Since this loop involves only the rack instrumentation, the error terms for the process error and sensor are not applicable. The source range and intermediate range rack instrumentation use the same detector. The instrumentation is located in an auxiliary and control building area and is not subjected to the harsh environmental parameters of radiation and temperature of a design basis accident. Therefore, the unmeasurable uncertainties during the channel operational test are 1.3332 percent. This calculation provides assurance that the margin between AV and As-Left Value includes all the uncertainties not measured during the channel operational test (COT). On this basis, the staff finds that the revised AV is adequate to provide assurance that the permissive will be given before the source range trip occurs.

Engineering design output Setpoint and Scaling Documents will specify the as-left calibration tolerance and the as-found tolerance for the trip setpoint setting as evaluated within TVA calculations. Periodic plant calibration will incorporate the as-left calibration tolerance value ensuring compliance with design basis requirements during performance of calibration activities. For setpoint values found outside the as-left value and inside the as-found value, the setpoint will be adjusted and left within the as-left tolerance per the surveillance requirement. Also, the licensee committed to using its setpoint calibration procedures to maintain the trip setpoints within the established setting tolerance to ensure that the instrument remains capable of performing its specified safety function.

If the allowable value is exceeded or a potential channel inoperability exists, Plant Procedure SPP-6.7, "Instrument Setpoint, Scaling, and Calibration Program," gives direction for controlling out-of-calibration instrument conditions and contains the requirements for entering the issue into the TVA Corrective Action Program (CAP). SPP-6.7 ensures that the condition is handled in accordance with the CAP including immediate actions to return the instrument to meet TS required functions. Trending, recurrence controls, and cause of the condition are also part of the CAP process. Based on review of the licensee's procedures, the staff finds that the setpoint calibration procedures maintain the trip setpoints within the established setting tolerance to ensure that the instruments will be capable of performing their specified safety functions and are, therefore, acceptable.

4.5 <u>Revise Fuel Storage Pool Area Radiation Monitor Setpoint</u>

Two area type exposure rate radiation detectors are installed in the spent fuel pool area of the auxiliary building to monitor the gross radiation in the air space above the spent fuel pool. The function of the monitors is to initiate isolation of the ventilation paths in the auxiliary building upon detection of high radiation levels and to activate the auxiliary building gas treatment system. The limiting radiation event in the auxiliary building is the fuel handling accident over spent fuel pool. No credit is taken for any of the isolation or filtration functions initiated by the fuel storage pool area radiation monitors. As such, the automatic functions initiated by these monitors are anticipatory only. They are not variables on which a safety limit has been placed.

TS Table 3.3-6, "Radiation Monitoring Instrumentation," Item 1, provides the fuel storage pool area radiation monitor. The licensee has proposed to revise the alarm/trip setpoint from ≥200 mR/hr to ≥151 mR/hr. The setpoint revision is needed to address identified errors in the dose calculations for a fuel-handling event. The identified errors in the dose calculation have been addressed by the TVA CAP. The licensee evaluated the proposed setpoint in the calculation to ensure that sufficient margin exists to the analytical limit.

According to the licensee's calculation, the analytical limit is 7.149 volts. The AV is derived as follows:

AV = analytical limit - (uncertainties not measured during COT + margin)
= 7.149 - 0.172
= 6.977 volts.

Converting 6.977 volts to mR/hr gives 307 mR/hr of the AV.

Setpoint = AV - uncertainties measured during COT
= 6.977 - 0.618
= 6.359 volts.

Converting to mR/hr gives 151 mR/hr of the Setpoint.

The staff concludes that the fuel storage pool area radiation monitor will actuate within the required accident analysis assumptions to support accident mitigation. Therefore, the staff finds the proposed setpoint acceptable.

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

TS Table 3.3-3, Functional Unit 6.e provides for the automatic actuation of the AFW system upon loss of off-site power. This Functional Unit includes both voltage sensors and load shed timers. TS Table 3.3-3, Functional Unit 7 provides for the automatic actuation of the EDGs upon either loss-of-voltage or degraded voltage at the 6.9 kV Shutdown Board. This Functional Unit includes voltage sensors, load shed timers, and logic enable timers.

The SQN TSs has redundant load shed and logic enable timers for each shutdown board in each train for both Functional Units 6.e and 7. These timers support automatic actuation of the loss-of-power start of the AFW pumps and EDGs. Thus, the Minimum Channels Operable column of TS Table 3.3-3 requires that 2 load shed and logic enable timers per shutdown board remain operable. The licensee has proposed to reduce the Minimum Channels Operable from 2 per shutdown board to only 1 per shutdown board. Since there is no NRC requirement for the licensee to have redundant timers, the staff finds the proposed change acceptable.

Actions 34 and 35 to TS Table 3.3-3 currently require prompt licensee action if one of the two load shed or logic enable timers of Functional Units 6.e or 7 become inoperable. Since the Minimum Channels Operable requirement has been changed from 2 to 1 per shutdown board, the licensee has proposed modifications to Actions 34 and 35 to permit continued plant operation with only a single load shed or logic enable timer. The proposed changes to Actions 34 and 35 support the previous change to the Minimum Channels Operable. The staff considers these changes to be administrative in nature and, therefore, acceptable.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Tennessee State official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (69 FR 60688). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Sang Rhow
Hukam Garg

Date: September 13, 2006

Licensee Response/NRC Response/NRC Question Closure

Id	**270**
NRC Question Number	**KAB022**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/20/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**8/20/2014 10:45 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**46**
NRC Question Number	**KAB023**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	**L-6**
JFD Number	
JFD Bases Number	
Page Number(s)	**437**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 437 of Enclosure 2, Volume 8, L06 provides the discussion of CTS Table 3.3-3 footnote (a) which is applicable to function unit 6.f, "Auxiliary Feedwater Trip of Main Feedwater Pumps Start Motor-Driven Pumps and Turbine Driven Pump." Footnote (a) states, "One channel may be inoperable during Mode 1 for up to 4 hours when placing the second main feedwater (MFW) pump in service or removing one of two MFW pumps from service." TVA has chosen to add this footnote into the ITS as a required actions note in Condition N, which is applicable to function 6.e, "Auxiliary Feedwater Trip of all Main Feedwater Pumps." However, the ITS required action note does not include the phrase, "during Mode 1." Without the phrase, "during Mode 1," added to the Note it expands the use of the note to Mode 2. This note is not in ISTS and the proposed change to the note is not allowed by CTS, therefore this is a beyond scope change. Provide the technical evaluation for NRC review or revise the note to be consistent with the CTS requirements.**
Attach File 1	
Attach File 2	
Issue Date	**5/9/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/9/2014 8:44 AM**
Notification	**Scott Bowman** **Michelle Conner** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**95**
NRC Question Number	**KAB023**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	

SQN is requesting a relaxation to the MODE of APPLICABILITY for Main Feedwater (MFW) pump OPERABILITY, from "during MODE 1" to "during MODES 1 and 2". The proposed relaxation to CTS Table 3.3-3 Function 6.f, Trip of Main Feedwater Pumps Start Motor-Driven Pumps and Turbine Driven Pump, Footnote (a), as discussed in ITS 3.3.2, discussion of change (DOC) L06 provides for an operational allowance during Modes 1 and 2 for placing MFW pumps in service or securing MFW pumps. This change is justified because the AFW Start function is anticipatory for loss of normal heat sink and is not credited in the accident analysis. Also, this relaxation does not affect the function that actuates AFW due to a blackout signal, low-low steam generator (SG) level, or a safety injection (SI) signal. The technical justification for the addition of MODE 2 relaxation is the same as the previously approved MODE 1 relaxation.

On August 26, 2008, Tennessee Valley Authority (TVA) submitted a request for a TS change (TS-08-05) to Licenses DPR-77 and DPR-79 for SQN. The requested TS change would revise Functional Unit 6.f of Table 3.3-3, “Engineered Safety Feature Actuation System Instrumentation,” modifying the mode of applicability. A footnote was added to indicate that the AFW auto-start function associated with the trip of MFW pumps in Mode 2 is only required when one or more MFW pumps are supplying feedwater to the steam generators. Functional Unit 6.f of TS Table 3.3-3 is an anticipatory trip function that provides early actuation of the AFW system. This specific change was requested based on an NRC issued Inspection Report 2008-003 dated August 7, 2008, to Watts Bar Nuclear (WBN) Plant. In this report, NRC informed TVA that plant operation is not conforming to TS 3.3.2 Item 6.e when a non-operating main feedwater (MFW) pump is reset. This TS function is equivalent to the SQN TS Functional Unit 6.f of Table 3.3-3. TVA had considered the associated AFW auto-start channel operable; however, NRC informed WBN that a non-operating MFW pump in the reset condition impacts operability of the AFW auto-start due to the false indication of the MFW pump status.

