of-three logic configuration to generate a shutdown board load shed actuation and start the DGs if the voltage is below 93.5% for 300 seconds (nominal) If a safety injection signal is present at the time of the degraded voltage condition or if a safety injection actuation occurs during a degraded voltage condition, the load shed actuation will occur within 9.5 seconds (nominal).

Additionally, three loss-of-voltage relays (one per phase) are provided on each 6.9 kV Shutdown Board for the purpose of detecting a loss-of-voltage condition. These relays are combined in a two-out-of-three logic to generate a shutdown board load shed actuation and start the DGs if the voltage is below 80% for 1.25 seconds (nominal) The LOP start actuation is described in FSAR Section 8.3, "Onsite Power System" (Reference 1).

Allowable Values and LOP DG Start Instrumentation Setpoints

The trip setpoints used in the relays and timers are based on the analytical limits presented in TVA calculations, References 3, 4, and 5. The selection of these trip setpoints is such that adequate protection is provided when all sensor and time delays are taken into account.

The Nominal Trip Setpoint is the expected value to be achieved during calibrations The Nominal Trip Setpoint considers all factors which may affect channel performance by statistically combining rack drift, rack measurement and test equipment effects, rack calibration accuracy, rack comparator setting accuracy, rack temperature effects, sensor measurements and test equipment effects, sensor calibration accuracy, primary element accuracy, and process measurement accuracy. The Allowable Value has been established by considering the measurable values assumed for rack effects only. The Allowable Value serves as an operability limit for the purpose of the CHANNEL FUNCTIONAL TESTS.

BASES

BACKGROUND (continued)

Setpoints adjusted consistent with the requirements of the Allowable Value ensure that the consequences of accidents will be acceptable, providing the unit is operated from within the LCOs at the onset of the accident and that the equipment functions as designed.

Allowable Values and/or Nominal Trip Setpoints are specified for each function in Table 3.3-17. Nominal Trip Setpoints are also specified in the unit specific setpoint calculations The trip setpoints are selected to ensure that the setpoint measured by the surveillance procedure does not exceed the Allowable Value if the relay is performing as required. If the measured setpoint does not exceed the Allowable Value, the relay is considered OPERABLE Operation with a trip setpoint less conservative than the Nominal Trip Setpoint, but within the Allowable Value, is acceptable provided that operation and testing is consistent with the assumptions of the unit specific setpoint calculation (Reference 3).

APPLICABLE SAFETY ANALYSES

The LOP DG start instrumentation is required for the Engineered Safety Features (ESF) Systems to function in any accident with a loss of offsite power. Its design basis is that of the ESF Actuation System (ESFAS).

Accident analyses credit the loading of the DG based on the loss of offsite power during a loss of coolant accident (LOCA). The actual DG start has historically been associated with the ESFAS actuation. The DG loading has been included in the delay time associated with each safety system component requiring DG supplied power following a loss of offsite power. The analyses assume a non-mechanistic DG loading, which does not explicitly account for each individual component of loss of power detection and subsequent actions.

The channels of LOP DG start instrumentation, in conjunction with the ESF systems powered from the DGs, provide unit protection in the event of any of the analyzed accidents discussed in Reference 2, in which a loss of offsite power is assumed.

The delay times assumed in the safety analysis for the ESF equipment include the 10 second DG start delay, and the appropriate sequencing delay, if applicable. The response times for ESFAS actuated equipment in LCO 3.3 2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," include the appropriate DG loading and sequencing delay.

The LOP DG start instrumentation channels satisfy Criterion 3 of the NRC Policy Statement.

LCO

The LCO for LOP DG Start Instrumentation requires that the loss-of-voltage, degraded voltage, load shed, and DG Start functions shall be OPERABLE in MODES 1, 2, 3, and 4 when the LOP DG Start Instrumentation supports safety systems associated with the ESFAS. In MODES 5 and 6, the functions must be OPERABLE whenever the associated DG is required to be OPERABLE to ensure that the automatic start of the DG is available when needed A channel is OPERABLE with an actual trip setpoint value outside its calibration tolerance band provided the trip setpoint value is conservative with respect to its associated Allowable Value and the channel is readjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A trip setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions. Loss of the LOP DG Start Instrumentation function could result in the delay of safety systems initiation when required. This could lead to unacceptable consequences during accidents During the loss of offsite power the DG powers the motor driven auxiliary feedwater pumps Failure of these pumps to start would leave only one turbine driven pump, as well as an increased potential for a loss of decay heat removal through the secondary system.

APPLICABILITY

The LOP DG Start Instrumentation Functions are required in MODES 1, 2, 3, and 4 because ESF Functions are designed to provide protection in these MODES Actuation in MODE 5 or 6 is required whenever the required DG must be OPERABLE so that it can perform its function on an LOP or a degraded voltage condition on the 6.9 kV Shutdown Board.

ACTIONS

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the channel is found inoperable, then the function that channel provides must be declared inoperable and the LCO condition entered for the particular protection function affected

<u>Action a</u>

Action a. applies to the LOP DG start function with one channel of voltage sensors per board inoperable.

If one channel of voltage sensors is inoperable, Action a. requires the channel to be restored to OPERABLE status within 6 hours The specified completion time is reasonable considering the function remains fully OPERABLE on every board and the low probability of an event occurring during these intervals

When the inoperable channel can not be returned to OPERABLE status within 6 hours, the requirements specified in LCO 3.8 1.1, "AC Sources Operating," or LCO 3 8.1.2, "AC Sources Shutdown," for the DG made inoperable by failure of the LOP DG start instrumentation are required to be entered immediately. The actions of those LCOs provide for adequate compensatory actions to assure unit safety.

BASES

ACTIONS (continued)

Action b

Action b. applies when more than one channel of voltage sensors or the required timer(s) on a single board is inoperable.

Action b. requires restoring all but one channel of voltage sensors and at least one timer for each required function to OPERABLE status The 1 hour completion time should allow ample time to repair most failures and takes into account the low probability of an event requiring an LOP start occurring during this interval

When the inoperable channel can not be returned to OPERABLE status within 1 hour, the requirements specified in LCO 3.8.1.1, "AC Sources Operating," or LCO 3.8.1.2, "AC Sources Shutdown," for the DG made inoperable by failure of the LOP DG start instrumentation are required to be entered immediately. The actions of those LCOs provide for adequate compensatory actions to assure unit safety.

Action c

Because the required channels are specified on a per shutdown board basis, the condition may be entered separately for each board as appropriate.

Action c. has been added to clarify the application of completion time rules. The conditions of this Specification may be entered independently for each function listed in the LCO. The completion time(s) of the inoperable channel(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function.

Action d

Action d. has been added to direct entry into the applicable actions of LCO 3.3.2, "Engineered Safety Feature Actuation System Instrumentation," for inoperable Auxiliary Feedwater Loss of Power start instrumentation. The loss-of-voltage relays required by this LCO also initiate load shed and the sequencing functions that initiate the start of the motor driven auxiliary feedwater pumps for a loss of power condition and generate a start signal for the turbine driven auxiliary feedwater pump as required in LCO 3.3.2.

SURVEILLANCE REQUIREMENTS

4.3 3 14 1

A CHANNEL FUNCTIONAL TEST of the voltage sensors is performed every 31 days. This test checks operation of the loss-of-voltage and degraded voltage sensors that provide actuation signals. The frequency is based on the known

BASES

SURVEILLANCE REQUIREMENTS (continued)

reliability of the relays and timers and the redundancy available, and has been shown to be acceptable through operating experience.

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the loss-of-voltage and degraded voltage functions, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The setpoints, as well as the response to a loss-of-voltage and a degraded voltage test, shall include a single point verification that the trip occurs within the required time delay, as shown in Reference 1.

The frequency of 18 months is based on operating experience and consistency with the typical industry refueling cycle and is justified by the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

REFERENCES

1. Sequoyah FSAR, Section 8.3, "Onsite Power System."
2. Sequoyah FSAR, Section 15 0, "Accident Analysis "
3. TVA Calculation 27 DAT, "Demonstrated Accuracy Calculation 27 DAT"
4. TVA Calculation DS1-2, "Demonstrated Accuracy Calculation DS1-2"
5. TVA Calculation SQN-EEB-MS-TI06-0008, "Degraded Voltage Analysis"

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

SECTION PAGE

3/4 2 POWER DISTRIBUTION LIMITS

3/4 3 INSTRUMENTATION

Add Insert 3

2 2 LIMITING SAFETY SYSTEM SETTINGS

REACTOR TRIP SYSTEM INSTRUMENTATION SETPOINTS

2.2.1 The reactor trip system instrumentation and interlocks setpoints shall be set consistent with ~~the Trip Setpoint~~ values shown in Table 2.2-1.
⇑ ***Nominal***

APPLICABILITY: As shown for each channel in Table 3.3-1.

ACTION:

With a reactor trip system instrumentation or interlock setpoint less conservative than the value shown in the Allowable Values column of Table 2.2-1, declare the channel inoperable and apply the applicable ACTION statement requirement of Specification 3 3.1 until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the ~~Trip Setpoint~~ value.
⇑ ***Nominal***

TABLE 2.2-1

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓*NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
1. Manual Reactor Trip	Not Applicable	Not Applicable
2. Power Range Neutron Flux	Low Setpoint - ≤ 25% of RATED THERMAL POWER High Setpoint - ≤ 109% of RATED THERMAL POWER	Low Setpoint - ≤ 27.4% of RATED THERMAL POWER High Setpoint - ≤ 111.4% of RATED THERMAL POWER
3. Power Range Neutron Flux High Positive Rate	≤ 5% of RATED THERMAL POWER with a time constant ≥ 2 second	≤ 6.3% of RATED THERMAL POWER with a time constant ≥ 2 second
4. Power Range Neutron Flux, High Negative Rate	≤ 5% of RATED THERMAL POWER with a time constant ≥ 2 second	≤ 6.3% of RATED THERMAL POWER with a time constant ≥ 2 second
5. Intermediate Range, Neutron Flux	≤ 25% of RATED THERMAL POWER	≤ 45.20% of RATED THERMAL POWER
6. Source Range Neutron Flux	≤ 10^5 counts per second	≤ 1.45×10^5 counts per second
7. Overtemperature ΔT	See Note 1	See Note 3
8. Overpower ΔT	See Note 2	See Note 4
9. Pressurizer Pressure--Low	≥ 1970 psig	≥ 1964.8 psig
10. Pressurizer Pressure--High	≤ 2385 psig	≤ 2390.2 psig
11. Pressurizer Water Level--High	≤ 92% of instrument span	≤ 92.7% of instrument span
12. Loss of Flow	≥ 90% of design flow per loop*	≥ 89.6% of design flow per loop*

*Design flow is 90,045 (87,000 X 1.035) gpm per loop.

TABLE 2 2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓*NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
13 Steam Generator Water Level–Low-Low		
a RCS Loop ΔT Equivalent to Power ≤ 50% RTP	RCS Loop ΔT variable input ≤ 50% RTP	RCS Loop ΔT variable input ≤ trip setpoint + 2 5% RTP ⇑ *nominal*
Coincident with Steam Generator Water Level–Low-Low (Adverse) and	≥ 15.0% of narrow range instrument span	≥ 14.4% of narrow range instrument span
Containment Pressure (EAM)	≤ 0.5 psig	≤ 0.6 psig
or		
Steam Generator Water Level–Low-Low (EAM)	≥ 10.7% of narrow range instrument span	≥ 10.1% of narrow range instrument span
With		
A time delay (T_S) if one Steam Generator is affected	≤ T_S (Note 5)	≤ (1.01) T_S (Note 5)
or		
A time delay (T_m) if two or more Steam Generators are affected	≤ T_M Note 5)	≤ (1.01)T_M (Note 5)

TABLE 2 2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓***NOMINAL*** TRIP SETPOINT	ALLOWABLE VALUES
b. RCS Loop ΔT Equivalent to Power > 50% RTP		
Coincident with Steam Generator Water Level--Low-Low(Adverse) and	~~≥~~ 15.0% of narrow range instrument span	≥ 14.4% of narrow range instrument span
Containment Pressure (EAM)	~~≤~~ 0 5 psig	≤ 0.6 psig
or		
Steam Generator Water Level--Low-Low (EAM)	~~≥~~ 10.7% of narrow range instrument span	≥ 10.1% of narrow range instrument span
14. Deleted		
15. Undervoltage-Reactor Coolant Pumps	~~≥~~ 5022 volts-each bus	**4952** ≥ ~~4739~~ volts - each bus
16. Underfrequency-Reactor Coolant Pumps	**57.0** ~~≥ 56~~ Hz - each bus	**56.3** ≥ ~~55 9~~ Hz - each bus
17. Turbine Trip		
A. Low Trip System Pressure	~~≥~~ 45 psig	≥ 43 psig
B. Turbine Stop Valve Closure	~~≥~~ 1% open	> 1% open
18. Safety Injection Input from ESF	Not Applicable	Not Applicable