On August 28, 2008, during a teleconference with NRC it was noted that entry into a limiting condition of operation (LCO) Action for placing the second main feedwater (MFW) pump in service or removing it from service would be inconsistent with TS application without additional notation. A

supplement to LAR TS-08-05, was submitted on August 28, 2008, to add a footnote to the Minimum Channels Operable column for Functional Unit 6.f of TS Table 3.3-3 to indicate one channel may be inoperable during Mode 1 for up to four hours when starting up or shutting down a MFW pump.

On August 29, 2008, the Nuclear Regulatory Commission issued Amendment No. 312 to Facility Operating License No. DPR-77 and Amendment No. 319 to Facility Operating License No. DPR-79 for the Sequoyah Nuclear Plant (SQN), Units 1 and 2, respectively (ML082401385). The amendment revised the requirements for the auxiliary feedwater system auto-start function associated with the trip of main feedwater pumps. The approved change added (1) Footnote (b), to indicate that Mode 2 applicability is limited to operation when one or more MFW pumps are supplying feedwater to the steam generators (SGs), and (2) Footnote (a), delaying the entry into the action statement when starting or stopping MFW pumps in Mode 1.

The NRC stated in Section 3, Technical Evaluation, the following, "The second proposed change addresses a conflict between the TS channel operability requirement and the design of the MFW pump control circuitry, which requires the pump to be reset before being placed into operation. Starting and stopping MFW pumps during plant startup and shutdown is a normal evolution, which will normally be accomplished within a short time. It was not intended to result in unnecessary entries into the action statement, which provides a timeframe to correct unplanned equipment failures. For the normal operating evolution of starting and stopping pumps, the proposed change would allow a delay of up to 4 hours before entering the action statement. The evolution should be completed in less time, but the 4 hours provides a reasonable allowance for operating contingencies. If the evolution takes longer than 4 hours, it is probably indicative of an equipment problem and entering the action statement would be appropriate. The 4 hours is consistent with similar allowances in other SQN TSs, such as the emergency core cooling system and low-temperature overpressure protection."

Response Date/Time	**6/5/2014 4:10 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/5/2014 3:08 PM**

Date Modified

Modified By

Licensee Response/NRC Response/NRC Question Closure

Id	**159**
NRC Question Number	**KAB023**
Select Application	**NRC Response**
Attachment 1	
Attachment 2	
Response Statement	**Please explain if Sequoyah operates with one MFP pump or two MFP pumps during Mode 2 with a brief explanation of your preferred method of operation in Mode 2 and before or during switchover to Mode 1.**
Response Date/Time	**6/27/2014 6:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/27/2014 12:39 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**357**
NRC Question Number	**KAB023**
Select Application	**Licensee Response**
Attachment 1	**KAB023 Attachment 1 second response STB.pdf** (87KB)
Attachment 2	
Response Statement	**In response to KAB023, the ITS 3.3.2 Condition N, NOTE (ISTS markups, Insert 6) on pages 458 and 492 of Enclosure 2, Volume 8, will be revised. Specifically, the Note will be revised to state, "One channel may be inoperable during MODE 1 for up to 4 hours when placing the second main feedwater (MFW) pump in service or removing one of two MFW pumps from service." The CTS markups for CTS Table 3.3-3, Function 6.f (Auxiliary Feedwater, Trip of Main Feedwater Pumps Start Motor-Driven Pumps and Turbine Driven Pump), Footnote (a) will be revised to retain the phrase, "during Mode 1." (Pages 346 and 386) Discussion of change (DOC) L06, that justified the removal of the phrase will be deleted, as well as, DOC L06 indicators. (Pages 346, 386, 438, and 439) The ITS 3.3.2 Bases, Actions Section for ITS Actions N.1 and N.2 (Insert 16) will be revised to state, "The Required Actions are modified by a note delaying the entry into the Required Action statement when starting or stopping MFW pumps during MODE 1." (Pages 581 and 659)** **Additionally, during review for KAB023, it was identified that the ITS 3.3.2 Bases, Applicable Safety Analyses, LCO and Applicability Section, for ITS Table 3.3.2-1, Function 6.e (Auxiliary Feedwater, Trip of all Main Feedwater Pumps) indicated that there are two Footnotes associated with Function 6.e. The ITS 3.3.2 Bases (Insert 9) will be revised to indicate that there is only one footnote associated with ITS Table 3.3.2-1 Function 6.e, and the discussion concerning the second footnote will be deleted. (Pages 560 and 638)** **See Attachment 1 for the draft revised CTS, ITS, and ITS Bases markups and the deletion of DOC L06.**
Response Date/Time	**9/26/2014 10:05 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill**

	Andrew Hon **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**9/26/2014 9:03 AM**
Date Modified	
Modified By	

ITS A01 ITS 3.3.2

Table 3.3.2-1 ITS ACTION

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

LA01

A02

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

Footnote (j) **Unit 1 shutdown boards only

stet

~~L06~~

Required Action N Note (a) One channel may be inoperable ~~during Mode 1~~ for up to 4 hours when placing the second main feedwater (MFW) pump in service or removing one of two MFW pumps from service.

Footnote (k) (b) When one or more Main Feedwater Pump(s) are supplying feedwater to steam generators.

ITS | A01 | ITS 3.3.2

Table 3.3.2-1

TABLE 3.3-3 (Continued)

ITS ACTION

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

LA01 | REQUIRED | A02

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

Footnote (j) ** Unit 2 Shutdown Boards Only

stet ~~L06~~

Required Action N Note (a) One channel may be inoperable ~~during Mode 1~~ for up to 4 hours when placing the second main feedwater (MFW) pump in service or removing one of two MFW pumps from service.

Footnote (k) (b) When one or more Main Feedwater Pump(s) are supplying feedwater to steam generators.

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DISCUSSION OF CHANGES
ITS 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

The purpose of the ITS Table 3.3.2-1 Function 4 Applicability is to provide an exception to clarify that the Steam Line Isolation instrumentation Functions are not required when the MSIVs are in a position that supports the safety analyses. This change is acceptable because the requirements continue to ensure that the structures, systems, and components are maintained in the MODES and other specified conditions assumed in the safety analyses and licensing basis. When all the MSIVs are in the closed position, they are in their assumed accident position, thus the isolation instrumentation is not needed. In addition, the MSIVs are not required to be OPERABLE in MODES 2 and 3 when the valves are closed, thus there is no purpose in requiring the instrumentation that closes the valves to be OPERABLE. This change is designated as less restrictive because the LCO requirements are applicable in fewer operating conditions than in the CTS.

L05 *(Category 2 – Relaxation of Applicability)* CTS Table 3.3-3 requires Functional Unit 5.a (Turbine Trip and Feedwater Isolation Steam Generator Water Level - High High) and 5.b (Turbine Trip and Feedwater Isolation - Automatic Actuation Logic) to be OPERABLE in MODES 1, 2, and 3. ITS Table 3.3.2-1 requires the same Functions (ITS Table 3.3.2-1 Functions 5.a and 5.b) to be OPERABLE in MODE 1, and in MODES 2 and 3 except when all MFIVs, MFRVs, and MFRV bypass valves are closed or isolated by a closed manual valve, Footnote (k). This changes the CTS by not requiring the instrumentation to be OPERABLE when all MFIVs, MFRVs, and MFRV bypass valves are closed or isolated by a closed manual valve.

The purpose of the ITS Table 3.3.2-1 Functions 5.a and 5.b Applicability is to provide an exception to clarify that the Turbine Trip and Feedwater Isolation Steam Generator Water Level - High High (P-14) instrumentation and the Turbine Trip and Feedwater Isolation Automatic Actuation Logic and Actuation Relays are not required when all MFIVs, MFRVs, and MFRV bypass valves are closed or isolated by a closed manual valve. In this condition, the Function will not need to function since the valves are in a position that supports the safety analyses. This change is acceptable because the requirements continue to ensure that the structures, systems, and components are maintained in the MODES and other specified conditions assumed in the safety analyses and licensing basis. When all MFIVs, MFRVs, and MFRV bypass valves are in the closed position, they are in their assumed accident position. This change is designated as less restrictive because the LCO requirements are applicable in fewer operating conditions than in the CTS.

~~L06~~ ~~*(Category 2 – Relaxation of Applicability)* CTS Table 3.3.3 footnote (a) is applicable to Functional Unit 6.f (Trip of Main Feedwater Pumps Start Motor-Driven Pumps and Turbine Driven Pump) "Minimum Channels OPERABLE" requirement. CTS Table 3.3.3 footnote (a) states that one channel may be inoperable during Mode 1 for up to 4 hours when placing the second main feedwater (MFW) pump in service or removing one of two MFW pumps from service. ITS 3.3.2 ACTION N is applicable Function 6.e (Auxiliary Feedwater, Trip of Main Feedwater Pumps) and is modified by a similar Required Action Note. ITS 3.3.2 ACTION N Required Action Note states that one channel may~~ Not Used

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DISCUSSION OF CHANGES
ITS 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

~~be inoperable for up to 4 hours when placing the second main feedwater (MFW) pump in service or removing one of two MFW pumps from service. This changes the CTS by increasing the MODES in which this footnote relaxation is Applicable.~~

~~The purpose of CTS Table 3.3.3 footnote (a) is to prevent unnecessary entries into the ACTION statement during the normal evolution of starting or stopping a main feedwater pump. Making this relaxation Applicable in MODE 2 addresses the possibility that a situation may exist requiring starting or stopping of a main feedwater pump, preventing an unnecessary entry into the associated ACTION. This change is acceptable because the requirements continue to ensure that the structures, systems, and components are maintained in the MODES and other specified conditions assumed in the safety analyses and licensing basis as the AFW auto-start function provides an anticipatory trip to reduce the effect of a feedwater transient. In addition, as in MODE 1, the evolution should be completed in less than 4 hours providing a reasonable allowance for operating contingencies. This change is designated as less restrictive because the Required Channel relaxation is applicable in more operating conditions than in the CTS.~~

L07 *(Category 9 – Allowed Outage Time, Surveillance Frequency, and Bypass Time Extensions Based on Generic Topical Reports)* CTS Table 3.3-3 ACTION 17, requires in part that with the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the inoperable channel is placed in the tripped condition within 6 hours. This action is applicable to CTS Table 3.3-3 Functional Units: 1.c (Containment Pressure – High); 1.d (Pressurizer Pressure – Low); 1.f (Steam Line Pressure – Low); 4.d (Steam Line Pressure – Low); 4.e (Negative Steam Line Pressure Rate – High); and 5.a (Steam Generator Water Level — High-High). ITS 3.3.2, Required Action D.1 require placing the associated channel in trip with a Completion Time of 72 hours for ITS Table 3.3.2-1 Functions 1.c (Containment Pressure – High); 1.d (Pressurizer Pressure – Low); 1.e (Steam Line Pressure – Low); 4.d.(1) (Steam Line Pressure – Low); 4.d.(2) (Negative Steam Line Pressure Rate – High); and 5.b (SG Water Level — High-High (P-14)). This changes the CTS by increasing the Completion Time for placing an inoperable channel for these Functional Units from six (6) hours to 72 hours.

The purpose of CTS Table 3.3-3 ACTION 17 is to limit the maximum time allowed for maintenance activities, in which the channel is unavailable or prior to being placed in a tripped state. This change is acceptable because the Completion Time is consistent with safe operation under the specified Condition, considering the OPERABLE status of the redundant systems or features. This includes the capacity and capability of remaining systems or features, a reasonable time for repairs or replacement, and the low probability of a DBA occurring during the allowed Completion Time. Additionally, this change is acceptable based on TVA's confirmation of applicability and incorporation of insights as described in Enclosure 4 of this submittal, required by the NRC in their letter and enclosed Safety Evaluation Report (SER) dated July 15, 1998, "Review of Westinghouse Owners Group Topical Reports WCAP-14333-P and WCAP-14334-NP, dated May 1995, 'Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times' (TAC NO. M92782)." This change is

2

INSERT 6

Table 3.3-3, Footnote (a)

----------------NOTE--------------
One channel may be inoperable during MODE 1 for up to 4 hours when placing the second main feedwater (MFW) pump in service or removing one of two MFW pumps from service.

CTS

3.3.2

2

INSERT 6

----------------NOTE--------------

Table 3.3-3, Footnote (a)

during MODE 1

One channel may be inoperable for up to 4 hours when placing the second main feedwater (MFW) pump in service or removing one of two MFW pumps from service.

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5

INSERT 9

a

indicating

This Function includes ~~two footnotes. The first~~ footnote ~~indicates~~ that MODE 2 applicability is limited to operation when one or more MFW pumps are supplying feedwater to the steam generators (SGs)~~, and the second footnote provides for delaying the entry into the action statement when starting or stopping MFW pumps in MODE 1~~.

The ~~first~~ footnote limits the Applicability to require the auto-start logic to be operable in MODE 2 only when at least one MFW pump is in service supplying feedwater to the SGs. Because plant conditions at the time of entry into Mode 2 do not allow the MFW pumps to operate, without this footnote the channels would need to be tripped resulting in an AFW start signal, starting the turbine-driven pump in addition to the motor-driven AFW pumps, which is an undesirable situation. This resolves a conflict between the MODE applicability and plant design, which does not support MFW pump operation at the time of entry into MODE 2. Also, modifying the requirement for auto-start of the AFW pumps to be only required when the MFW pumps are in service limits the potential for inadvertent AFW actuations during normal plant startups and shutdowns that could lead to reactivity control issues due to over cooling transients.

~~The second footnote delays entry into the Required Action for less than minimum channels operable for up to 4 hours. During the time of starting and stopping a second MFW pump, when the pump is in reset, the auto-start function is inoperable. Starting and stopping MFW pumps during plant startup and shutdown is a normal evolution, which will normally be accomplished within a short time. This note is intended to prevent unnecessary entries into the Required Actions, which provides a timeframe to correct unplanned equipment failures. For the normal operating evolution of starting and stopping pumps, the footnote allows a delay of up to 4 hours before entering the Required Action. The evolution should be completed in less time, but the 4 hours provides a reasonable allowance for operating contingencies. If the evolution takes longer than 4 hours, it is probably indicative of an equipment problem and entering the Required Action is appropriate.~~

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INSERT 16

during MODE 1

The Required Actions are modified by a note delaying the entry into the Required Action statement when starting or stopping MFW pumps. Starting and stopping MFW pumps during plant startup and shutdown is a normal evolution, which will normally be accomplished within a short time. It was not intended to result in unnecessary entries into the Required Actions, which provides a timeframe to correct unplanned equipment failures. The 4 hours is consistent with similar allowances in other SQN TSs. 7

O.1

Condition O applies to the following ESFAS Functions:

- Auxiliary Feedwater Pump Suction Transfer on Suction Pressure - Low,
- Auxiliary Feedwater Suction Transfer Time Delays, Motor-Driven Pump, and
- Auxiliary Feedwater Suction Transfer Time Delays, Turbine-Driven Pump. 2

These functions are provided by three pressure sensors located on the suction of each AFW pump arranged in a two-out-of-three logic scheme. The motor driven AFW pumps have one time delay, while the TDAFW pump has two. The motor driven and the first TDAFW pump time delays prevent spurious transfer. The TDAFW Pump second time delay ensures ERCW Train A valves stroke open sufficiently.

If a pressure sensor channel or a time delay channel is inoperable, the associated AFW pump must be declared inoperable immediately.

5

INSERT 9

a

indicating

This Function includes ~~two footnotes. The first~~ footnote ~~indicates~~ that MODE 2 applicability is limited to operation when one or more MFW pumps are supplying feedwater to the steam generators (SGs)~~, and the second footnote provides for delaying the entry into the action statement when starting or stopping MFW pumps in MODE 1~~.

The ~~first~~ footnote limits the Applicability to require the auto-start logic to be operable in MODE 2 only when at least one MFW pump is in service supplying feedwater to the SGs. Because plant conditions at the time of entry into Mode 2 do not allow the MFW pumps to operate, without this footnote the channels would need to be tripped resulting in an AFW start signal, starting the turbine-driven pump in addition to the motor-driven AFW pumps, which is an undesirable situation. This resolves a conflict between the MODE applicability and plant design, which does not support MFW pump operation at the time of entry into MODE 2. Also, modifying the requirement for auto-start of the AFW pumps to be only required when the MFW pumps are in service limits the potential for inadvertent AFW actuations during normal plant startups and shutdowns that could lead to reactivity control issues due to over cooling transients.

~~The second footnote delays entry into the Required Action for less than minimum channels operable for up to 4 hours. During the time of starting and stopping a second MFW pump, when the pump is in reset, the auto-start function is inoperable. Starting and stopping MFW pumps during plant startup and shutdown is a normal evolution, which will normally be accomplished within a short time. This note is intended to prevent unnecessary entries into the Required Actions, which provides a timeframe to correct unplanned equipment failures. For the normal operating evolution of starting and stopping pumps, the footnote allows a delay of up to 4 hours before entering the Required Action. The evolution should be completed in less time, but the 4 hours provides a reasonable allowance for operating contingencies. If the evolution takes longer than 4 hours, it is probably indicative of an equipment problem and entering the Required Action is appropriate.~~

INSERT 16

during MODE 1

The Required Actions are modified by a note delaying the entry into the Required Action statement when starting or stopping MFW pumps. Starting and stopping MFW pumps during plant startup and shutdown is a normal evolution, which will normally be accomplished within a short time. It was not intended to result in unnecessary entries into the Required Actions, which provides a timeframe to correct unplanned equipment failures. The 4 hours is consistent with similar allowances in other SQN TSs. 7

O.1

Condition O applies to the following ESFAS Functions:

- Auxiliary Feedwater Pump Suction Transfer on Suction Pressure - Low,
- Auxiliary Feedwater Suction Transfer Time Delays, Motor-Driven Pump, and
- Auxiliary Feedwater Suction Transfer Time Delays, Turbine-Driven Pump. 2

These functions are provided by three pressure sensors located on the suction of each AFW pump arranged in a two-out-of-three logic scheme. The motor driven AFW pumps have one time delay, while the TDAFW pump has two. The motor driven and the first TDAFW pump time delays prevent spurious transfer. The TDAFW Pump second time delay ensures ERCW Train A valves stroke open sufficiently.