TABLE 2 2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓*NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
19. Intermediate Range Neutron Flux, P-6, Enable Block Source Range Reactor Trip	$\geq 1 \times 10^{-5}$% of RATED THERMAL POWER	$\geq 6 \times 10^{-6}$% of RATED THERMAL POWER
20. Power Range Neutron Flux (not P-10) Input to Low Power Reactor Trips Block P-7	≤ 10% of RATED THERMAL POWER	≤ 12.4% of RATED THERMAL POWER
21. Turbine Impulse Chamber Pressure -(P-13) Input to Low Power Reactor Trips Block P-7	≤ 10% Turbine Impulse Pressure Equivalent	≤ 12.4% Turbine Impulse Pressure Equivalent
22. Power Range Neutron Flux - (P-8) Low Reactor Coolant Loop Flow, and Reactor Trip	≤ 35% of RATED THERMAL POWER	≤ 37 4% of RATED THERMAL POWER
23 Power Range Neutron Flux - (P-I0) - Enable block of Source, Intermediate, and Power Range (low setpoint) Reactor Trips	≥ 10% of RATED THERMAL POWER	≥ 7.6% of RATED THERMAL POWER
24. Reactor Trip P-4	Not Applicable	Not Applicable
25. Power Range Neutron Flux - (P-9) Blocks Reactor Trip for Turbine - Trip Below 50% Rated Power	≤ 50% of RATED THERMAL POWER	≤ 52 4% of RATED THERMAL POWER

TABLE 2.2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

NOTATION

NOTE 1:

$$\text{Overtemperature } \Delta T \left(\frac{1 + \tau_4 S}{1 + \tau_5 S}\right) \leq \Delta T_0 \left\{K_1 - K_2 \left(\frac{1 + \tau_1 S}{1 + \tau_2 S}\right)[T - T'] + K_3 (P - P') - f_1 (\Delta I)\right\}$$

Where:

$\frac{1 + \tau_4 S}{1 + \tau_5 S}$	=	Lead-lag compensator on measured ΔT
τ_4, τ_5	=	Time constants utilized in the lead-lag controller for ΔT, $\tau_4 \geq 5$ secs, $\tau_5 \leq 3$ sec.
ΔT_0	=	Indicated ΔT at RATED THERMAL POWER
K_1	≤	1.15
K_2	≥	0 011
$\frac{1 + \tau_1 S}{1 + \tau_2 S}$	=	The function generated by the lead-lag controller for T_{avg} dynamic compensation
τ_1, & τ_2	=	Time constants utilized in the lead-lag controller for T_{avg}, $\tau_1 \geq 33$ secs., $\tau_2 \leq 4$ secs.
T	=	Average temperature °F
T'	≤	578.2°F (~~Nominal~~ T_{avg} at RATED THERMAL POWER)
K_3	=	0.00055
P	=	Pressurizer pressure, psig
P'	=	2235 psig (Nominal RCS operating pressure)

TABLE 2.2-1 (Continued)
REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

NOTATION (Continued)

NOTE 1: (Continued)

S = Laplace transform operator (sec^{-1})

and $f_1(\Delta I)$ is a function of the indicated difference between top and bottom detectors of the power-range nuclear ion chambers; with gains to be selected based on measured instrument response during plant startup tests such that.

(i) for q_t - q_b between QTNL* and QTPL* $f_1(\Delta I) = 0$ (where q_t and q_b are percent RATED THERMAL POWER in the top and bottom halves of the core respectively, and $q_t + q_b$ is total THERMAL POWER in percent of RATED THERMAL POWER).

(ii) ⇓ *nominal*
for each percent that the magnitude of (q_t - q_b) exceeds QTNL*, the ΔT trip set point shall be automatically reduced by QTNS* of its value at RATED THERMAL POWER.

(iii) ⇓ *nominal*
for each percent that the magnitude of (q_t - q_b) exceeds QTPL*, the ΔT trip set-point shall be automatically reduced by QTPS* of its value at RATED THERMAL POWER.

NOTE 2: Overpower $$\Delta T\left(\frac{1+\tau_4 S}{1+\tau_5 S}\right) \leq \Delta T_0 \left\{K_4 - K_5\left(\frac{\tau_3 S}{1+\tau_3 S}\right) T - K_6 \;(T - T'') - f_2\;(\Delta I)\right\}$$

Where: $\frac{1+\tau_4 S}{1+\tau_5 S}$ = as defined in Note 1

* QTNL, QTPL, QTNS, and QTPS are specified in the COLR per Specification 6.9.1.14.

TABLE 2 2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS
NOTATION (Continued)

NOTE 2: (Continued)

τ_4, τ_5	=	as defined in Note 1
ΔT_0	=	as defined in Note 1
K_4	≤	1.087
K_5	≥	0.02/°F for increasing average temperature and 0 for decreasing average temperature
$\frac{\tau_3 S}{1 + \tau_3 S}$	=	The function generated by the rate-lag controller for T_{avg} dynamic compensation
τ_3	=	Time constant utilized in the rate-lag controller for T_{avg}, $\tau_3 \geq$ 10 secs
K_6	≥	0.0011 for $T > T''$ and $K_6 \geq 0$ for $T \leq T''$
T	=	as defined in Note 1
T"	=	Indicated T_{avg} at RATED THERMAL POWER (Calibration temperature for ΔT instrumentation, ≤ 578.2°F)
S	=	as defined in Note 1

and $f_2(\Delta I)$ is a function of the indicated difference between top and bottom detectors of the power-range nuclear ion chambers, with gains to be selected based on measured instrument response during plant startup tests such that:

(i) for $q_t - q_b$ between QPNL* and QPPL* $f_2(\Delta I) = 0$ (where q_t and q_b are percent RATED THERMAL POWER in the top and bottom halves of the core respectively, and $q_t + q_b$ is total THERMAL POWER in percent of RATED THERMAL POWER).

(ii) for each percent that the magnitude of $(q_t - q_b)$ exceeds QPNL* the ΔT ⇓ ***nominal*** trip setpoint shall be automatically reduced by QPNS* of its value at RATED THERMAL POWER.

(iii) for each percent that the magnitude of $(q_t - q_b)$ exceeds QPPL* the ΔT ⇓ ***nominal*** trip setpoint shall be automatically reduced by QPPS* of its value at RATED THERMAL POWER.

*QPNL, QPPL, QPNS, and QPPS are specified in the COLR per Specification 6.9.1.14.

TABLE 2 2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

NOTATION (Continued)

nominal ⇓ ⇓ **set**

NOTE 3. The channel's maximum trip setpoint shall not exceed its computed trip point by more than 1.9 percent ΔT span

nominal ⇓

NOTE 4: The channel's maximum trip setpoint shall not exceed its computed trip setpoint by more than 1.7 percent ΔT span

NOTE 5: Trip Time Delay - Steam Generator Water Level--Low-Low

$$T_s = \{(-0.00583)(P)^3 + (0.735)(P)^2 - (33.560)(P) + 649.5\}\{0.99\} \text{ secs}$$

$$T_m = \{(-0.00532)(P)^3 + (0.678)(P)^2 - (31.340)(P) + 589.5\}\{0.99\} \text{ secs}$$

Where.

P = RCS Loop ΔT Equivalent to Power (% RTP), $P \geq 50\%$ RTP

T_s = Time delay for Steam Generator Water Level--Low-Low Reactor Trip, one Steam Generator affected (secs).

T_m = Time delay for Steam Generator Water Level--Low-Low Reactor Trip, two or more Steam Generators affected (secs)

2 1.1 REACTOR CORE (Continued)

These limiting heat flux conditions are higher than those calculated for the range of all control rods fully withdrawn to the maximum allowable control rod insertion assuming the axial power imbalance is within the limits of the f_1(delta I) function of the Overtemperature Delta T trip. When the axial power imbalance is not within the tolerance, the axial power imbalance effect on the Overtemperature delta T trips will reduce the setpoints to provide protection consistent with core safety limits.

2 1.2 REACTOR COOLANT SYSTEM PRESSURE

The restriction of this Safety Limit protects the integrity of the Reactor Coolant System from overpressurization and thereby prevents the release of radionuclides contained in the reactor coolant from reaching the containment atmosphere.

The reactor pressure vessel and pressurizer are designed to Section III of the ASME Code for Nuclear Power Plant which permits a maximum transient pressure of 110% (2735 psig) of design pressure The Reactor Coolant System piping, valves and fittings, are designed to ANSI B 31.1 1967 Edition, which permits a maximum transient pressure of 120% (2985 psig) of component design pressure. The Safety Limit of 2735 psig is therefore consistent with the design criteria and associated code requirements.

The entire Reactor Coolant System is hydrotested at 3107 psig, 125% of design pressure, to demonstrate integrity prior to initial operation.

2.2 1 REACTOR TRIP SYSTEM INSTRUMENTATION SETPOINTS

⇓ *Nominal*

The Reactor Trip Setpoint Limits specified in Table 2.2-1 are the values at which the

⇓ *Nominal*

Reactor Trips are set for each functional unit. The Trip Setpoints have been selected to ensure that the reactor core and reactor coolant system are prevented from exceeding their safety limits during normal operation and design basis anticipated operational occurrences and to assist the Engineered Safety Features Actuation System in mitigating the consequences of accidents

⇓ *Nominal*

Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable

Nominal ⇓

Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is equal to or less than th~~e drift~~ allowance assumed for each trip in the safety analyses.

⇑ *rack*

Add Insert 1

Add Insert 2

3/4.3.2 ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Feature Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4.
⇑ ***Nominal***

APPLICABILITY: As shown in Table 3.3-3.

ACTION:

a. With an ESFAS instrumentation channel or interlock trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3-4, declare the channel inoperable and apply the applicable ACTION requirement of Table 3 3-3 until the channel is restored to OPERABLE status with the trip setpoint adjusted consistent with the Trip Setpoint value.
⇑ ***Nominal***

b. With an ESFAS instrumentation channel or interlock inoperable, take the ACTION shown in Table 3.3-3.

SURVEILLANCE REQUIREMENTS

4 3 2.1.1 Each ESFAS instrumentation channel and interlock shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4.3-2.

4.3 2.1.2 The logic for the interlocks shall be demonstrated OPERABLE during the automatic actuation logic test. The total interlock function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by interlock operation.

4.3 2.1.3 The ENGINEERED SAFETY FEATURES RESPONSE TIME of each ESFAS function shall be verified to be within the limit at least once per 18 months. Each verification shall include at least one train such that both trains are verified at least once per 36 months and one channel per function such that all channels are verified at least once per N times 18 months where N is the total number of redundant channels in a specific ESFAS function as shown in the "Total No of Channels" Column of Table 3.3-3

TABLE 3 3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
3. CONTAINMENT ISOLATION					
b. Phase "B" Isolation					
1) Manual	2	1**	2	1, 2, 3, 4	20
2) Automatic Actuation Logic	2	1	2	1, 2, 3, 4	15
3) Containment Pressure-High-High	4	2	3	1, 2, 3	18
~~c. Containment Ventilation Isolation~~					
~~1) Manual~~	~~2~~	~~1~~	~~2~~	~~1, 2, 3, 4~~	~~19*~~
~~2) Automatic Isolation Logic~~	~~2~~	~~1~~	~~2~~	~~1, 2, 3, 4~~	~~15~~
~~3) Containment Purge Air Exhaust Monitor Radioactivity-High~~	~~2~~	~~1~~	~~1~~	~~1, 2, 3, 4~~	~~19*~~

** Two switches must be operated simultaneously for actuation.

TABLE 3 3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
e. Loss of Power Start					
1. Voltage Sensors	3/shutdown board**	2/shutdown board**	3/shutdown board**	1, 2, 3	35
2. Load Shed Timer	2/shutdown board**	1/shutdown board**	⇓ 1 ~~2~~/shutdown board**	1, 2, 3	35
f. Trip of Main Feedwater Pumps Start Motor-Driven Pumps and Turbine Driven Pump	1/pump	1/pump	1/pump	1, 2	20*
g. Auxiliary Feedwater Suction Pressure-Low	3/pump	2/pump	3/pump	1, 2, 3	21*
h. Auxiliary Feedwater Suction Transfer Time Delays					
1. Motor-Driven Pump	1/pump	1/pump	1/pump	1, 2, 3	21*
2. Turbine-Driven Pump	2/pump	1/pump	2/pump	1, 2, 3	21*

** Unit 2 Shutdown Boards Only

TABLE 3 3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
⇓ 7. *This Specification has been deleted.*					
7 LOSS OF POWER					
a 6 9 kv Shutdown Board --Loss of Voltage					
1 Voltage Sensors	3/shutdown board	2/shutdown board	3/shutdown board	1, 2, 3, 4, 5####, 6####	34
2 Diesel Generator Start and Load Shed Timer	2/shutdown board	1/shutdown board	2/shutdown board	1, 2, 3, 4, 5####, 6####	34
b 6 9 kv Shutdown Board Degraded Voltage					
1. Voltage Sensors	3/shutdown board	2/shutdown board	3/shutdown board	1, 2, 3, 4, 5####, 6####	34
2 Diesel Generator Start and Load Shed Timer	2/shutdown board	1/shutdown board	2/shutdown board	1, 2, 3, 4, 5####, 6####	34
3 SI/Degraded Voltage Logic Enable Timer	2/shutdown board	1/shutdown board	2/shutdown board	1, 2, 3, 4	34

TABLE 3 3-3 (Continued)

TABLE NOTATION

\# Trip function may be bypassed in this MODE below P-11 (Pressurizer Pressure Block of Safety Injection) setpoint.

\## Trip function automatically blocked above P-11 and may be blocked below P-11 when Safety Injection on Steam Line Pressure-Low is not blocked.

\### When Associated Diesel Generator is required to be OPERABLE by LCO 3.8.1.2, "AC Sources-Shutdown." The Provisions of Specification 3.0 4 are not applicable.

* The provisions of Specification 3 0 4 are not applicable.

ACTION STATEMENTS

ACTION 15 - With the number of OPERABLE Channels one less than the Total Number of Channels, be in HOT STANDBY within 12 hours and in COLD SHUTDOWN within the following 30 hours; however, one channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1.1 provided the other channel is OPERABLE.

ACTION 16 - Deleted.

ACTION 17 - With the number of OPERABLE Channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours

b. The Minimum Channels OPERABLE requirements is met, however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.2.1.1.

ACTION 18 - With the number of OPERABLE Channels one less than the Total Number of Channels, operation may proceed provided the inoperable channel is placed in the bypassed condition within 6 hours and the Minimum Channels OPERABLE requirement is met; one additional channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1.1.

⇩ *Deleted*

ACTION 19 - ~~With less than the Minimum Channels OPERABLE, operation may continue provided the containment purge supply and exhaust valves are maintained closed~~

ACTION 20 - With the number of OPERABLE Channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours

TABLE 3 3-3 (Continued)

ACTION 21 - With less than the Minimum Number of Channels OPERABLE, declare the associated auxiliary feedwater pump inoperable, and comply with the ACTION requirements of Specification 3.7.1.2.

ACTION 22- With less than the Minimum Number of Channels OPERABLE, declare the interlock inoperable and verify that all affected channels of the functions listed below are OPERABLE or apply the appropriate ACTION statement(s) for those functions. Functions to be evaluated are:

a Safety Injection
  Pressurizer Pressure
  Steam Line Pressure
  Negative Steam Line Pressure Rate

b Deleted

c Turbine Trip
  Steam Generator Level High-High
  Feedwater Isolation
  Steam Generator Level High-High

ACTION 23 - With the number of OPERABLE channels one less than the Total Number of Channels, be in at least HOT STANDBY within 6 hours and in at least HOT SHUTDOWN within the following 6 hours; however, one channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3 2.1.1.

ACTION 24 - With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within 6 hours and in at least HOT SHUTDOWN within the following 6 hours

ACTION 25- With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or declare the associated valve inoperable ~~and take the ACTION required by Specification 3 7 1.5.~~

⇓ ***Deleted***

ACTION 34 - ~~a With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 6 hours or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated diesel generator set made inoperable by the channel~~

~~b With the number of OPERABLE channels less than the Total Number of Channels by more than one, restore all but one channel to OPERABLE status within 1 hour or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated diesel generator set made inoperable by the channels~~

TABLE 3.3-3 (Continued)

ACTION 35 - a. With the number of OPERABLE channels one less than the Total Number of ⇓ *for voltage sensors* Channels, restore the inoperable channel to OPERABLE status within 6 hours or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated auxiliary feedwater pump made inoperable by the channel.

b. With the number of OPERABLE channels less than the Total Number of ⇓ *for voltage sensors or timers* Channels by more than one, restore all but one channel to OPERABLE status within 1 hour or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated auxiliary feedwater pump made inoperable by the channels.

ACTION 36 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied.

a The inoperable channel is placed in the tripped condition within 6 hours

b. For the affected protection set, the Trip Time Delay for one affected steam generator (T_S) is adjusted to match the Trip Time Delay for multiple affected steam generators (T_M) within 4 hours.

c. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.2 1.1.

ACTION 37 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided that within 6 hours, for the affected protection set, the Trip Time Delays (T_S and T_M) threshold power level for zero seconds time delay is adjusted to 0% RTP.

ACTION 38 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided that within 6 hours, for the affected protection set, the Steam Generator Water Level - Low-Low (EAM) channels trip setpoint is adjusted to the same value as Steam Generator Water Level - Low-Low (Adverse).

TABLE 3 3-4

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓*NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
1. SAFETY INJECTION, TURBINE TRIP AND FEEDWATER ISOLATION		
a. Manual Initiation	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c Containment Pressure--High	≤1.54 psig	≤1.6 psig
d. Pressurizer Pressure--Low	≥1870 psig	≥1864.8 psig
e. Deleted		
f. Steam Line Pressure--Low	≥600 psig steam line pressure (Note 1)	≥592.2 psig steam line pressure (Note 1)

TABLE 3 3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓*NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
2. CONTAINMENT SPRAY		
a. Manual Initiation	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Containment Pressure--High-High	~~≤~~2.81 psig	≤2.9 psig
3. CONTAINMENT ISOLATION		
a. Phase "A" Isolation		
1. Manual	Not Applicable	Not Applicable
2. From Safety Injection Automatic Actuation logic	Not Applicable	Not Applicable
b. Phase "B" Isolation		
1. Manual	Not Applicable	Not Applicable
2. Automatic Actuation Logic	Not Applicable	Not Applicable
3. Containment Pressure--High-High	~~≤~~2.81 psig	≤2.9 psig
~~c Containment Ventilation Isolation~~		
~~1 Manual~~	~~Not Applicable~~	~~Not Applicable~~
~~2 Automatic Isolation Logic~~	~~Not Applicable~~	~~Not Applicable~~

TABLE 3 3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓*NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
~~3. Containment Purge Air Exhaust Monitor Radioactivity - High~~	~~$\leq 8.5 \times 10^{-3}$ µCi/cc~~	~~$\leq 8.5 \times 10^{-3}$ µCi/cc~~
4. STEAM LINE ISOLATION		
a. Manual	Not Applicable	Not Applicable
b Automatic Actuation Logic	Not Applicable	Not Applicable
c. Containment Pressure--High-High	≤2.81 psig	≤2.9 psig
d. Steam Line Pressure--Low	≥600 psig steam line pressure (Note 1)	≥592.2 psig steam line pressure (Note 1)
e Negative Steam Line Pressure Rate--High	≤100.0 psi (Note 2)	≤107.8 psi (Note 2)
5. TURBINE TRIP AND FEEDWATER ISOLATION		
a. Steam Generator Water level -- High-High	≤81% of narrow range instrument span each steam generator	≤81.7% of narrow range instrument span each steam generator
b. Automatic Actuation Logic	N A.	N.A.

TABLE 3 3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓*NOMINAL* TRIP SETPOINT	ALLOWABLE VALUES
6. AUXILIARY FEEDWATER		
a. Manual	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Main Steam Generator Water Level--Low-Low		
i. RCS Loop ΔT Equivalent to Power ≤50% RTP	RCS Loop ΔT variable input ≤ 50% RTP	RCS Loop ΔT variable ⇓ *nominal* input ≤ trip setpoint +2.5% RTP
Coincident with Steam Generator Water Level--Low-Low (Adverse) and	≥15.0% of narrow range instrument span	≥14.4% of narrow range instrument span
Containment Pressure-EAM	≤0.5 psig	≤0.6 psig
or		
Steam Generator Water Level--Low-Low (EAM)	≥10.7% of narrow range instrument span	≥10.1% of narrow instrument span
with		
A time delay (T_S) if one Steam Generator is affected	≤T_S (Note 5, Table 2.2-1)	≤ (1.01) T_S (Note 5, Table 2.2-1)
or		
A time delay (T_M) if two or more Steam Generators are affected	≤T_M (Note 5, Table 2.2-1)	≤ (1.01) T_M (Note 5, Table 2.2-1)

TABLE 3 3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓***NOMINAL*** TRIP SETPOINT	ALLOWABLE VALUES
ii. RCS Loop ΔT Equivalent to Power > 50% RTP		
Coincident with Steam Generator Water Level--Low-Low (Adverse)	≥15.0% of narrow range instrument span	≥14 4% of narrow range instrument span
and		
Containment Pressure (EAM)	≤0.5 psig	≤0 6 psig
or		
Steam Generator Water Level--Low-Low (EAM)	≥10.7% of narrow range instrument span	≥10.1% of narrow range instrument span
d S.I.	See 1 above (all SI Setpoints)	
e Loss of Power Start	⇓ ***Refer to Function 1 of Table***	***3.3-17 for setpoints***
1 Voltage Sensors	~~≥ 5520 volts~~ ***and allowable values.***	~~≥ 5331 volts~~
2. Load Shed Timer	~~1 25 seconds~~	~~1 25 ±0 25 seconds~~
f. Trip of Main Feedwater Pumps	N.A	N.A.
g. Auxiliary Feedwater Suction Pressure-Low	≥3 21 psig (motor driven pump)	≥ 2.44 psig (motor driven pump)
	≥13.9 psig (turbine driven pump)	≥ 12 psig (turbine driven pump)
h. Auxiliary Feedwater Suction Transfer Time Delays	4 seconds (motor driven pump)	≤ ***4.4 seconds*** ≥ ***3.6 seconds*** ~~4 seconds +0 4~~ (motor driven pump) ~~seconds~~
	5.5 seconds (turbine driven pump)	≤ ***6.05 seconds*** ≥ ***4.95 seconds*** ~~5.5 seconds +0 55 seconds~~(turbine driven pump)

TABLE 3 3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓***NOMINAL*** TRIP SETPOINT	ALLOWABLE VALUES
⇓ ***7. This Specification has been deleted.***		
~~7. LOSS OF POWER~~		
~~a 6 9 kv Shutdown Board Undervoltage Loss of Voltage~~		
~~1. Voltage Sensors~~	~~≥ 5520 volts~~	~~≥ 5331 volts~~
~~2 Diesel Generator Start and Load Shed Timer~~	~~1 25 seconds~~	~~1 25 ±0 25 seconds~~
~~b 6 9 kv Shutdown Board Degraded Voltage~~		
~~1. Voltage Sensors~~	~~6456 volts~~	~~≥ 6403 5 volts (dropout)~~ ~~≤ 6595 5 volts (reset)~~
~~2. Diesel Generator Start and Load Shed Timer~~	~~≤300 seconds~~	~~≤ 370 seconds~~
~~3 SI/Degraded Voltage Logic Enable Timer~~	~~9 5 seconds~~	~~9 5 ± 2 0 seconds~~
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS		
a Pressurizer Pressure		
1. Not P-11, Automatic Unblock of Safety Injection on Increasing Pressure	≤1970 psig	≤1975 2 psig
2. P-11, Enable Manual Block of Safety Injection on Decreasing Pressure	≥1962 psig	≥1956 8 psig

TABLE 3 3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	⇓***NOMINAL*** TRIP SETPOINT	ALLOWABLE VALUES
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS (Continued)		
b Deleted		
c. Deleted		
d. Steam Generator Level Turbine Trip, Feedwater Isolation P-14	(See 5. above)	
9 AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP		
a. RWST Level - Low COINCIDENT WITH	130" from tank base	≤ ***132.71" from tank base*** ⇓ ≥ ***127.29"*** ~~130" ± 2 71"~~ from tank base
Containment Sump Level - High	30" above elev. 680'	≤ ***31.68" above elev. 680'*** ⇓ ≥ ***28.32"*** ~~30" ± 1 68"~~ above elev. 680'
AND Safety Injection	(See 1 above for all Safety Injection Setpoints/Allowable Valves)	
b Automatic Actuation Logic	N A	N A

Note 1: Time constants utilized in the lead-lag controller for Steam Pressure-Low are $\tau_1 \geq 50$ seconds and $\tau_2 \leq 5$ seconds.

Note 2: Time constant utilized in the rate-lag controller for Negative Steam Line Pressure Rate-High is $\tau_1 \geq 50$ seconds

TABLE 4 3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
3. CONTAINMENT ISOLATION				
a. Phase "A" Isolation				
1) Manual	N A	N.A.	R	1, 2, 3, 4
2) From Safety Injection Automatic Actuation Logic	N.A	N A	M(1)	1, 2, 3, 4
b. Phase "B" Isolation				
1) Manual	N.A.	N A	R	1, 2, 3, 4
2) Automatic Actuation Logic	N.A.	N.A	M(1)	1, 2, 3, 4
3) Containment Pressure--High-High	S	R	Q	1, 2, 3
~~c Containment Ventilation Isolation~~				
~~1) Manual~~	~~N A.~~	~~N A.~~	~~R~~	~~1, 2, 3, 4~~
~~2) Automatic Isolation Logic~~	~~N A.~~	~~N A.~~	~~M(1)~~	~~1, 2, 3, 4~~
~~3) Containment Purge Air Exhaust Monitor Radioactivity-High~~	~~S~~	~~R~~	~~Q~~	~~1, 2, 3, 4~~

TABLE 4 3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
c. Main Steam Generator Water Level--Low-Low				
1. Steam Generator Water Level--Low-Low (Adverse)	S	R	Q	1, 2, 3
2. Steam Generator Water Level--Low-Low (EAM)	S	R	Q	1, 2, 3
3. RCS Loop ΔT	S	R	Q	1, 2, 3
4. Containment Pressure (EAM)	S	R	Q	1, 2, 3
d. S.I	See 1 above (all SI surveillance requirements)			
e. Loss of Power Start				
1. Voltage Sensors	N.A.	R	M	1, 2, 3
2. Load Shed Timer	N.A.	R	N.A.	1, 2, 3
f. Trip of Main Feedwater Pumps	N.A.	N.A	R	1, 2
g. Auxiliary Feedwater Suction Pressure-Low	N.A.	R	N.A	1, 2, 3
h. Auxiliary Feedwater Suction ~~Transfer Time Delays~~	N.A.	R	N.A.	1, 2, 3