If a pressure sensor channel or a time delay channel is inoperable, the associated AFW pump must be declared inoperable immediately.

Licensee Response/NRC Response/NRC Question Closure

Id	**363**
NRC Question Number	**KAB023**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**9/30/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**9/30/2014 10:48 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**47**
NRC Question Number	**KAB024**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	**A-14**
JFD Number	
JFD Bases Number	
Page Number(s)	**419, 420**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

On page 419 of Enclosure 2, Volume 8, A14 provides the discussion of CTS Table 3.3-3 functional unit 4.d, "Steam Line Isolation Steam Line Pressure – Low," and footnote #. CTS permit functional unit 4.d (ITS function 4.d.(1)) to be bypassed in Mode 3 below P-11 (Pressurizer Pressure Block of Safety Injection) setpoint.

On page 420 of Enclosure 2, Volume 8, A15 provides the discussion of CTS Table 3.3-3 functional unit 4.e, "Steam Line Isolation Negative Steam Line Pressure Rate–High," and footnote ##. CTS permit functional unit 4.e (ITS function 4.d.(2)) to be bypassed in Mode 3 below P-11 when Safety Injection on Steam Line Pressure Low is not blocked and it states that this function is automatically blocked above P-11.

ITS footnote (a) states, "Above the P-11 (Pressurizer Pressure) interlock." ITS footnote (a) is the equivalent of CTS footnote #, the only difference between the two footnotes is that the ITS footnote discusses when it is required to be operable and the CTS footnote discusses when it is permitted to be bypassed. However, TVA is not proposing to add ITS footnote (a) to ITS function 4.d.(1). TVA is proposing to add new footnote (f), which states, "When Steam Line Isolation on Steam Line Pressure, Negative Rate-High is blocked." ITS footnote (f) would not require function 4.d.(1) to be operable in Mode 3 unless the Steam Line Isolation Steam Line Pressure, Negative Rate-High is

blocked/bypassed.

Furthermore, a similar footnote (g) is proposed for ITS function 4.d.(2), "Steam Line Isolation Steam Line Pressure Negative Rate-High," and states that this function would not be required to be operable in Mode 3 unless the Steam Line Isolation on Steam Line Pressure, Low is blocked."

Therefore, in Mode 3 if neither function is blocked/bypassed then neither function is required to be operable. CTS operability of functional unit 4.d is not dependent on functional unit 4.e, nor should the operability of ITS function 4.d.(1) be dependent on function 4.d.(2). In addition, if ITS function 4.d.(1) becomes inoperable and is placed in block/bypass while above P-11 then ITS requires function 4.d.(2) to be operable, however this is not possible due to the design automatically blocking above P-11.

These footnotes are not in ISTS and the results of the proposed footnotes are not allowed by CTS, therefore this is a beyond scope change. Provide the technical evaluation for NRC review or revise the footnotes to be consistent with the CTS requirements.

Attach File 1	
Attach File 2	
Issue Date	**5/9/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/9/2014 8:48 AM**
Notification	**Scott Bowman** **Michelle Conner** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**96**
NRC Question Number	**KAB024**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 revised submittal pages for 3.3.2 Footnotes.pdf** (1MB)
Attachment 2	
Response Statement	**In response to KAB-024, SQN will revise the ISTS Table 3.3.2-1 Footnotes (a), (f), and (g) associated with ITS Table 3.3.2-1 Functions 1.d, 1.e, 4.d.(1), and 4.d.(2), to be consistent with CTS Table 3.3-3 Notes # and ## requirements.** **(1) CTS TABLE 3.3-3 Note # as it applies to ITS Table 3.3.2-1 Footnote (a), will be revised to read, "Safety Injection, Pressurizer Pressure - Low and Safety Injection, Steam Line Pressure - Low may be bypassed below the P-11 (Pressurizer Pressure) interlock." Associated changes for ITS Table 3.3.2-1 Footnote (a) will be made to the CTS markups for Units 1 and 2 (pages 350 and 390 of Enclosure 2, Volume 8), discussion of change (DOC) A13 (page 419), and ISTS markups for Units 1 and 2 (pages 466 and 500).** **(2) CTS TABLE 3.3-3 Note # as it applies to ITS Table 3.3.2-1 Footnote (f) will be revised to read, "Steam Line Isolation, Steam Line Pressure - Low may be bypassed below the P-11 (Pressurizer Pressure) interlock." Associated changes for ITS Table 3.3.2-1 Footnote (f) will be made to the CTS markups for Units 1 and 2 (pages 350 and 390 of Enclosure 2, Volume 8), DOC A14 (page 419), and ISTS markups for Units 1 and 2 (pages 470 and 504).** **(3) CTS TABLE 3.3-3 Note ## as it applies to ITS Table 3.3.2-1 footnote (g) will be revised to read, "Steam Line Isolation, Steam Line Pressure Negative Rate-High is automatically blocked above P-11 and may be blocked below P-11 when Safety Injection, Steam Line Pressure - Low is not blocked." Associated changes for ITS Table 3.3.2-1 Footnote (g) will be made to the CTS markups for Units 1 and 2 (pages 350 and 390 of Enclosure 2, Volume 8), DOC A15 (page 420), and ISTS markups for Units 1 and 2 (pages 470 and 504).** **See Attachment 1 for the draft revised CTS markups/Inserts for Units 1 and 2; DOCs A13, A14, and A15; and ISTS Markups for Units 1 and 2.**
Response Date/Time	**6/5/2014 4:15 PM**
Closure Statement	

Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/5/2014 3:13 PM**
Date Modified	
Modified By	

ITS   A01   ITS 3.3.2

TABLE 3.3-3 (Continued)

INSERT 3 — A13

TABLE NOTATION

INSERT 4 — A14

Table 3.3.2-1 Footnote (a) and Footnote (f)

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

A15 — INSERT 5

Table 3.3.2-1 Footnote (g)

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

(e) Except when all MSIV's are closed. — L04

(i) Except when all MFIVs, MFRVs, and MFRV bypass valves are closed or isolated by a closed manual valve. — L05

ACTION STATEMENTS

ACTION S — 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 S Note

ACTION 16 - Deleted.

ACTION D — 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~~ 72 hours. — L07

b. The Minimum Channels OPERABLE requirements is met; however, the inoperable channel may be bypassed for up to ~~4~~ 12 hours for surveillance testing of other channels per Specification 4.3.2.1.1. — L08

Add proposed Required Action D.2.1 and D.2.2 — M07

ACTION E
ACTION P — 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~~ 72 for ACTION E, otherwise 6 hours and the Minimum Channels OPERABLE requirement is met; one additional channel may be bypassed for up to ~~4~~ 12 for ACTION E, otherwise 4 hours for surveillance testing per Specification 4.3.2.1.1. — L09, L10

Add proposed Required Action E.2.1 and E.2.2 — M08

ACTION 19 - With less than the Minimum Channels OPERABLE, operation may continue provided the containment purge supply and exhaust valves are maintained closed. — See ITS 3.3.6

ACTION B
ACTION N — 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. — A16

Add proposed Required Action P.2.1 and P.2.2 — M09

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ITS

Table 3.3.2-1

ITS 3.3.2

A13

INSERT 3

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

Safety Injection, Pressurizer Pressure - Low and Safety Injection, Steam Line Pressure - Low may be bypassed below the P-11 (Pressurizer Pressure) interlock.

A14

INSERT 4

Footnote (f) ~~When Steam Line Isolation, Steam Line Pressure, Negative Rate -High is blocked~~.

Steam Line Isolation, Steam Line Pressure - Low may be bypassed below the P-11 (Pressurizer Pressure) interlock.

A15

INSERT 5

Footnote (g) ~~When Steam Line Isolation on Steam Line Pressure, Low is blocked~~.

Steam Line Isolation, Steam Line Pressure Negative Rate-High is automatically blocked above P-11 and may be blocked below P-11 when Safety Injection, Steam Line Pressure - Low is not blocked.

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ITS — A01 — ITS 3.3.2

TABLE 3.3-3 (Continued)

INSERT 3 — A13

TABLE NOTATION

INSERT 4 — A14

Table 3.3.2-1 Footnote (a) and Footnote (f)

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

INSERT 5 — A15

Table 3.3.2-1 Footnote (g)

~~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.~~

(j) Except when all MSIV's are closed. — L04

(k) Except when all MFIVs, MFRVs, and MFRV bypass valves are closed or isolated by a closed manual valve. — L05

ACTION STATEMENTS

ACTION S

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 S Note

ACTION 16 - Deleted.

ACTION D

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:

72 — L07

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

12 — L08

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.

Add proposed Required Action D.2.1 and D.2.2 — M07

ACTION E
ACTION P

72 for ACTION E, otherwise 6 — L09

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.