⇓ ***7. This Specification has been deleted.***

~~7 LOSS OF POWER~~

~~a 6 9 kv Shutdown Board - Loss of Voltage~~				
~~1 Voltage Sensors~~	~~N A~~	~~R~~	~~M~~	~~1, 2, 3, 4, 5#, 6#~~
~~2 Diesel Generator Start and Load Shed Timer~~	~~N A~~	~~R~~	~~N A~~	~~1, 2, 3, 4, 5#, 6#~~

TABLE 4 3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
~~b 6 9 kv Shutdown Board - Degraded Voltage~~				
~~1. Voltage Sensors~~	~~N A~~	~~R~~	~~M~~	~~1, 2, 3, 4, 5#, 6#~~
~~2. Diesel Generators Start and Load Shed Timer~~	~~N A~~	~~R~~	~~N A~~	~~1, 2, 3, 4, 5#, 6#~~
~~3 SI/Degraded Voltage Logic Enable Timer~~	~~N A~~	~~R~~	~~N A~~	~~1, 2, 3, 4~~
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS				
a Pressurizer Pressure, P-11/Not P-11	N.A.	R(2)	N A	1, 2, 3
b. Deleted				
c. Steam Generator Level, P-14	N A.	R(2)	N.A	1, 2
9. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP				
a. RSWT Level - Low COINCIDENT WITH	S	R	Q	1, 2, 3, 4
Containment Sump Level - High AND	S	R	Q	1, 2, 3, 4
Safety Injection	(See 1 above for all Safety Injection Surveillance Requirements)			
b. Automatic Actuation Logic	N.A	N.A.	M(1)	1, 2, 3, 4

3/4 3 3 MONITORING INSTRUMENTATION

RADIATION MONITORING INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

⇓ ***This Specification has been deleted***

3.3.3.1 The radiation monitoring instrumentation channels shown in Table 3 3-6 shall be OPERABLE with their alarm/trip setpoints within the specified limits

APPLICABILITY: As shown in Table 3 3-6

ACTION:

a With a radiation monitoring channel alarm/trip setpoint exceeding the value shown in Table 3 3-6, adjust the setpoint to within the limit within 4 hours or declare the channel inoperable

b With one or more radiation monitoring channels inoperable, take the ACTION shown in Table 3 3-6

c The provisions of Specifications 3 0 3 and 3 0.4 are not applicable

SURVEILLANCE REQUIREMENTS

4 3 3 1 Each radiation monitoring instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4 3-3

TABLE 3 3-6
RADIATION MONITORING INSTRUMENTATION

This Table has been deleted.
⇓ (Pages 3/4 3-41 and 3/4 3-42 are deleted)

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ALARM/TRIP SETPOINT	MEASUREMENT RANGE	ACTION
1 AREA MONITOR					
a Fuel Storage Pool Area	1	*	≤200 mR/hr	10^{-1} – 10^{4} mR/hr	26
2 PROCESS MONITORS					
a Containment Purge Air	1	1, 2, 3, 4 & 6	≤8 5 x 10^{-3} μCi/cc	10 – 10^{7} cpm	28
b. Containment					
i Gaseous Activity					
RCS Leakage Detection	1	1, 2, 3 & 4	N/A	10 – 10^{7} cpm	27
ii Particulate Activity					
RCS Leakage Detection	1	1, 2, 3 & 4	N/A	10 – 10^{7} cpm	27
c Control Room Isolation	2	ALL MODES and during movement of irradiated fuel assemblies	≤ 400 cpm**	10 – 10^{7} cpm	29

* With fuel in the storage pool or building

** Equivalent to 1.0 x 10^{-5} μCi/cc

TABLE 3.3-6 (Continued)

ACTION STATEMENTS

ACTION 26 - With the number of OPERABLE channels less than required by the Minimum Channels OPERABLE requirement, perform area surveys of the monitored area with portable monitoring instrumentation at least once per 24 hours.

ACTION 27 - With the number of OPERABLE channels less than required by the Minimum Channels OPERABLE requirement, comply with the ACTION requirements of Specification 3.4.6.1.

ACTION 28 - With the number of OPERABLE channels less than required by the Minimum Channels OPERABLE requirement, comply with the ACTION requirements of Specification 3.9.9 (MODE 6) and 3.3.2 (MODES 1, 2, 3, and 4).

ACTION 29 - a. With one channel inoperable, place the associated control room emergency ventilation system (CREVS) train in recirculation mode of operation within 7 days or be at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With two channels inoperable, within 1 hour initiate and maintain operation of one CREVS train in the recirculation mode of operation and enter the required Actions for one CREVS train made inoperable by inoperable CREVS actuation instrumentation.

Or

place both trains in the recirculation mode of operation within one hour.

If the completion time of Action 29b cannot be met in Modes 1, 2, 3, and 4, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

If the completion time of Action 29b cannot be met during the movement of irradiated fuel assemblies, suspend core alterations and suspend movement of irradiated fuel assemblies.

If the completion time of Action 29b cannot be met in Modes 5 and 6, initiate action to restore one CREVS train.

TABLE 4 3-3

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

⇓ ***This Table has been deleted.***

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
1. AREA MONITOR				
a Fuel Storage Pool Area	S	R	Q	*
2 PROCESS MONITORS				
a Containment Purge Air Exhaust	S	R	Q	1, 2, 3, 4 & 6
b Containment				
i Gaseous Activity				
RCS Leakage Detection	S	R	Q	1, 2, 3, & 4
ii Particulate Activity				
RCS Leakage Detection	S	R	Q	1, 2, 3 & 4
c Control Room Isolation	S	R	Q	ALL MODES

* With fuel in the storage pool or building

New Page

CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3 11 The Containment Ventilation Isolation Instrumentation for each function in Table 3 3-14 shall be OPERABLE.

APPLICABILITY: According to Table 3.3-14

ACTION:

MODES 1, 2, 3, and 4

a. With one or more functions inoperable with one or more manual or automatic actuation trains inoperable, immediately enter applicable conditions and actions of Specification 3.6.3, "Containment Isolation Valves," for containment ventilation isolation valves made inoperable by isolation instrumentation.

b. With the required radiation monitoring channel inoperable, immediately enter applicable conditions and actions of Specification 3.6 3, "Containment Isolation Valves," for containment purge and exhaust isolation valves made inoperable by isolation instrumentation.

c. Separate condition entry is allowed for each function.

d. The provisions of Specification 3 0.4 are not applicable.

e. One train of automatic actuation logic may be bypassed and Action a. may be delayed for up to 4 hours for surveillance testing provided the other train is OPERABLE.

During movement of irradiated fuel assemblies within containment

a. With one radiation monitoring channel inoperable, restore the affected channel to OPERABLE status within 4 hours or enter applicable conditions and actions of Specification 3 9.4, "Containment Building Penetrations," for containment ventilation isolation valves made inoperable by isolation instrumentation.

b. With one or more functions inoperable with one or more manual or automatic actuation trains inoperable, immediately enter applicable conditions and actions of Specification 3 9.4, "Containment Building Penetrations," for containment ventilation isolation valves made inoperable by isolation instrumentation.

c. With two radiation monitoring channels inoperable, immediately enter applicable conditions and actions of Specification 3.9.4, "Containment Building Penetrations," for containment ventilation isolation valves made inoperable by isolation instrumentation.

New Page

ACTION (Continued)

d. Separate condition entry is allowed for each function.

e. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3 3.11.1 Each Containment Ventilation Isolation Instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 4.3-10.

4.3.3.11.2 The ENGINEERED SAFETY FEATURES RESPONSE TIME of each Containment Ventilation Isolation Instrumentation function shall be verified to be within the limit at least once per 18 months Each verification shall include at least one train such that both trains are verified at least once per 36 months. The Safety Injection function response time is addressed in Specification 3.3.2.

New Page

TABLE 3 3-14

CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION

FUNCTION	APPLICABLE MODES OR CONDITIONS	REQUIRED CHANNELS	ALLOWABLE VALUE	MEASUREMENT RANGE
1. Manual Initiation	1, 2, 3, & 4, **	2	NA	NA
2. Automatic Actuation Logic	1, 2, 3, & 4, **	2	NA	NA
3. Containment Purge Air Exhaust Radiation Monitors	1, 2, 3, & 4	1	≤ 100,000 cpm	10 - 10^7 cpm
4. Containment Purge Air Exhaust Radiation Monitors	**	2	≤ 100,000 cpm	10 - 10^7 cpm
5. Safety Injection	#	#	#	#

TABLE 4 3-10

CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTION	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE REQUIRED
1. Manual Initiation	N.A.	N.A	R	1, 2, 3, & 4, **
2. Automatic Actuation Logic	N. A.	N. A.	M*	1, 2, 3, & 4, **
3. and 4. Containment Purge Air Exhaust Radiation Monitors	S	R	Q	1, 2, 3, & 4, **
5 Safety Injection	#	#	#	#

* Each train or logic channel shall be tested at least every 62 days on a STAGGERED TEST BASIS.

** During movement of irradiated fuel assemblies within containment

Refer to Specification 3.3.2, "Engineered Safety Feature Actuation System Instrumentation," Function 1 for all initiating functions and requirements.

New Page

INSTRUMENTATION

AUXILIARY BUILDING GAS TREATMENT SYSTEM (ABGTS) ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3.12 The ABGTS Actuation Instrumentation for each function in Table 3.3-15 shall be OPERABLE.

APPLICABILITY: According to Table 3.3-15

ACTION:

MODES 1, 2, 3, and 4

a With one or more functions with one channel or train inoperable, place one ABGTS train in operation within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b With one or more functions with two channels or trains inoperable, immediately place one ABGTS train in operation and enter applicable conditions and actions of Specification 3.7.8, "Auxiliary Building Gas Treatment System," for one train made inoperable by inoperable actuation instrumentation or immediately place both ABGTS trains in emergency radiation protection mode; Otherwise, be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours

c. Separate condition entry is allowed for each function.

d. The provisions of Specification 3 0.4 are not applicable.

During movement of irradiated fuel assemblies in the fuel handling area

a. With one or more functions with two channels or trains inoperable, immediately place one ABGTS train in operation or immediately suspend movement of irradiated fuel assemblies in the fuel handling area.

b. The provisions of Specifications 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.3.12.1 Each ABGTS Actuation Instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 4.3-11.

New Page

TABLE 3.3-15

AUXILIARY BUILDING GAS TREATMENT SYSTEM ACTUATION INSTRUMENTATION

FUNCTION	APPLICABLE MODES OR CONDITIONS	REQUIRED CHANNELS	ALLOWABLE VALUE	MEASUREMENT RANGE
1. Manual Initiation	1, 2, 3, & 4, **	2	NA	NA
2. Fuel Storage Pool Area Radiation Monitors	**	1 (Same Train as Required ABGTS)	≤ 307 mR/hr	10^{-1} - 10^{4} mR/hr
3. Containment Isolation Phase "A"	#	#	#	#

TABLE 4 3-11

AUXILIARY BUILDING GAS TREATMENT SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTION	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE REQUIRED
1. Manual Initiation	N.A.	N A	R	1, 2, 3, & 4, **
2. Fuel Storage Pool Area Radiation Monitors	S	R	Q	**
3. Containment Isolation Phase "A"	#	#	#	#

** During movement of irradiated fuel assemblies in the fuel handling area.

Refer to Specification 3.3.2, "Engineered Safety Feature Actuation System Instrumentation," Function 3.a for all initiating functions and requirements.

New Page

CONTROL ROOM EMERGENCY VENTILATION SYSTEM (CREVS) ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3 3.3 13 The CREVS Actuation Instrumentation for each function in Table 3.3-16 shall be OPERABLE.

APPLICABILITY: According to Table 3.3-16

ACTION:

MODES 1, 2, 3, and 4

a. With one or more functions with one channel or train inoperable, place one CREVS train in recirculation mode of operation within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours

b. With one or more functions with two channels or trains inoperable, within one (1) hour place one CREVS train in recirculation mode operation and enter applicable conditions and actions of Specification 3.7.7, "Control Room Emergency Ventilation System," for one train made inoperable by inoperable actuation instrumentation or within one (1) hour place both CREVS trains in emergency radiation protection mode; Otherwise, be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. Separate condition entry is allowed for each function

d. The provisions of Specification 3.0.4 are not applicable.

MODES 5 and 6

a. With one or more functions with one channel or train inoperable, place one CREVS train in recirculation mode of operation within 7 days or immediately initiate action to restore one CREVS train to OPERABLE status

b. With one or more functions with two channels or trains inoperable, within one (1) hour place one CREVS train in recirculation mode operation and enter applicable conditions and actions of Specification 3.7.7, "Control Room Emergency Ventilation System," for one train made inoperable by inoperable actuation instrumentation or within one (1) hour place both CREVS trains in emergency radiation protection mode, Otherwise, immediately initiate action to restore the CREVS trains to OPERABLE status.

c. Separate condition entry is allowed for each function

d. The provisions of Specifications 3.0.4 are not applicable.

New Page

ACTION (Continued)

During movement of irradiated fuel assemblies

a. With one or more functions with one channel or train inoperable, place one CREVS train in recirculation mode of operation within 7 days or immediately suspend movement of irradiated fuel assemblies.

b. With one or more functions with two channels or trains inoperable, within one (1) hour place one CREVS train in recirculation mode operation and enter applicable conditions and actions of Specification 3.7.7, "Control Room Emergency Ventilation System," for one train made inoperable by inoperable actuation instrumentation or within one (1) hour place both CREVS trains in emergency radiation protection mode; Otherwise, immediately suspend movement of irradiated fuel assemblies

c. Separate condition entry is allowed for each function

d The provisions of Specifications 3.0 4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3 3 13.1 Each CREVS Actuation Instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 4.3-12.