12 for ACTION E, otherwise 4 — L10

Add proposed Required Action E.2.1 and E.2.2 — M08

ACTION 19 - With less than the Minimum Channels OPERABLE, operation may continue provided the containment purge supply and exhaust valves are maintained closed. — See ITS 3.3.6

ACTION B
ACTION N

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. — A16

Add proposed Required Action P.2.1 and P.2.2 — M09

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ITS

Table 3.3.2-1

ITS 3.3.2

A13

INSERT 3

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

Safety Injection, Pressurizer Pressure - Low and Safety Injection, Steam Line Pressure - Low may be bypassed below the P-11 (Pressurizer Pressure) interlock.

A14

INSERT 4

Footnote (f) ~~When Steam Line Isolation, Steam Line Pressure, Negative Rate–High is blocked.~~

Steam Line Isolation, Steam Line Pressure - Low may be bypassed below the P-11 (Pressurizer Pressure) interlock.

A15

INSERT ~~5~~

Footnote (g) ~~When Steam Line Isolation on Steam Line Pressure, Low is blocked.~~

Steam Line Isolation, Steam Line Pressure Negative Rate-High is automatically blocked above P-11 and may be blocked below P-11 when Safety Injection, Steam Line Pressure - Low is not blocked.

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DISCUSSION OF CHANGES
ITS 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

and 4.d, Steam Line Isolation, Steam Line Pressure - Low

making the footnote specific to the Safety Injection functional units. (See DOC A14 for the discussion on making Note # specific to Steam Line Isolation, Steam Line Pressure - Low.)

A13 CTS Table 3.3-3 Note #, in part, is associated with Functional Units 1.d (Safety Injection, Pressurizer Pressure-Low) and 1.f (Safety Injection, Steam Line Pressure-Low). CTS Table 3.3-3 Note # modifies the Functional Unit's MODE of Applicability by stating that the trip function may be bypassed in MODE 3 below P-11 (Pressurizer Pressure Block of Safety Injection) setpoint. ITS Table 3.3.2-1 footnote (a) is associated with Functions 1.d (Safety Injection, Pressurizer Pressure-Low), and 1.e (Safety Injection, Steam Line Pressure-Low). ITS Table 3.3.2-1 footnote (a) modifies the Function's Applicability by stating ~~"Above the P-11 (Pressurizer Pressure) interlock."~~ This changes the CTS by ~~replacing the description of how the P-11 interlock operates and when the Functions are allowed to be bypassed, with a statement of when the Functions are required to be OPERABLE.~~

"Safety Injection, Pressurizer Pressure - Low and Safety Injection, Steam Line Pressure - Low may be bypassed below the P-11 (Pressurizer Pressure) interlock."

The purpose of CTS Table 3.3-3 Note # is to modify the Applicability for the associated Functional Units stating when it is permissible for these Functional Units to be bypassed. Note # does this by providing information on the Functional Units interaction with interlock P-11. One purpose of P-11 is to prevent an inadvertent ECCS actuation during plant heatup and cooldown by blocking portions of the safety injection and steam line isolation signal actuation logic. The pressurizer low pressure and steamline low pressure safety injection actuation signals can be manually blocked when RCS pressure is below the P-11 permissive setpoint. ~~CTS Table 3.3-3 Note # states that these Functional Units may be bypassed when below P-11. ITS Table 3.3.2-1 footnote (a) modifies the applicability of the pressurizer low pressure and steamline low pressure safety injection Functions, stating that they are required to be OPERABLE above the P-11 (Pressurizer Pressure) interlock. Thus replacing the statements in CTS for when they may be bypassed with statements in ITS for when these Functions are required to be OPERABLE. Therefore,~~ ITS requires these Functions to provide a signal that will actuate safety injection under the same Conditions as CTS. This change is designated as administrative because it does not result in technical changes to the CTS.

making the footnote specific to the Steam Line Isolation functional unit. (See DOC A13 for the discussion on making footnote # specific to the Safety Injection functional units.)

"Steam Line Isolation, Steam Line Pressure - Low may be bypassed below the P-11 (Pressurizer Pressure) interlock."

A14 CTS Table 3.3-3 Note #, in part, is associated with Functional Unit 4.d (Steam Line Isolation, Steam Line Pressure-Low). CTS Table 3.3-3 Note # modifies the Functional Unit's MODE of Applicability by stating that the trip function may be bypassed in MODE 3 below P-11 (Pressurizer Pressure Block of Safety Injection) setpoint. ITS Table 3.3.2-1 footnote (f) is associated with Function 4.d.(1) (Steam Line Isolation, Steam Line Pressure, Low). ITS Table 3.3.2-1 footnote (f) modifies the Function's applicability by stating ~~"when Steam Line Isolation on Steam Line Pressure Negative Rate -High is blocked."~~ This changes the CTS by ~~replacing the description of how the P-11 interlock operates and when the Function is allowed to be bypassed, with a statement of when the Function is required to be OPERABLE.~~

The purpose of CTS Table 3.3-3 Note # is to modify the Applicability for the associated Functional Units stating when it is permissible for this Functional Unit to be bypassed. Note # does this by providing information on the Functional Units interaction with interlock P-11. One purpose of P-11 is to prevent an inadvertent ECCS actuation during plant heatup and cooldown by blocking

DISCUSSION OF CHANGES
ITS 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

portions of the steam line isolation signal actuation logic. The steam line isolation steam pressure low actuation signal can be manually blocked when RCS pressure is below the P-11 permissive setpoint. ~~CTS Table 3.3-3 Note # states that this Functional Unit may be bypassed when below P-11. ITS Table 3.3.2-1 footnote (a) modifies the Applicability of the Steamline Isolation, Steam Line Pressure, Low Function by stating that this Function is required to be OPERABLE when Steam Line Isolation on Steam Line Pressure Negative Rate-High is blocked.~~ ~~Therefore,~~ ITS requires this Function to provide a signal that will actuate steam line isolation under the same Conditions as CTS. This change is designated as administrative because it does not result in technical changes to the CTS.

"Steam Line Isolation, Steam Line Pressure Negative Rate-High is automatically blocked above P-11 and may be blocked below P-11 when Safety Injection, Steam Line Pressure - Low is not blocked."

A15 CTS Table 3.3-3 Note ## is associated with Functional Unit 4.e (Steam Line Isolation, Negative Steam Line Pressure Rate-High). CTS Table 3.3-3 Note ## modifies the Functional Unit's MODE of Applicability by stating that that the trip function is automatically blocked above P-11 and that it may be blocked below P11 when Safety Injection on Steam Line Pressure-Low is not blocked. ITS Table 3.3.2-1 footnote (g) is associated with Function 4.d.(2) (Steam Line Isolation, Steam Line Pressure, Negative Rate-High). ITS Table 3.3.2-1 footnote (g) modifies the applicability of the Steam Line Isolation, Steam Line Pressure, Negative Rate-High Function by stating ~~that this Function is required to be OPERABLE when the Steam Line Isolation on Steam Line Pressure-Low Function is blocked."~~ This changes the CTS by ~~replacing the description of how the P-11 interlock operates and when the Function is allowed to be blocked, with a statement of when the Function is required to be OPERABLE.~~

making the footnote specific to the Steam Line Isolation, Steam Line Pressure, Negative Rate-High functional unit.

The purpose of CTS Table 3.3-3 Note ## is to modify the Applicability for the associated Functional Unit stating when it is permissible for this Functional Unit to be blocked. Note ## does this by providing information on the Functional Unit's interaction with interlock P-11. One purpose of P-11 is to prevent an inadvertent ECCS or steam line isolation actuation during plant heatup and cooldown by blocking portions of the safety injection and steam line isolation signal actuation logic. The steam line isolation Negative Steam Line Pressure Rate-High actuation signal is automatically blocked when RCS pressure is above the P-11 permissive setpoint and can be manually enabled below P-11. ~~CTS Table 3.3-3 Note ## states that this Functional Unit's trip function is automatically blocked above P-11 and may be blocked below P-11 when Safety Injection on Steam Line Pressure-Low is not blocked. ITS Table 3.3.2-1 footnote (g) modifies the Applicability of the Steam Line Isolation, Steam Pressure, Negative Rate-High Function by stating that this Function is required to be OPERABLE when Steam Line Isolation on Steam Line Pressure -Low is blocked.~~ ~~Therefore,~~ ITS requires this Function to provide a signal that will actuate steam line isolation under the same Conditions as CTS. This change is designated as administrative because it does not result in technical changes to the CTS.