New Page

TABLE 3 3-16

CONTROL ROOM EMERGENCY VENTILATION SYSTEM ACTUATION INSTRUMENTATION

	FUNCTION	APPLICABLE MODES OR CONDITIONS	REQUIRED CHANNELS	ALLOWABLE VALUE	MEASUREMENT RANGE
1.	Manual Initiation	1, 2, 3, 4, 5, & 6**	2	NA	NA
2.	Control Room Intake Radiation Monitors	1, 2, 3, 4, 5, & 6**	2	≤ 43,400 cpm	10 - 10^7 cpm
3.	Safety Injection	#	#	#	#

TABLE 4 3-12

CONTROL ROOM EMERGENCY VENTILATION SYSTEM ACTUATION INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

	FUNCTION	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE REQUIRED
1.	Manual Initiation	N A.	N.A.	R	1, 2, 3, 4, 5, & 6, **
2.	Control Room Intake Radiation Monitors	S	R	Q	1, 2, 3, 4, 5, & 6, **
3	Safety Injection	#	#	#	#

** During movement of irradiated fuel assemblies.

Refer to Specification 3.3.2, "Engineered Safety Feature Actuation System Instrumentation," Function 1 for all initiating functions and requirements.

New Page

LOSS OF POWER (LOP) DIESEL GENERATOR (DG) START INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3.14 The LOP DG start instrumentation for each function in Table 3.3-17 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4,
When associated DG is required to be OPERABLE by LCO 3.8 1.2, "AC Sources - Shutdown."

ACTION:

a. With the number of OPERABLE channels one less than the Required Channels for voltage sensors, restore the inoperable channel to OPERABLE status within 6 hours or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated DG set made inoperable by the channel.

b With the number of OPERABLE channels less than the Required Channels by more than one for voltage sensors or with the number of OPERABLE channels one less than the Required Channels for timers, restore all but one channel of voltage sensors and at least one timer for each function to OPERABLE status within 1 hour or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated DG set made inoperable by the channels

c. Separate entry is allowed for each function.

d. Enter applicable Actions of LCO 3.3.2, "Engineered Safety Feature Actuation System Instrumentation," for Auxiliary Feedwater Loss of Power Start Instrumentation made inoperable by LOP DG Start Instrumentation.

SURVEILLANCE REQUIREMENTS

4.3.3 14.1 Each LOP DG Start Instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 4.3-13.

4.3.3 14.2 The ENGINEERED SAFETY FEATURES RESPONSE TIME of each LOP DG Start Instrumentation function shall be verified to be within the limit at least once per 18 months. Each verification shall include at least one train such that both trains are verified at least once per 36 months and one channel per function such that all channels are verified at least once every N times 18 months where N is the total number of redundant channels.

New Page

TABLE 3 3-17

LOSS OF POWER DIESEL GENERATOR START INSTRUMENTATION

FUNCTIONAL UNIT	APPLICABLE MODES OR CONDITIONS	REQUIRED CHANNELS	NOMINAL TRIP SETPOINT	ALLOWABLE VALUES
1. 6.9 kv Shutdown Board - Loss of Voltage				
a. Voltage Sensors	1, 2, 3, 4, #	3/Shutdown Board	5520	≥ 5331 volts and ≤ 5688 volts
b. Diesel Generator Start and Load Shed Timer	1, 2, 3, 4, #	1/Shutdown Board	1.25 seconds	≥ 1.00 seconds and ≤ 1.50 seconds
2. 6.9 kv Shutdown Board - Degraded Voltage				
a Voltage Sensors	1, 2, 3, 4, #	3/Shutdown Board	6456 volts	≥ 6403.5 volts and ≤ 6522.5 volts
b. Diesel Generator Start and Load Shed Timer	1, 2, 3, 4, #	1/Shutdown Board	300 seconds	≥ 218.6 seconds and ≤ 370 seconds
c. SI/Degraded Voltage Logic Enable Timer	1, 2, 3, 4	1/Shutdown Board	9.5 seconds	≥ 7.5 seconds and ≤ 11.5 seconds

When associated DG is required to be OPERABLE by LCO 3.8.1.2, "AC Sources - Shutdown." The provision of Specification 3.0.4 are not applicable.

New Page

TABLE 4 3-13

LOSS OF POWER DIESEL GENERATOR START INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE REQUIRED
1. 6.9 kv Shutdown Board - Loss of Voltage				
a Voltage Sensors	N.A	R	M	1, 2, 3, 4, #
b. Diesel Generator Start and Load Shed Timer	N A	R	N.A.	1, 2, 3, 4, #
2 . 6.9 kv Shutdown Board - Degraded Voltage				
a. Voltage Sensors	N A	R	M	1, 2, 3, 4, #
b. Diesel Generators Start and Load Shed Timer	N.A.	R	N.A.	1, 2, 3, 4, #
c SI/Degraded Voltage Logic Enable Timer	N.A	R	N.A.	1, 2, 3, 4

When associated DG is required to be OPERABLE by LCO 3.8.1.2, "AC Sources - Shutdown."

REACTOR COOLANT SYSTEM

3/4.4 6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3 4.6 1 The following Reactor Coolant System leakage detection instrumentation shall be OPERABLE:

a. Two lower containment atmosphere radioactivity monitors (gaseous and particulate), and

b. One containment pocket sump level monitor.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a With both containment pocket sump monitors inoperable, operation may continue for up to 30 days provided SR 4.4.6.2.1 is performed once per 24 hours*; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. The provisions of Specification 3 0 4 are not applicable.

b. With either or both the gaseous or particulate lower containment atmosphere radioactivity monitors inoperable, operation may continue for up to 30 days provided grab samples of the lower containment atmosphere are analyzed once per 24 hours or SR 4 4.6.2.1 is performed once per 24 hours*, otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. The provisions of Specification 3.0 4 are not applicable.

c With both containment pocket sump monitors and both lower containment atmosphere radioactivity monitors inoperable, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours .

SURVEILLANCE REQUIREMENTS

4.4.6.1 The leakage detection instrumentation shall be demonstrated OPERABLE by:

a Performance of the lower containment atmosphere gaseous and particulate monitor
⇓***at least once per 12 hours*** ***at least once per 18 months***
CHANNEL CHECK, CHANNEL CALIBRATION ~~and~~ CHANNEL FUNCTIONAL TEST at ~~the frequencies specified in Table 4 3-3,~~ and
⇑ ***least once per 92 days,***

b Performance of containment pocket sump level monitor CHANNEL CALIBRATION at least once per 18 months.

* Surveillance performance not required until 12 hours after establishment of steady state operation.

This specification affected by previously submitted TS Change 00-14

3/4 4 12 LOW TEMPERATURE OVER PRESSURE PROTECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3 4.12 At least one of the following Overpressure Protection Systems shall be OPERABLE:

a. Two power operated relief valves (PORVs) with a ~~nominal~~ lift setting less than or equal to that shown in Figure 3.4-4, or

b. The Reactor Coolant System (RCS) depressurized with an RCS vent of greater than or equal to 3 square inches.

APPLICABILITY: MODE 4, MODE 5, and MODE 6 with the reactor vessel head on

ACTION:

a. With one PORV inoperable, in MODE 4 either.

   1. Restore the inoperable PORV to operable status within 7 days, or

   2 Depressurize and vent the RCS through at least a 3 square inch vent within the next 8 hours, or

   3 Ensure pressurizer level is maintained less than or equal to 30 percent

b. With one PORV inoperable in MODES 5 or 6, either (1) restore the PORV to operable status within 24 hours, or (2) complete depressurization and venting of the RCS through at least a 3 square inch vent within a total of 32 hours.

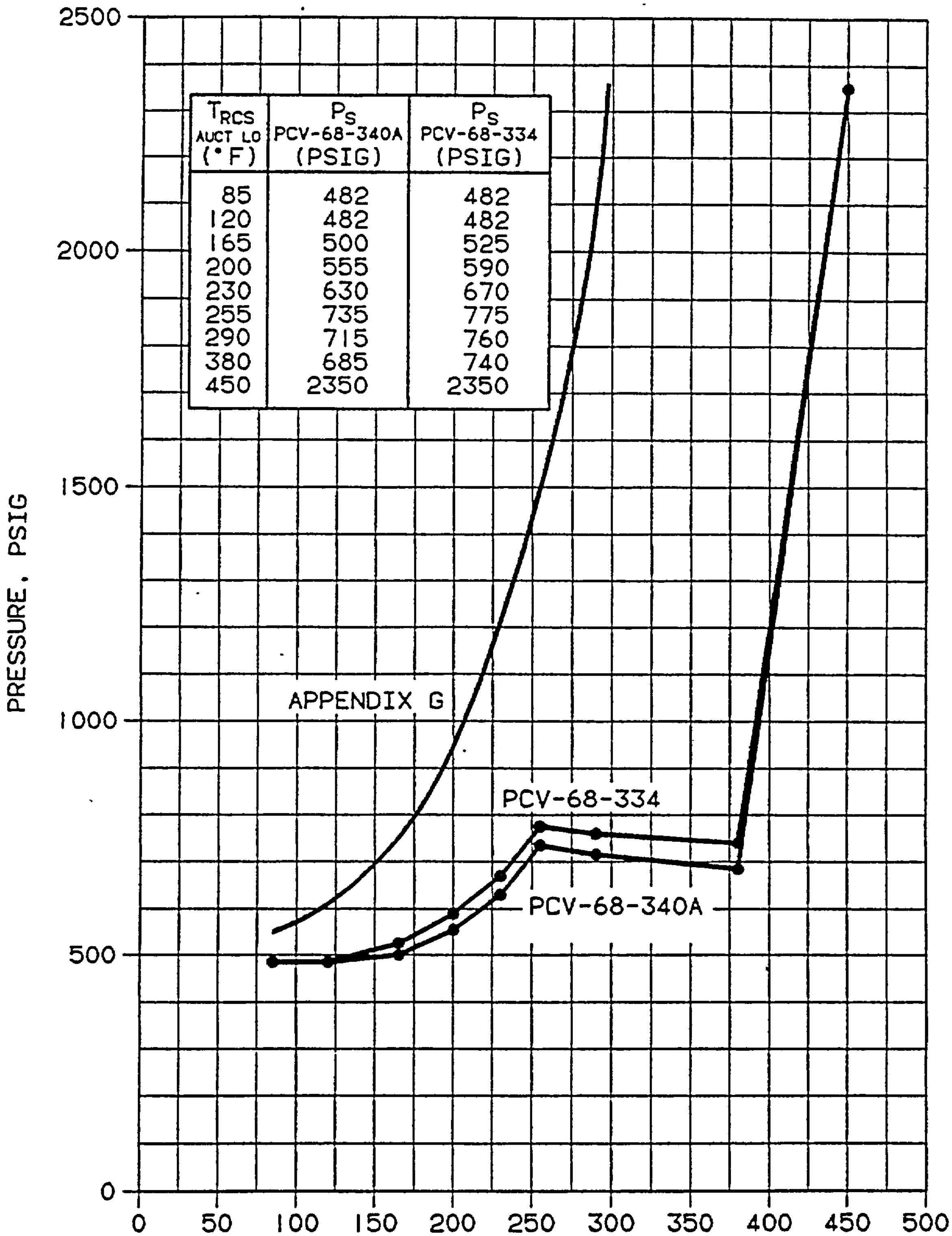
c With both PORVs inoperable, depressurize and vent the RCS through at least a 3 square inch vent within 8 hours

d. With the RCS vented per ACTIONS a, b, or c, verify the vent pathway at least once per 31 days when the pathway is provided by a valve(s) that is locked, sealed, or otherwise secured in the open position; otherwise, verify the vent path every 12 hours.

e. When RCS temperature is less than 350° F, both safety injection pumps and one centrifugal charging pump shall be made incapable of automatic injection into the RCS. Should any of these pumps be found actually capable of automatic injection, return the pump(s) to incapable status within 12 hours or depressurize and vent RCS through at least a 3 square inch vent within the next 8 hours.

f. In the event either the PORVs or the RCS vent(s) are used to mitigate an RCS pressure transient, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days. The report shall describe the circumstances initiating the transient, the effect of the PORVs or RCS vent(s) on the transient, and any corrective action necessary to prevent recurrence

g. The provisions of Specification 3 0.4 are not applicable.



T_{RCS} AUCT LO (°F)	P_S PCV-68-340A (PSIG)	P_S PCV-68-334 (PSIG)
85	482	482
120	482	482
165	500	525
200	555	590
230	630	670
255	735	775
290	715	760
380	685	740
450	2350	2350

PORV ~~NOMINAL~~ LIFT SETTINGS - APPLICABLE UP TO 14.5 EFPY

FIGURE 3.4-4

3/4 3.1 and 3/4 3 2 REACTOR TRIP AND ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

The OPERABILITY of the Reactor Trip and Engineered Safety Features Actuation Systems instrumentation and interlocks ensure that 1) the associated action and/or reactor ~~trip will~~ be initiated when the parameter monitored by each channel or combination thereof ~~reaches~~ its *nominal trip* setpoint, 2) the specified coincidence logic is maintained, 3) sufficient redundancy is maintained to ~~permit a~~ channel to be out of service for testing or maintenance, and 4) sufficient system functional capability is available from diverse parameters.

The OPERABILITY of these systems is required to provide the overall reliability, redundancy and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the accident analyses. The surveillance requirements specified for these systems ensure that the overall system functional capability is maintained comparable to the original design standards. The periodic surveillance tests performed at the minimum frequencies are sufficient to demonstrate this capability.

Add Insert 2

The Engineered Safety Feature ~~Actuation System interlocks~~ perform the functions indicated below on increasing the required parameter, consistent with the *nominal trip* setpoints listed in Table 3 3-4.

P-11 Defeats the manual block of safety injection actuation on low pressurizer pressure

P-14 Trip of all feedwater pumps, turbine trip, closure of feedwater isolation valves and inhibits feedwater control valve modulation.

On decreasing the required parameter the opposite function is performed at reset setpoints.

The surveillance for the comparison of the incore to the excore Axial Flux Difference is required only when reactor power is $\geq$ 15 percent. The 96 hour delay in the first performance of the surveillance after reaching 15 percent reactor thermal power (RTP), following a refueling outage, is to achieve a higher power level and approach Xenon stability. The surveillance is typically performed when RTP is $\geq$ 30 percent to ensure the results of the evaluation are more accurate and the adjustments more reliable. The frequency of 31 EFPD is to allow slow changes in neutron flux to be better detected during the fuel cycle.

3/4.3 3 MONITORING INSTRUMENTATION

3/4 3 3 1 RADIATION MONITORING INSTRUMENTATION

⇓ ***This Specification has been deleted***

~~The OPERABILITY of the radiation monitoring channels ensures that 1) the radiation levels are continually measured in the areas served by the individual channels and 2) the alarm or automatic action is initiated when the radiation level trip setpoint is exceeded~~

~~Relative to the control room instrumentation isolation function, one set of process radiation monitors acts to automatically initiate control room isolation The actuation instrumentation consists of redundant radiation monitors A high radiation signal from the detector will initiate its associated train of the Control Room Emergency Ventilation System (CREVS) The CREVS is also automatically actuated by a safety injection (SI) signal from either unit The SI function is discussed in LCO 3.3 2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation." In addition, the control room operator can manually initiate CREVS~~

3/4 3 3 2 MOVABLE INCORE DETECTORS

The OPERABILITY of the movable incore detectors with the specified minimum complement of equipment ensures that the measurements obtained from use of this system accurately represent the spatial neutron flux distribution of the reactor core. The OPERABILITY of this system is demonstrated by irradiating each detector used and determining the acceptability of its voltage curve.

For the purpose of measuring $F_Q(X,Y,Z)$ or $F\Delta_H(X,Y)$ a full incore flux map is used. Quarter-core flux maps, as defined in WCAP-8648, June 1976, may be used in recalibration of the excore neutron flux detection system, and full incore flux maps or symmetric incore thimbles may be used for monitoring the QUADRANT POWER TILT RATIO when one Power Range Channel is inoperable

B 3/4.3 INSTRUMENTATION

B 3/4.3.3.11 Containment Ventilation Isolation Instrumentation

BASES

BACKGROUND

Containment Ventilation Isolation Instrumentation closes the containment isolation valves in the Containment Purge System This action isolates the containment atmosphere from the environment to minimize releases of radioactivity in the event of an accident The Reactor Building Purge System may be in use during reactor operation and with the reactor shutdown.

Containment Ventilation Isolation is initiated by a safety injection (SI) signal or by manual actuation. The Bases for LCO 3.3 2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," discuss initiation of SI signals.

Redundant and independent gaseous radioactivity monitors measure the radioactivity levels of the containment purge exhaust, each of which will initiate its associated train of automatic Containment Ventilation Isolation upon exceeding the alarm/trip setpoint

APPLICABLE SAFETY ANALYSES

The containment isolation valves for the Reactor Building Purge System close within five seconds following the DBA. The containment ventilation isolation radiation monitors act as backup to the SI signal to ensure closing of the purge air system supply and exhaust valves They are also the primary means for automatically isolating containment in the event of a fuel handling accident during shutdown. Containment isolation in turn ensures meeting the containment leakage rate assumptions of the safety analyses, and ensures that the calculated accidental offsite radiological doses are below 10 CFR 100 (Ref. 1) limits

The Containment Ventilation Isolation instrumentation satisfies Criterion 3 of the NRC Policy Statement.

LCO

The LCO requirements ensure that the instrumentation necessary to initiate Containment Ventilation Isolation, listed in Table 3.3-14, is OPERABLE.

1. <u>Manual Initiation</u>

   The LCO requires two channels OPERABLE. The operator can initiate Containment Ventilation Isolation at any time by using either of two switches in the control room Either switch actuates both trains. This action will cause actuation of all components in the same manner as any of the automatic actuation signals. These manual switches also initiate a Phase A isolation signal.

BASES

LCO (continued)

The LCO for Manual Initiation ensures the proper amount of redundancy is maintained in the manual actuation circuitry to ensure the operator has manual initiation capability.

Each channel consists of one selector switch and the interconnecting wiring to the actuation logic cabinet.

2. Automatic Actuation Logic

The LCO requires two trains of Automatic Actuation Logic OPERABLE to ensure that no single random failure can prevent automatic actuation Automatic Actuation Logic consists of all circuitry housed within the actuation subsystems, including the initiating relay contacts responsible for actuating Containment Ventilation Isolation.

The applicable MODES and specified conditions for the containment ventilation isolation portion of the SI Function is different and less restrictive than those for the SI role. If one or more of the SI Functions becomes inoperable in such a manner that only the Containment Ventilation Isolation Function is affected, the Conditions applicable to the SI Functions need not be entered. The less restrictive Actions specified for inoperability of the Containment Ventilation Isolation Functions specify sufficient compensatory measures for this case.

3. Containment Radiation

The LCO specifies required channels of radiation monitors to ensure that the radiation monitoring instrumentation necessary to initiate Containment Ventilation Isolation remains OPERABLE. In Modes 1 through 4, the radiation monitors provide a supplemental function to the Safety Injection signal for the isolation of containment and only requires the OPERABILITY of one channel of radiation monitors During the movement of irradiated fuel assemblies within containment, the radiation monitors provide the primary isolation function for containment isolation and both radiation monitors are required to be OPERABLE to provide adequate single failure capability.

For sampling systems, channel OPERABILITY involves more than OPERABILITY of the channel electronics OPERABILITY may also require correct valve lineups and sample pump operation, as well as detector OPERABILITY, if these supporting features are necessary for trip to occur under the conditions assumed by the safety analyses

LCO (continued)

4. Safety Injection (SI)

Refer to LCO 3.3.2, Function 1, for all initiating Functions and requirements.

APPLICABILITY

The Manual Initiation, Automatic Actuation Logic, Safety Injection, and Containment Radiation Functions are required OPERABLE in MODES 1, 2, 3, and 4, and during movement of irradiated fuel assemblies within containment Under these conditions, the potential exists for an accident that could release fission product radioactivity into containment. Therefore, the Containment Ventilation Isolation Instrumentation must be OPERABLE in these MODES

While in MODES 5 and 6 without fuel handling in progress, the Containment Ventilation Isolation Instrumentation need not be OPERABLE since the potential for radioactive releases is minimized and operator action is sufficient to ensure post accident offsite doses are maintained within the limits of Reference 1.

The Applicability for the containment ventilation isolation on the ESFAS Safety Injection Functions are specified in LCO 3.3.2.

ACTIONS

The most common cause of channel inoperability is outright failure or drift sufficient to exceed the tolerance allowed by unit specific calibration procedures. Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function If the Trip Setpoint is less conservative than the tolerance specified by the calibration procedure, the channel must be declared inoperable immediately and the appropriate condition entered

Action a - MODES 1, 2, 3, and 4

Action a. applies to all Containment Ventilation Isolation Functions and addresses the train orientation of the Solid State Protection System (SSPS) and the master and slave relays for these functions If a train is inoperable, operation may continue as long as the required action for the applicable Conditions of LCO 3.6 3 is met for each valve made inoperable by failure of isolation instrumentation.

Action b - MODES 1, 2, 3, and 4

Action b. addresses the failure of the required radiation monitoring channel. If the required radiation monitor is inoperable, operation may continue as long as the required action for the applicable Conditions of LCO 3.6 3 is met for each containment purge and exhaust isolation valve made inoperable by failure of isolation instrumentation.

BASES

ACTIONS (continued)

Action c - MODES 1, 2, 3, and 4

This action has been added to clarify the application of completion time rules The conditions of this Specification may be entered independently for each function listed in Table 3.3-14. The completion time(s) of the inoperable channel(s)/train(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function.

Action d - MODES 1, 2, 3, and 4

Action d. allows the entry into applicable modes while relying on the required actions as an exception to the requirements of Specification 3.0 4.

Action e - MODES 1, 2, 3, and 4

Action e. has been added to allow one train of actuation logic to be placed in bypass and to delay entering the required actions for up to four hours to perform surveillance testing provided the other train is OPERABLE. The 4 hour allowance is consistent with the required actions for actuation logic trains in LCO 3.3.2, "Engineered Safety Features Actuation System Instrumentation" and allows periodic testing to be conducted while at power without causing an actual actuation. The delay for entering the required actions relieves the administrative burden of entering the required actions for isolation valves inoperable solely due to the performance of surveillance testing on the actuation logic and is acceptable based on the OPERABILITY of the opposite train.

Action a - Fuel Movement

Action a applies to the failure of one containment purge isolation radiation monitor channel. Since the two containment radiation monitors are both gaseous detectors, failure of a single channel may result in loss of the redundancy. Consequently, the failed channel must be restored to OPERABLE status. The 4 hours allowed to restore the affected channel is justified by the low likelihood of events occurring during this interval, and recognition that one or more of the remaining channels will respond to most events.

If the radiation monitor channel is not returned to OPERABLE status within the 4-hour limit, operation may continue as long as the required action for the applicable conditions of LCO 3.9.4, "Containment Building Penetrations," is met for each valve made inoperable by failure of isolation instrumentation.

Action b. - Fuel Movement

Action b. applies to all Containment Ventilation Isolation Functions and addresses the train orientation of the Solid State Protection System (SSPS) and the master and slave relays for these functions. If a train is inoperable, operation may continue as long as the required action for the applicable Conditions of LCO 3.9 4, "Containment Building Penetrations," is met for each valve made inoperable by failure of isolation instrumentation.

ACTIONS (continued)

Action c. - Fuel Movement

Action c. addresses the failure of multiple radiation monitoring channels If multiple radiation monitors are inoperable, operation may continue as long as the required action for the applicable Conditions of LCO 3 9.4, "Containment Building Penetrations," is met for each valve made inoperable by failure of isolation instrumentation.

Action d. - Fuel Movement

This action has been added to clarify the application of completion time rules. The conditions of this Specification may be entered independently for each function listed in Table 3.3-14. The completion time(s) of the inoperable channel(s)/train(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function.

Action e - Fuel Movement

Action e. allows the entry into applicable conditions while relying on the required actions as an exception to the requirements of Specification 3.0.4.

SURVEILLANCE REQUIREMENTS

4.3 3 11 1

Performance of the CHANNEL CHECK once every 12 hours 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. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including 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

The frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

A CHANNEL FUNCTIONAL TEST is performed on the Automatic Actuation Logic every 31 days The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. Through the semiautomatic tester, all possible

BASES

SURVEILLANCE REQUIREMENTS (continued)

logic combinations, with and without applicable permissives, are tested for each protection function. In addition, the master relay coil is pulse tested for continuity. This verifies that the logic modules are OPERABLE and there is an intact voltage signal path to the master relay coils. This test is performed every 31 days on a STAGGERED TEST BASIS. The Surveillance interval is acceptable based on instrument reliability and industry operating experience.

A CHANNEL FUNCTIONAL TEST is performed every 92 days on each radiation monitor to ensure the entire channel will perform the intended function. The frequency is based on the staff recommendation for increasing the availability of radiation monitors according to NUREG-1366 (Ref. 2) This test verifies the capability of the instrumentation to provide the containment ventilation system isolation. The setpoint shall be left consistent with the current unit specific calibration procedure tolerance

A CHANNEL FUNCTIONAL TEST of the Manual Initiation function is performed every 18 months Each Manual Initiation function is tested up to, and including, the master relay coils. In some instances, the test includes actuation of the end device (i.e., pump starts, valve cycles, etc.)

The frequency is based on the known reliability of the function and the redundancy available, and has been shown to be acceptable through operating experience

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The Frequency is based on operating experience and is consistent with the typical industry refueling cycle.

REFERENCES

1. Title 10, Code of Federal Regulations, Part 100.11, "Determination of Exclusion Area, Low Population Zone, and Population Center Distance."

2. NUREG-1366, "Improvement to Technical Specification Surveillance Requirements," December 1992.

B 3/4.3 INSTRUMENTATION

B 3/4.3.3.12 Auxiliary Building Gas Treatment (ABGTS) Actuation Instrumentation

BASES

BACKGROUND

The ABGTS ensures that radioactive materials in the fuel building atmosphere following a fuel handling accident or a loss of coolant accident (LOCA) are filtered and adsorbed prior to exhausting to the environment. The system initiates filtered exhaust of air from the fuel handling area, ECCS pump rooms, and penetration rooms automatically following receipt of a fuel pool area high radiation signal or a Containment Phase A Isolation signal. Initiation may also be performed manually as needed from the main control room.