A16 CTS Table 3.3-3 ACTION 20 requires that 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. CTS Table 3.3-3 ACTION 20 is applicable to CTS Table 3.3-3 Functional Units

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CTS

ESFAS Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.2~~A~~

Table 3.3-3

Table 3.3.2-1 (page 1 of 11)
Engineered Safety Feature Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	~~[~~NOMINAL~~(f)~~ TRIP SETPOINT~~]~~	
	1. Safety Injection							
1.a	a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.~~8~~ 7	NA	NA	2
1.b	b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.~~4~~ 3 SR 3.3.2.~~6~~ 5	NA	NA	2
1.c	c. Containment Pressure - High ~~1~~	1,2,3	3	D	SR 3.3.2.1 SR 3.3.2.~~5~~ 4 [(b)(c)] SR 3.3.2.~~9~~ 8 [(b)(c)] SR 3.3.2.~~10~~ 9	≤ ~~[3.86]~~ 1.6 psig	~~[3.6]~~ 1.54 psig	3 2
1.d	d. Pressurizer Pressure - Low	1,2,3 [(a)]	~~[~~3~~]~~	D	SR 3.3.2.1 SR 3.3.2.~~5~~ 4 [(b)(c)] SR 3.3.2.~~9~~ 8 [(b)(c)] SR 3.3.2.~~10~~ 9	≥ ~~[1839]~~ 1864.8 psig	~~[1850]~~ 1870 psig	3 2
1.f	e. Steam Line Pressure							
	~~(1)~~ - Low	1,2,3 ~~[(a)]~~	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.~~5~~ 4 [(b)(c)] SR 3.3.2.~~9~~ 8 [(b)(c)] SR 3.3.2.~~10~~ 9	≥ ~~[635]~~ 592.2 [(d)] psig	~~[675]~~ 600 [(d)] psig	3 2
	~~(2) High Differential Pressure Between Steam Lines~~	~~1,2,3~~	~~3 per steam line~~	~~D~~	~~[SR 3.3.2.1]~~ ~~SR 3.3.2.5(b)(c)~~ ~~SR 3.3.2.9(b)(c)~~ ~~SR 3.3.2.10~~	~~≤ [106] psig~~	~~[97] psig~~	

Note # (a) ~~Above the P-11 (Pressurizer Pressure) interlock.~~ Safety Injection, Pressurizer Pressure - Low and Safety Injection, Steam Line Pressure - Low may be bypassed below the P-11 (Pressurizer Pressure) interlock. 2

3.3.2.1, and ACTION (b) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

3.3.2.1, and ACTION (c) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that ~~the~~ as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The ~~NTSP and the~~ methodologies used to determine the as-found and as-left tolerances are specified in ~~[insert the facility FSAR reference or the name of any document incorporated into the facility FSAR by reference]~~ UFSAR Section 7.1.2. 2 3

Table 3.3-4 Note 1 (d) Time constants used in the lead/lag controller are ~~t~~ τ_1 ≥ ~~[~~50~~]~~ seconds and ~~t~~ τ_2 ≤ ~~[~~5~~]~~ seconds. 2 3

~~REVIEWER'S NOTE~~

~~(f) Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.~~ 4

CTS

ESFAS Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.2~~A~~

Table 3.3-3

Table 3.3.2-1 (page 5 of 11)
Engineered Safety Feature Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	~~[~~NOMINAL[~~(f)~~] TRIP SETPOINT~~]~~ 3
	4. Steam Line Isolation						
	d. Steam Line Pressure						
4.d	(1) Low	1,2[~~(i)~~ e],3[~~(j)~~] (~~a~~)[f]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.~~5~~ 4 (b)(c) SR 3.3.2.~~9~~ 8 (b)(c) SR 3.3.2.~~10~~ 9	≥ ~~[635]~~ 592.2[(d)] psig	~~[675]~~ 600[(d)] psig 3
4.e	(2) Negative Rate - High	3 (~~h~~ g) (~~j~~ e)	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.~~5~~ 4 (b)(c) SR 3.3.2.~~9~~ 8 (b)(c) SR 3.3.2.~~10~~ 9	≤ ~~[121.6]~~ 107.8[(~~i~~ h)] psi	~~[110]~~ 100.0[(~~i~~ h)] psi 3

2

Note # (~~a~~ f) ~~Above the P-11 (Pressurizer Pressure) interlock.~~ ~~When Steam Line Isolation on Steam Line Pressure, Negative Rate - High is blocked~~

2

3.3.2.1, and ACTION (b) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

3.3.2.1, and ACTION (c) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The ~~NTSP and the~~ methodologies used to determine the as-found and as-left tolerances are specified in ~~[insert the facility FSAR reference or the name of any document incorporated into the facility FSAR by reference]~~ UFSAR Section 7.1.2. 2 3

Table 3.3-4 Note 1 (d) Time constants used in the lead/lag controller are ~~t_1~~ τ_1 ≥ ~~[~~50~~]~~ seconds and ~~t_2~~ τ_2 ≤ ~~[~~5~~]~~ seconds. 2 3

Table 3.3-3 Note ## (~~h~~ g) ~~Below the P-11 (Pressurizer Pressure) interlock.~~ ~~When Steam Line Isolation on Steam Line Pressure, Low is blocked~~ 2

Table 3.3-4 Note 2 (~~i~~ h) Time constant utilized in the rate/lag controller is ≥ ~~[~~50~~]~~ seconds. 3

DOC L04 (~~j~~ e) Except when all MSIVs are closed ~~and [de-activated]~~. 3

~~REVIEWER'S NOTE~~

~~(I) Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.~~ 4

Steam Line Isolation, Steam Line Pressure - Low may be bypassed below the P-11 (Pressurizer Pressure) interlock.

Steam Line Isolation, Steam Line Pressure Negative Rate-High is automatically blocked above P-11 and may be blocked below P-11 when Safety Injection, Steam Line Pressure - Low is not blocked.

CTS

ESFAS Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.2~~A~~

Table 3.3-3

Table 3.3.2-1 (page 1 of 11)
Engineered Safety Feature Actuation System Instrumentation

CTS	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	~~[~~NOMINAL TRIP SETPOINT~~]~~ ~~(f)~~	
	1. Safety Injection							
1.a	a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.~~8~~ 7	NA	NA	2
1.b	b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.~~4~~ 3 SR 3.3.2.~~6~~ 5	NA	NA	2
1.c	c. Containment Pressure - High ~~1~~	1,2,3	3	D	SR 3.3.2.1 SR 3.3.2.~~5~~ 4 (b)(c) SR 3.3.2.~~9~~ 8 (b)(c) SR 3.3.2.~~10~~ 9	≤ ~~[3.86]~~ 1.6 psig	~~[3.6]~~ 1.54 psig	3, 2
1.d	d. Pressurizer Pressure - Low	1,2,3 (a)	~~[~~3~~]~~	D	SR 3.3.2.1 SR 3.3.2.~~5~~ 4 (b)(c) SR 3.3.2.~~9~~ 8 (b)(c) SR 3.3.2.~~10~~ 9	≥ ~~[1839]~~ 1864.8 psig	~~[1850]~~ 1870 psig	3, 2
1.f	e. Steam Line Pressure							
	~~(1)~~ - Low	1,2,3 ~~[~~(a)~~]~~	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.~~5~~ 4 (b)(c) SR 3.3.2.~~9~~ 8 (b)(c) SR 3.3.2.~~10~~ 9	≥ [~~635~~] 592.2 (d) psig	~~[675]~~ 600 (d) psig	3, 2
	~~(2) High Differential Pressure Between Steam Lines~~	~~1,2,3~~	~~3 per steam line~~	~~D~~	~~[SR 3.3.2.1]~~ ~~SR 3.3.2.5 (b)(c)~~ ~~SR 3.3.2.9 (b)(c)~~ ~~SR 3.3.2.10~~	~~≤ [106] psig~~	~~[97] psig~~	2

Note # (a) ~~Above the P-11 (Pressurizer Pressure) interlock.~~ Safety Injection, Pressurizer Pressure - Low and Safety Injection, Steam Line Pressure - Low may be bypassed below the P-11 (Pressurizer Pressure) interlock. 2

3.3.2.1, and ACTION (b) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

3.3.2.1, and ACTION (c) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The ~~NTSP and the~~ methodologies used to determine the as-found and as-left tolerances are specified in ~~[insert the facility FSAR reference or the name of any document incorporated into the facility FSAR by reference]~~ UFSAR Section 7.1.2. 2 3

Table 3.3-4 Note 1 (d) Time constants used in the lead/lag controller are ~~t~~ τ$_1$ ≥ ~~[~~50~~]~~ seconds and ~~t~~ τ$_2$ ≤ ~~[~~5~~]~~ seconds. 2 3

~~REVIEWER'S NOTE~~

~~(f) Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.~~ 4

CTS

Table 3.3-3

Table 3.3.2-1 (page 5 of 11)
Engineered Safety Feature Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	~~[~~NOMINAL~~(l)~~ TRIP SETPOINT~~]~~ 3
	4. Steam Line Isolation						
	d. Steam Line Pressure						
4.d	(1) Low	1,2 ~~(i)~~ e, 3 ~~(i)~~ ~~(a)~~ f	3 per steam line	D	SR 3.3.2.1 4 SR 3.3.2.~~5~~ 8 (b)(c) SR 3.3.2.~~9~~ 9 (b)(c) SR 3.3.2.~~10~~	≥ ~~[635]~~ 592.2 (d) psig	~~[675]~~ 600 (d) psig 3
4.e	(2) Negative Rate - High	3 ~~(h)~~ g ~~(j)~~ e	3 per steam line	D	SR 3.3.2.1 4 SR 3.3.2.~~5~~ 8 (b)(c) SR 3.3.2.~~9~~ 9 (b)(c) SR 3.3.2.~~10~~	≤ ~~[121.6]~~ 107.8 ~~(i)~~ h psi	~~[110]~~ 100.0 ~~(i)~~ h psi 3

2

Note # (~~a~~ f) ~~Above the P-11 (Pressurizer Pressure) interlock.~~ ~~When Steam Line Isolation on Steam Line Pressure, Negative Rate–High is blocked~~ 2

3.3.2.1, and ACTION (b) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

3.3.2.1, and ACTION (c) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The ~~NTSP and the~~ methodologies used to determine the as-found and as-left tolerances are specified in ~~[insert the facility FSAR reference or the name of any document incorporated into the facility FSAR by reference]~~ UFSAR Section 7.1.2. 2 3

Table 3.3-4 Note 1 (d) Time constants used in the lead/lag controller are $\tau_1 \geq$ ~~[~~50~~]~~ seconds and $\tau_2 \leq$ ~~[~~5~~]~~ seconds. 2 3

Table 3.3-3 Note ## (~~h~~ g) ~~Below the P-11 (Pressurizer Pressure) interlock.~~ ~~When Steam Line Isolation on Steam Line Pressure, Low is blocked~~ 2

Table 3.3-4 Note 2 (~~i~~ h) Time constant utilized in the rate/lag controller is ≥ ~~[~~50~~]~~ seconds. 3

DOC L04 (~~j~~ e) Except when all MSIVs are closed ~~and [de-activated]~~. 3

~~REVIEWER'S NOTE~~

~~(l) Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.~~ 4

Steam Line Isolation, Steam Line Pressure - Low may be bypassed below the P-11 (Pressurizer Pressure) interlock.

Steam Line Isolation, Steam Line Pressure Negative Rate-High is automatically blocked above P-11 and may be blocked below P-11 when Safety Injection, Steam Line Pressure - Low is not blocked.

Licensee Response/NRC Response/NRC Question Closure

Id	**106**
NRC Question Number	**KAB024**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/6/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/6/2014 10:05 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**48**
NRC Question Number	**KAB025**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	**L-8**
JFD Number	
JFD Bases Number	
Page Number(s)	**440**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 440 of Enclosure 2, Volume 8, L08 provides the discussion of the requirements for bypassing inoperable channels during surveillance testing as stated in CTS Table 3.3-3 ACTION 17. In the discussion, some of the numerical references are intermixed in such a way that they should reference the CTS numerical functional units and instead they reference the ITS numerical functions, and vice versa. For example, L08 states, "This allowance is applicable to CTS Table 3.3-3 Functional Units … :1.e (Steam Line Pressure – Low); 4.d.(1) (Steam Line Pressure-Low); 4.d.(2) (Negative Steam Line Pressure Rate-High)…," this sentence should list the CTS numbers for the functional units but instead lists the numbers for the same functions in ITS. Please review L08 and submit the needed corrections, or explain why intermixing the numerical identifiers is correct.**
Attach File 1	
Attach File 2	
Issue Date	**5/9/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/9/2014 8:50 AM**
Notification	**Scott Bowman Michelle Conner Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**65**
NRC Question Number	**KAB025**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 revised 3.3.2 DOC L08.pdf** (16KB)
Attachment 2	
Response Statement	**In response to KAB025, discussion of change (DOC) L08, on page 440 of Enclosure 2, Volume 8, will be revised. Specifically, CTS Table 3.3-3 references to Functional Units 1.e, 4.d.(1), and 4.d.(2) will be revised to 1.f, 4.d, and 4.e, respectively. ITS Table 3.3.2-1 references to Functional Units 1.f, 4.d, 4.e, and 5.a will be revised to 1.e, 4.d.(1), 4.d.(2), and 5.b, respectively.** **See Attachment 1 for the draft revised DOC L08.**
Response Date/Time	**5/29/2014 1:30 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**5/29/2014 12:25 PM**
Date Modified	
Modified By	

DISCUSSION OF CHANGES
ITS 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

designated as less restrictive because additional time is allowed to restore parameters to within the LCO limits than was allowed in the CTS.

L08 *(Category 9 – Allowed Outage Time, Surveillance Frequency, and Bypass Time Extensions Based on Generic Topical Reports)* CTS Table 3.3-3 ACTION 17 allows in part that with the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following listed conditions are satisfied but further states that the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.2.1.1. This allowance is applicable f to CTS Table 3.3-3 Functional Units 1.c (Containment Pressure – High); 1.d e (Pressurizer Pressure – Low); 1.e (Steam Line Pressure – Low); 4.d~~.(1)~~ (Steam Line Pressure – Low); 4.~~d.(2)~~ (Negative Steam Line Pressure Rate – High); and 5.a (Steam Generator Water Level — High-High). ITS 3.3.2 ACTION D Required Actions are modified by a Note that states; "The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels." This allowance is applicable to ITS Table 3.3.2-1 Functional Units 1.c (Containment Pressure – High); 1.d (Pressurizer Pressure – Low); 1.~~f~~ e (Steam Line Pressure – Low); 4.d .(1) (Steam Line Pressure – Low); 4.~~e~~ d.(2) (Negative Steam Line Pressure Rate – High); and 5.~~a~~ b (Steam Generator Water Level — High-High). This changes the CTS by increasing the time allowed for these functions to be bypassed from 4 hours to 12 hours. KAB-025

The purpose of CTS Table 3.3-3 ACTION 17 is to limit the maximum time allowed for maintenance activities, in which the channel is unavailable or prior to being placed in a tripped state. The proposed bypass time of 12 hours in ITS 3.3.2 ACTION D is a sufficient time to perform train or channel surveillance. The 12 hour period is acceptable based on TVA's confirmation of applicability and incorporation of insights as described in Enclosure 4 of this submittal, required by the NRC in their letter and enclosed Safety Evaluation Report (SER) dated July 15, 1998, "Review of Westinghouse Owners Group Topical Reports WCAP-14333-P and WCAP-14334-NP, dated May 1995, 'Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times' (TAC NO. M92782)." This change is designated as less restrictive because additional time is allowed for an inoperable channel to be bypassed for maintenance than was allowed in the CTS.

L09 *(Category 9 – Allowed Outage Time, Surveillance Frequency, and Bypass Time Extensions Based on Generic Topical Reports)* CTS Table 3.3-3 ACTION 18, requires, in part, that 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. This action is applicable to CTS Table 3.3-3 Functional Units 2.c (Containment Pressure –- High-High); 3.b.3) (Containment Pressure –- High-High); 4.c (Containment Pressure –- High-High); 9.a (RWST Level – Low); and 9.a (Containment Sump Level – High). ITS Table 3.3.2-1 designates Condition E as the referenced Condition for Functions 2.c (Containment Pressure –- High-High), 3.b.(3) (Containment Pressure –- High-High), and 4.c (Containment Pressure –- High-High) while designating Condition P as the referenced Condition for Functions 7.b (RWST Level – Low) and 7.b (Containment Sump Level – High). ITS 3.3.2,

Licensee Response/NRC Response/NRC Question Closure

Id	**79**
NRC Question Number	**KAB025**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**5/30/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**5/30/2014 8:38 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**49**
NRC Question Number	**KAB026**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	**L-10**
JFD Number	
JFD Bases Number	
Page Number(s)	**441**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

On page 441 of Enclosure 2, Volume 8, L10 provides the discussion of the requirements for bypassing inoperable channels during surveillance testing as stated in CTS Table 3.3-3 ACTION 18. L10 states:

> **ITS 3.3.2 ACTIONS E Required Actions are modified by a Note that states; "The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels." This allowance is applicable to ITS Table 3.3.2-1 Functional Units… and 7.b (RWST Level – Low). ITS 3.3.2 Required Action Note retains the CTS inoperable channel bypass allowance of 4 hours for surveillance testing of other channels.**

The note modifying ITS 3.3.2 Required Actions for Condition E is not quoted correctly. The note in ITS 3.3.2 Required Actions for Condition E is not applicable to function 7.b (RWST Level – Low). The last sentence of the quote above is confusing because the note in ITS 3.3.2 Required Actions for Condition E has an allowance is 12 hours.

Please (1) correct quote of the note modifying ITS 3.3.2 Required Actions for Condition E, (2) remove function 7.b from the discussion of ITS Condition E or revise the sentence

to include discussion of ITS Condition P, and (3) explain the meaning of the last sentence.