High area radiation, monitored by either of two monitors, provides ABGTS initiation. Each ABGTS train is initiated by high radiation detected by a channel dedicated to that train. There are a total of two channels, one for each train. High radiation exceeding the monitor's alarm/trip setpoint or a Phase A isolation signal from the Engineered Safety Features Actuation System (ESFAS) initiates auxiliary building isolation and starts the ABGTS. These actions function to prevent exfiltration of contaminated air by initiating filtered ventilation, which imposes a negative pressure on the Auxiliary Building Secondary Containment Enclosure (ABSCE)

APPLICABLE SAFETY ANALYSES

The ABGTS ensures that radioactive materials in the ABSCE atmosphere following a fuel handling accident or a LOCA are filtered and adsorbed prior to being exhausted to the environment. This action reduces the radioactive content in the auxiliary building exhaust following a LOCA or fuel handling accident so that offsite doses remain within the limits specified in 10 CFR 100 (Ref 1)

The ABGTS Actuation Instrumentation satisfies Criterion 3 of the NRC Policy Statement.

LCO

The LCO requirements ensure that instrumentation necessary to initiate the ABGTS is OPERABLE.

1. Manual Initiation

   The LCO requires two channels OPERABLE. The operator can initiate the ABGTS at any time by using either of two switches in the control room. This action will cause actuation of all components in the same manner as any of the automatic actuation signals.

LCO (continued)

The LCO for Manual Initiation ensures the proper amount of redundancy is maintained in the manual actuation circuitry to ensure the operator has manual initiation capability.

Each channel consists of one hand switch and the interconnecting wiring to the actuation logic relays

2. Fuel Pool Area Radiation

The LCO specifies one required Fuel Pool Area Radiation Monitor during the movement of irradiated fuel assemblies in the fuel handling area to ensure that the radiation monitoring instrumentation necessary to initiate the ABGTS remains OPERABLE. One radiation monitor is dedicated to each train of ABGTS.

For sampling systems, channel OPERABILITY involves more than OPERABILITY of channel electronics. OPERABILITY may also require correct valve lineups, sample pump operation, and filter motor operation, as well as detector OPERABILITY, if these supporting features are necessary for trip to occur under the conditions assumed by the safety analyses.

3 Containment Phase A Isolation

Refer to LCO 3 3.2, Function 3 a, for all initiating functions and requirements

APPLICABILITY

The manual ABGTS initiation must be OPERABLE in MODES 1, 2, 3, and 4 and when moving irradiated fuel assemblies in the fuel handling area, to ensure the ABGTS operates to remove fission products associated with leakage after a LOCA or a fuel handling accident. The Phase A ABGTS Actuation is also required in MODES 1, 2, 3, and 4 to remove fission products caused by post LOCA Emergency Core Cooling Systems leakage.

High radiation initiation of the ABGTS must be OPERABLE in any MODE during movement of irradiated fuel assemblies in the fuel handling area to ensure automatic initiation of the ABGTS when the potential for a fuel handling accident exists

While in MODES 5 and 6 without fuel handling in progress, the ABGTS instrumentation need not be OPERABLE since a fuel handling accident cannot occur.

The Applicability for the ABGTS actuation on the ESFAS Containment Isolation Phase A Functions are specified in LCO 3.3.2.

New Page

ACTIONS

The most common cause of channel inoperability is outright failure or drift sufficient to exceed the tolerance allowed by unit specific calibration procedures. Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function. If the Trip Setpoint is less conservative than the tolerance specified by the calibration procedure, the channel must be declared inoperable immediately and the appropriate Condition entered.

Action a - MODES 1, 2, 3, and 4

Action a applies to the actuation logic train function from the Phase A Isolation and the manual function. Action a. applies to the failure of a single actuation logic train or manual channel. If one channel or train is inoperable, a period of 7 days is allowed to restore it to OPERABLE status. If the train cannot be restored to OPERABLE status, one ABGTS train must be placed in operation. This accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation. The 7 day completion time is the same as is allowed if one train of the mechanical portion of the system is inoperable as required by Specification 3.7.8.

If the required action to return the ABGTS train to OPERABLE status or place a train of ABGTS in operation within 7 days has not been met and the plant is in MODE 1, 2, 3, or 4. The plant must be brought to a MODE in which the LCO requirements are not applicable. To achieve this status, the plant must be brought to HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours The allowed completion times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems

Action b - MODES 1, 2, 3, and 4

Action b. applies to the failure of two ABGTS actuation logic signals from the Phase A Isolation or two manual channels The required action is to place one ABGTS train in operation immediately This accomplishes the actuation instrumentation function that may have been lost and places the unit in a conservative mode of operation. The applicable conditions and required actions of Specification 3 7.8 must also be entered for the ABGTS train made inoperable by the inoperable actuation instrumentation. This ensures appropriate limits are placed on train inoperability.

Alternatively, both trains may be placed in the emergency radiation protection mode This ensures the ABGTS Function is performed even in the presence of a single failure.

BASES

ACTIONS (continued)

If the above required actions have not been met and the plant is in MODE 1, 2, 3, or 4 the plant must be brought to a MODE in which the LCO requirements are not applicable. To achieve this status, the plant must be brought to HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours. The allowed completion times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Action c - MODES 1, 2, 3, and 4

This action has been added to clarify the application of completion time rules. The conditions of this Specification may be entered independently for each function listed in Table 3.3-15. The completion time(s) of the inoperable channel(s)/train(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function.

Action d - MODES 1, 2, 3, and 4

Action d allows the entry into applicable modes while relying on the required actions as an exception to the requirements of Specification 3.0.4.

Action a - Fuel Movement

Action a. applies to the failure of two ABGTS actuation logic signals from the Phase A Isolation, two radiation monitors, or two manual channels. The required action is to place one ABGTS train in operation immediately. This accomplishes the actuation instrumentation function that may have been lost and places the unit in a conservative mode of operation

When the above required action has not been met and irradiated fuel assemblies are being moved in the fuel handling area Movement of irradiated fuel assemblies in the fuel handling area must be suspended immediately to eliminate the potential for events that could require ABGTS actuation Performance of these actions shall not preclude moving a component to a safe position.

Action b - Fuel Movement

Action b. allows the entry into applicable modes while relying on the required actions as an exception to the requirements of Specification 3.0.4.

SURVEILLANCE REQUIREMENTS

4 3 3 12.1

Performance of the CHANNEL CHECK once every 12 hours 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 A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including 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.

The frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels

A CHANNEL FUNCTIONAL TEST is performed every 92 days on each radiation monitor to ensure the entire channel will perform the intended function This test verifies the capability of the instrumentation to provide the ABGTS actuation. The setpoints shall be left consistent with the unit specific calibration procedure tolerance. The frequency of 92 days is based on the known reliability of the monitoring equipment and has been shown to be acceptable through operating experience.

A CHANNEL FUNCTIONAL TEST of the Manual Initiation function is performed every 18 months Each Manual Initiation function is tested up to, and including, the master relay coils. In some instances, the test includes actuation of the end device (i e., pump starts, valve cycles, etc.). The frequency is based on operating experience and is consistent with the typical industry refueling cycle

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy. The frequency is based on operating experience and is consistent with the typical industry refueling cycle

REFERENCES

1. Title 10, Code of Federal Regulations, Part 100.11, "Determination of Exclusion Area, Low Population Zone, and Population Center Distance."

B 3/4.3 INSTRUMENTATION

B 3/4.3.3.13 Control Room Emergency Ventilation System (CREVS) Actuation Instrumentation

BASES

BACKGROUND

The CREVS provides an enclosed control room environment from which the unit can be operated following an uncontrolled release of radioactivity. During normal operation, the Control Building Ventilation System provides control room ventilation. Upon receipt of an actuation signal, the CREVS initiates filtered ventilation and pressurization of the control room

The actuation instrumentation consists of redundant radiation monitors. A high radiation alarm/trip signal from any monitor will initiate its associated trains of the CREVS The control room operator can also initiate CREVS trains by manual switches in the control room The CREVS is also actuated by a safety injection (SI) signal

APPLICABLE SAFETY ANALYSES

The control room must be kept habitable for the operators stationed there during accident recovery and post accident operations

The CREVS acts to terminate the supply of unfiltered outside air to the control room, initiate filtration, and emergency pressurization of the control room These actions are necessary to ensure the control room is kept habitable for the operators stationed there during accident recovery and post accident operations by minimizing the radiation exposure of control room personnel

In MODES 1, 2, 3, and 4, the radiation monitor actuation of the CREVS is a backup for the SI signal actuation This ensures initiation of the CREVS during a loss of coolant accident or steam generator tube rupture.

The radiation monitor actuation of the CREVS in MODES 5 and 6, during movement of irradiated fuel assemblies and during CORE ALTERATIONS, is the primary means to ensure control room habitability in the event of a fuel handling or waste gas decay tank rupture accident.

The CREVS actuation instrumentation satisfies Criterion 3 of the NRC Policy Statement.

BASES

LCO

The LCO requirements ensure that instrumentation necessary to initiate the CREVS is OPERABLE.

1. Manual Initiation

The LCO requires two channels OPERABLE. The operator can initiate the CREVS at any time by using either of two switches in the control room This action will cause actuation of all components in the same manner as any of the automatic actuation signals.

The LCO for Manual Initiation ensures the proper amount of redundancy is maintained in the manual actuation circuitry to ensure the operator has manual initiation capability.

Each channel consists of one hand switch and the interconnecting wiring to the actuation logic relays

2. Control Room Radiation

The LCO specifies two required Control Room Air Intake Radiation Monitors to ensure that the radiation monitoring instrumentation necessary to initiate the CREVS remains OPERABLE. One radiation monitor is dedicated to each train of CREVS.

For sampling systems, channel OPERABILITY involves more than OPERABILITY of channel electronics OPERABILITY may also require correct valve lineups, sample pump operation, and filter motor operation, as well as detector OPERABILITY, if these supporting features are necessary for trip to occur under the conditions assumed by the safety analyses

3. Safety Injection

Refer to LCO 3.3.2, Function 1, for all initiating Functions and requirements.

APPLICABILITY

The CREVS Functions must be OPERABLE in MODES 1, 2, 3, 4, and during movement of irradiated fuel assemblies. The Functions must also be OPERABLE in MODES 5 and 6 when required for a waste gas decay tank rupture accident, to ensure a habitable environment for the control room operators.

The Applicability for the CREVS actuation on the ESFAS Safety Injection Functions are specified in LCO 3.3.2.

BASES

ACTIONS

The most common cause of channel inoperability is outright failure or drift sufficient to exceed the tolerance allowed by the plant specific calibration procedures. Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function. If the Trip Setpoint is less conservative than the tolerance specified by the calibration procedure, the channel must be declared inoperable immediately and the appropriate condition entered.

Action a - MODES 1, 2, 3, and 4

Action a. applies to the actuation logic train function of the CREVS, the radiation monitor channel functions, and the manual channel functions.

If one train is inoperable, or one radiation monitor channel is inoperable in one or more functions, 7 days are permitted to restore it to OPERABLE status The 7-day completion time is the same as is allowed if one train of the mechanical portion of the system is inoperable as required by LCO 3 7.7. If the channel/train cannot be restored to OPERABLE status, one CREVS train must be placed in the emergency radiation protection mode of operation. This accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation.

If the required action to return the CREVS train to OPERABLE status or place a train of CREVS in operation within 7 days has not been met and the plant is in MODE 1, 2, 3, or 4, the plant must be brought to a MODE in which the LCO requirements are not applicable. To achieve this status, the plant must be brought to HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours The allowed completion times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Action b - MODES 1, 2, 3, and 4

Action b applies to the failure of two CREVS actuation trains, two radiation monitor channels, or two manual channels. The first required action is to place one CREVS train in the emergency radiation protection mode of operation immediately. This accomplishes the actuation instrumentation function that may have been lost and places the unit in a conservative mode of operation. The applicable actions of LCO 3.7.7 must also be entered for the CREVS train made inoperable by the inoperable actuation instrumentation. This ensures appropriate limits are placed upon train inoperability.

Alternatively, both trains may be placed in the emergency radiation protection mode. This ensures the CREVS function is performed even in the presence of a single failure.

BASES

ACTIONS (continued)

If the above required actions have not been met and the plant is in MODE 1, 2, 3, or 4 the plant must be brought to a MODE in which the LCO requirements are not applicable. To achieve this status, the plant must be brought to HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours The allowed completion times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems

Action c - MODES 1, 2, 3, and 4

This action has been added to clarify the application of completion time rules The conditions of this Specification may be entered independently for each function listed in Table 3 3-16. The completion time(s) of the inoperable channel(s)/train(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function.

Action d - MODES 1, 2, 3, and 4

Action d allows the entry into applicable modes while relying on the required actions as an exception to the requirements of Specification 3.0 4.

Action a. - MODES 5 and 6

Action a. applies to the actuation logic train function of the CREVS, the radiation monitor channel functions, and the manual channel functions

If one train is inoperable, or one radiation monitor channel is inoperable in one or more functions, 7 days are permitted to restore it to OPERABLE status. The 7-day completion time is the same as is allowed if one train of the mechanical portion of the system is inoperable as required by LCO 3.7.7. If the channel/train cannot be restored to OPERABLE status, one CREVS train must be placed in the emergency radiation protection mode of operation. This accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation

If the required action to return the CREVS train to OPERABLE status or place a train of CREVS in operation within 7 days has not been met and the plant is in MODE 5 or 6, actions must be initiated to restore the inoperable train to OPERABLE status immediately to ensure adequate isolation capability in the event of a waste gas decay tank rupture.

ACTIONS (continued)

Action b. - MODES 5 and 6

Action b. applies to the failure of two CREVS actuation trains, two radiation monitor channels, or two manual channels. The first required action is to place one CREVS train in the emergency radiation protection mode of operation immediately. This accomplishes the actuation instrumentation function that may have been lost and places the unit in a conservative mode of operation The applicable actions of LCO 3 7.7 must also be entered for the CREVS train made inoperable by the inoperable actuation instrumentation. This ensures appropriate limits are placed upon train inoperability.

Alternatively, both trains may be placed in the emergency radiation protection mode. This ensures the CREVS function is performed even in the presence of a single failure

If the above required actions have not been met and the plant is in MODE 5 or 6, actions must be initiated to restore the inoperable trains to OPERABLE status immediately to ensure adequate isolation capability in the event of a waste gas decay tank rupture.

Action c - MODES 5 and 6

This action has been added to clarify the application of completion time rules The conditions of this Specification may be entered independently for each function listed in Table 3.3-16. The completion time(s) of the inoperable channel(s)/train(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function

Action d - MODES 5 and 6

Action d allows the entry into applicable modes while relying on the required actions as an exception to the requirements of Specification 3.0.4.

Action a - Fuel Movement

Action a. applies to the actuation logic train function of the CREVS, the radiation monitor channel functions, and the manual channel functions.

If one train is inoperable, or one radiation monitor channel is inoperable in one or more functions, 7 days are permitted to restore it to OPERABLE status. The 7-day completion time is the same as is allowed if one train of the mechanical portion of the system is inoperable as required by LCO 3.7.7. If the channel/train cannot be restored to OPERABLE status, one CREVS train must be placed in the emergency radiation protection mode of operation. This accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation

New Page

BASES

ACTIONS (continued)

If the required action to return the CREVS train to OPERABLE status or place a train of CREVS in operation within 7 days has not been met when irradiated fuel assemblies are being moved, movement of irradiated fuel assemblies must be suspended immediately to reduce the risk of accidents that would require CREVS actuation

Action b - Fuel Movement

Action b applies to the failure of two CREVS actuation trains, two radiation monitor channels, or two manual channels The first required action is to place one CREVS train in the emergency radiation protection mode of operation immediately. This accomplishes the actuation instrumentation function that may have been lost and places the unit in a conservative mode of operation The applicable actions of LCO 3.7.7 must also be entered for the CREVS train made inoperable by the inoperable actuation instrumentation. This ensures appropriate limits are placed upon train inoperability.

Alternatively, both trains may be placed in the emergency radiation protection mode This ensures the CREVS function is performed even in the presence of a single failure

If the above required actions have not been met when irradiated fuel assemblies are being moved, movement of irradiated fuel assemblies must be suspended immediately to reduce the risk of accidents that would require CREVS actuation.

Action c - Fuel Movement

This action has been added to clarify the application of completion time rules The conditions of this Specification may be entered independently for each function listed in Table 3.3-16. The completion time(s) of the inoperable channel(s)/train(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function.

Action d - Fuel Movement

Action d allows the entry into applicable modes while relying on the required actions as an exception to the requirements of Specification 3.0.4.

SURVEILLANCE REQUIREMENTS

4 3 3.13 1

Performance of the CHANNEL CHECK once every 12 hours 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 A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including 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.

The frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

A CHANNEL FUNCTIONAL TEST is performed every 92 days on each radiation monitor to ensure the entire channel will perform the intended function. This test verifies the capability of the instrumentation to provide the CREVS actuation. The setpoints shall be left consistent with the unit specific calibration procedure tolerance The frequency of 92 days is based on the known reliability of the monitoring equipment and has been shown to be acceptable through operating experience.

A CHANNEL FUNCTIONAL TEST of the Manual Initiation function is performed every 18 months Each Manual Initiation function is tested up to, and including, the master relay coils In some instances, the test includes actuation of the end device (i e , pump starts, valve cycles, etc.) The frequency is based on operating experience and is consistent with the typical industry refueling cycle.

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy. The frequency is based on operating experience and is consistent with the typical industry refueling cycle.

REFERENCES None.

B 3/4.3 INSTRUMENTATION

B 3/4.3.3.14 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

BASES

BACKGROUND

The DGs provide a source of emergency power when offsite power is either unavailable or is insufficiently stable to allow safe unit operation. Undervoltage protection will generate an LOP start if a loss-of-voltage or degraded voltage condition occurs in the switchyard. There are four LOP start signals, one for each 6.9 kV Shutdown Board.

Three degraded voltage relays (one per phase) are provided on each 6.9 kV Shutdown Board for detecting a sustained undervoltage condition. The relays are combined in a two-out-of-three logic configuration to generate a shutdown board load shed actuation and start the DGs if the voltage is below 93.5% for 300 seconds (nominal). If a safety injection signal is present at the time of the degraded voltage condition or if a safety injection actuation occurs during a degraded voltage condition, the load shed actuation will occur within 9 5 seconds (nominal)

Additionally, three loss-of-voltage relays (one per phase) are provided on each 6.9 kV Shutdown Board for the purpose of detecting a loss-of-voltage condition. These relays are combined in a two-out-of-three logic to generate a shutdown board load shed actuation and start the DGs if the voltage is below 80% for 1.25 seconds (nominal) The LOP start actuation is described in FSAR Section 8.3, "Onsite Power System" (Reference 1).

Allowable Values and LOP DG Start Instrumentation Setpoints

The trip setpoints used in the relays and timers are based on the analytical limits presented in TVA calculations, References 3, 4, and 5. The selection of these trip setpoints is such that adequate protection is provided when all sensor and time delays are taken into account.

The Nominal Trip Setpoint is the expected value to be achieved during calibrations. The Nominal Trip Setpoint considers all factors which may affect channel performance by statistically combining rack drift, rack measurement and test equipment effects, rack calibration accuracy, rack comparator setting accuracy, rack temperature effects, sensor measurements and test equipment effects, sensor calibration accuracy, primary element accuracy, and process measurement accuracy. The Allowable Value has been established by considering the measurable values assumed for rack effects only. The Allowable Value serves as an operability limit for the purpose of the CHANNEL FUNCTIONAL TESTS.

BASES

BACKGROUND (continued)

Setpoints adjusted consistent with the requirements of the Allowable Value ensure that the consequences of accidents will be acceptable, providing the unit is operated from within the LCOs at the onset of the accident and that the equipment functions as designed.

Allowable Values and/or Nominal Trip Setpoints are specified for each function in Table 3.3-17. Nominal Trip Setpoints are also specified in the unit specific setpoint calculations The trip setpoints are selected to ensure that the setpoint measured by the surveillance procedure does not exceed the Allowable Value if the relay is performing as required If the measured setpoint does not exceed the Allowable Value, the relay is considered OPERABLE. Operation with a trip setpoint less conservative than the Nominal Trip Setpoint, but within the Allowable Value, is acceptable provided that operation and testing is consistent with the assumptions of the unit specific setpoint calculation (Reference 3).

APPLICABLE SAFETY ANALYSES

The LOP DG start instrumentation is required for the Engineered Safety Features (ESF) Systems to function in any accident with a loss of offsite power. Its design basis is that of the ESF Actuation System (ESFAS).

Accident analyses credit the loading of the DG based on the loss of offsite power during a loss of coolant accident (LOCA). The actual DG start has historically been associated with the ESFAS actuation The DG loading has been included in the delay time associated with each safety system component requiring DG supplied power following a loss of offsite power. The analyses assume a non-mechanistic DG loading, which does not explicitly account for each individual component of loss of power detection and subsequent actions.

The channels of LOP DG start instrumentation, in conjunction with the ESF systems powered from the DGs, provide unit protection in the event of any of the analyzed accidents discussed in Reference 2, in which a loss of offsite power is assumed.

The delay times assumed in the safety analysis for the ESF equipment include the 10 second DG start delay, and the appropriate sequencing delay, if applicable. The response times for ESFAS actuated equipment in LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," include the appropriate DG loading and sequencing delay.

The LOP DG start instrumentation channels satisfy Criterion 3 of the NRC Policy Statement

BASES

LCO

The LCO for LOP DG Start Instrumentation requires that the loss-of-voltage, degraded voltage, load shed, and DG Start functions shall be OPERABLE in MODES 1, 2, 3, and 4 when the LOP DG Start Instrumentation supports safety systems associated with the ESFAS. In MODES 5 and 6, the functions must be OPERABLE whenever the associated DG is required to be OPERABLE to ensure that the automatic start of the DG is available when needed. A channel is OPERABLE with an actual trip setpoint value outside its calibration tolerance band provided the trip setpoint value is conservative with respect to its associated Allowable Value and the channel is readjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A trip setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions Loss of the LOP DG Start Instrumentation function could result in the delay of safety systems initiation when required. This could lead to unacceptable consequences during accidents During the loss of offsite power the DG powers the motor driven auxiliary feedwater pumps Failure of these pumps to start would leave only one turbine driven pump, as well as an increased potential for a loss of decay heat removal through the secondary system

APPLICABILITY

The LOP DG Start Instrumentation Functions are required in MODES 1, 2, 3, and 4 because ESF Functions are designed to provide protection in these MODES. Actuation in MODE 5 or 6 is required whenever the required DG must be OPERABLE so that it can perform its function on an LOP or a degraded voltage condition on the 6.9 kV Shutdown Board.

ACTIONS

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the channel is found inoperable, then the function that channel provides must be declared inoperable and the LCO condition entered for the particular protection function affected.

Action a.

Action a. applies to the LOP DG start function with one channel of voltage sensors per board inoperable.

If one channel of voltage sensors is inoperable, Action a requires the channel to be restored to OPERABLE status within 6 hours. The specified completion time is reasonable considering the function remains fully OPERABLE on every board and the low probability of an event occurring during these intervals

When the inoperable channel can not be returned to OPERABLE status within 6 hours, the requirements specified in LCO 3 8.1.1, "AC Sources Operating," or LCO 3 8.1.2, "AC Sources Shutdown," for the DG made inoperable by failure of the LOP DG start instrumentation are required to be entered immediately The actions of those LCOs provide for adequate compensatory actions to assure unit safety.

BASES

ACTIONS (continued)

Action b

Action b. applies when more than one channel of voltage sensors or the required timer(s) on a single board is inoperable.

Action b. requires restoring all but one channel of voltage sensors and at least one timer for each required function to OPERABLE status. The 1 hour completion time should allow ample time to repair most failures and takes into account the low probability of an event requiring an LOP start occurring during this interval

When the inoperable channel can not be returned to OPERABLE status within 1 hour, the requirements specified in LCO 3.8.1.1, "AC Sources Operating," or LCO 3.8 1.2, "AC Sources Shutdown," for the DG made inoperable by failure of the LOP DG start instrumentation are required to be entered immediately. The actions of those LCOs provide for adequate compensatory actions to assure unit safety.

Action c.

Because the required channels are specified on a per shutdown board basis, the condition may be entered separately for each board as appropriate.

Action c has been added to clarify the application of completion time rules The conditions of this Specification may be entered independently for each function listed in the LCO. The completion time(s) of the inoperable channel(s) of a function will be tracked separately for each function starting from the time the condition was entered for that function

Action d

Action d. has been added to direct entry into the applicable actions of LCO 3.3 2, "Engineered Safety Feature Actuation System Instrumentation," for inoperable Auxiliary Feedwater Loss of Power start instrumentation. The loss-of-voltage relays required by this LCO also initiate load shed and the sequencing functions that initiate the start of the motor driven auxiliary feedwater pumps for a loss of power condition and generate a start signal for the turbine driven auxiliary feedwater pump as required in LCO 3.3 2.

SURVEILLANCE REQUIREMENTS

4.3 3 14 1

A CHANNEL FUNCTIONAL TEST of the voltage sensors is performed every 31 days. This test checks operation of the loss-of-voltage and degraded voltage sensors that provide actuation signals. The frequency is based on the known

BASES

SURVEILLANCE REQUIREMENTS (continued)

reliability of the relays and timers and the redundancy available, and has been shown to be acceptable through operating experience.

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the loss-of-voltage and degraded voltage functions, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The setpoints, as well as the response to a loss-of-voltage and a degraded voltage test, shall include a single point verification that the trip occurs within the required time delay, as shown in Reference 1.

The frequency of 18 months is based on operating experience and consistency with the typical industry refueling cycle and is justified by the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

REFERENCES

1. Sequoyah FSAR, Section 8.3, "Onsite Power System."
2. Sequoyah FSAR, Section 15.0, "Accident Analysis."
3. TVA Calculation 27 DAT, "Demonstrated Accuracy Calculation 27 DAT"
4. TVA Calculation DS1-2, "Demonstrated Accuracy Calculation DS1-2"
5. TVA Calculation SQN-EEB-MS-TI06-0008, "Degraded Voltage Analysis"