Attach File 1	
Attach File 2	
Issue Date	**5/9/2014**
Added By	**Kristy Bucholtz**
Date Modified	
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Date Added	**5/9/2014 8:52 AM**
Notification	**Scott Bowman** **Michelle Conner** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**97**
NRC Question Number	**KAB026**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.2 revised DOC L10.pdf** (17KB)
Attachment 2	
Response Statement	**In response to KAB026, discussion of change (DOC) L10, on page 441 of Enclosure 2, Volume 8, will be revised. The following changes will be made:** **(1) The ITS 3.3.2 ACTIONS E Required Actions Note will be revised to state, "One additional channel may be bypassed for up to 12 hours for surveillance testing of other channels."** **(2) ITS function 7.b (RWST Level – Low) will be removed from the discussion concerning the application of ITS 3.3.2 ACTIONS E Required Actions Note.** **(3) The sentence, "ITS 3.3.2 Required Action Note retains the CTS inoperable channel bypass allowance of 4 hours for surveillance testing of other channels." will be revised to state, "ITS 3.3.2 ACTIONS P Required Action Note retains the CTS one additional channel bypass allowance of 4 hours for surveillance testing of other channels." This sentence is included in DOC L10 to indicate that CTS ACTION 18 becomes ITS ACTIONS E and P, and although ITS ACTIONS E is increasing the time allowed for an additional channel to be bypassed (4 hours to 12 hours); ITS ACTIONS P retains the CTS allowance time of 4 hours.** **(4) The sentence, "This changes the CTS by increasing the time allowed for an additional channel to be bypassed for these Functional Units from 4 hours to 12 hours." will be revised to state, "This changes the CTS by increasing the time allowed for an additional channel to be bypassed for Functional Units 2.c, 3.b.(3), and 4.c, from 4 hours to 12 hours." This sentence will be revised to indicate that the change to CTS, increasing the time allowed for an additional channel to be bypassed, is only applicable to Functional Units 2.c, 3.b.(3), and 4.c.** **See Attachment 1 for the draft revised DOC L10.**
Response Date/Time	**6/5/2014 4:20 PM**
Closure Statement	

Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/5/2014 3:16 PM**
Date Modified	
Modified By	

DISCUSSION OF CHANGES
ITS 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

Required Actions E.1 requires placing the associated channel in bypass with a Completion Time of 72 hours for ITS Table 3.3.2-1 Functions 2.c (Containment Pressure –- High-High), 3.b.(3) (Containment Pressure –- High-High), and 4.c (Containment Pressure –- High-High). ITS 3.3.2 Required Action P.1 retains the CTS Completion Time of 6 hours for placing the associated inoperable channel in bypass. This changes the CTS by increasing the Completion Time for placing an inoperable channel in bypass for these Functional Units from six (6) hours to 72 hours.

The purpose of CTS Table 3.3-3 ACTION 18 is to limit the maximum time allowed for maintenance activities, in which the channel is unavailable or prior to being placed in a bypassed state. This change is acceptable because the Completion Time is consistent with safe operation under the specified Condition, considering the OPERABLE status of the redundant systems or features. This includes the capacity and capability of remaining systems or features, a reasonable time for repairs or replacement, and the low probability of a DBA occurring during the allowed Completion Time. Additionally, this change is acceptable based on TVA's confirmation of applicability and incorporation of insights as described in Enclosure 4 of this submittal, required by the NRC in their letter and enclosed Safety Evaluation Report (SER) dated July 15, 1998, "Review of Westinghouse Owners Group Topical Reports WCAP-14333-P and WCAP-14334-NP, dated May 1995, 'Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times' (TAC NO. M92782)." This change is designated as less restrictive because additional time is allowed to restore parameters to within the LCO limits than was allowed in the CTS.

L10 *(Category 9 – Allowed Outage Time, Surveillance Frequency, and Bypass Time Extensions Based on Generic Topical Reports)* CTS Table 3.3-3 ACTION 18 requires, in part, that with the number of OPERABLE channels one less than the Total Number of Channels operation may proceed provide the specified conditions are met but further states that one additional channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1.1. This allowance is applicable to CTS Table 3.3-3 Functional Units 2.c (Containment Pressure – High-High); 3.b.3) (Containment Pressure – High-High); 4.c (Containment Pressure – High-High); 9.a (RWST Level – Low); and 9.a (Containment Sump Level – High). ITS Table 3.3.2-1 designates Condition E as the referenced Condition for Functions 2.c (Containment Pressure –- High-High), 3.b.(3) (Containment Pressure –- High-High), and 4.c (Containment Pressure –- High-High) while designating Condition P as the referenced Condition for Functions 7.b (RWST Level – Low) and 7.b (Containment Sump Level – High). ITS 3.3.2 ACTIONS E Required Actions are modified by a Note that states; "One additional ~~The inoperable~~ channel may be bypassed for up to 12 hours for surveillance testing of other channels." This allowance is applicable to ITS Table 3.3.2-1 Functional Units 2.c (Containment Pressure – High-High); and 3.b.3) (Containment Pressure – High-High); 4.c (Containment Pressure – High-High)~~;~~ ~~and 7.b (RWST Level – Low)~~. ITS 3.3.2 ACTIONS P Required Action Note retains the CTS one additional ~~inoperable~~ channel bypass allowance of 4 hours for surveillance testing of other channels. This changes the CTS by increasing the time allowed for an additional channel to be bypassed for ~~these~~ Functional Units 2.c, 3.b.(3), and 4.c, from 4 hours to 12 hours. KAB-026

Licensee Response/NRC Response/NRC Question Closure

Id	**107**
NRC Question Number	**KAB026**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/6/2014**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/6/2014 10:06 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**50**
NRC Question Number	**KAB027**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	**L-11**
JFD Number	
JFD Bases Number	
Page Number (s)	**442**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 442 of Enclosure 2, Volume 8, L11 provides the discussion of CTS Table 3.3-3 ACTION 23. CTS ACTION 23 is compared to ITS 3.3.2 Condition H. However, in the last paragraph it discusses ITS 3.3.2 Condition G. Please provide a revised L11 that discusses the appropriate ITS 3.3.2 Condition or explain why both ITS Conditions are correct.**
Attach File 1	
Attach File 2	
Issue Date	**5/9/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/9/2014 8:54 AM**
Notification	**Scott Bowman** **Michelle Conner** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**64**
NRC Question Number	**KAB027**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 revised 3.3.2 DOC L11.pdf** (13KB)
Attachment 2	
Response Statement	**In response to KAB027, discussion of change (DOC) L11, on page 442 of Enclosure 2, Volume 8, will be revised. Specifically, the reference to ITS 3.3.2 ACTION G will be revised to reference ITS 3.3.2 ACTION H.** **See Attachment 1 for the draft revised DOC L11.**
Response Date/Time	**5/29/2014 12:45 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**5/29/2014 11:41 AM**
Date Modified	
Modified By	

DISCUSSION OF CHANGES
ITS 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

The purpose of CTS Table 3.3-3 ACTION 18 is to limit the maximum time allowed for maintenance activities, in which the channel is unavailable or prior to being placed in a bypassed state. The proposed bypass time of 12 hours in ITS 3.3.2 ACTION E is a sufficient time to perform train or channel surveillance. The 12 hour period is acceptable based on TVA's confirmation of applicability and incorporation of insights as described in Enclosure 4 of this submittal, required by the NRC in their letter and enclosed Safety Evaluation Report (SER) dated July 15, 1998, "Review of Westinghouse Owners Group Topical Reports WCAP-14333-P and WCAP-14334-NP, dated May 1995, 'Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times' (TAC NO. M92782)." This change is designated as less restrictive because additional time is allowed for an inoperable channel to be bypassed for maintenance than was allowed in the CTS.

L11 *(Category 9 – Allowed Outage Time, Surveillance Frequency, and Bypass Time Extensions Based on Generic Topical Reports)* CTS Table 3.3-3, ACTION 23 for Functional Units 4.b (Steam Line Isolation, Automatic Actuation Logic), 5.b (Turbine Trip & Feedwater Isolation, Automatic Actuation Logic), and 6.b (Auxiliary Feedwater, Automatic Actuation Logic) states, "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." ITS 3.3.2, ACTION H for Functions 4.b (Steam Line Isolation, Automatic Actuation Logic and Actuation Relays), 5.a (Turbine Trip & Feedwater Isolation, Automatic Actuation Logic and Actuation Relays), and 6.a (Auxiliary Feedwater, Automatic Actuation Logic and Actuation Relays) requires restoration of the inoperable train to OPERABLE status within 24 hours or be in MODE 3 within 30 hours and MODE 4 within 36 hours; and is modified by a Note stating, "One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE." This changes the CTS by allowing 24 hours for train maintenance to restore the train to an OPERABLE status before requiring a power reduction to MODE 3 within an additional 6 hours and MODE 4 in additional 6 hours for an inoperable Steam Line Isolation, Automatic Actuation Logic, Turbine Trip & Feedwater Isolation, Automatic Actuation Logic, or Auxiliary Feedwater, Automatic Actuation Logic, plus increasing the allowed time a train can be bypassed for surveillance testing from 2 hours to 4 hours. KAB-027

The purpose of CTS Table 3.3-3, ACTION 23 is to allow some time to restore the inoperable train before requiring a unit shut down. ITS LCO 3.3.2 ACTION ~~G~~ H allows 24 hours to restore the train to an OPERABLE status and the Required Actions Note allows placing one train in the bypassed condition for up to 4 hours while performing routine surveillance testing provided the other train is OPERABLE. These changes are acceptable and are the result of WCAP-14333-P-A, Revision 1 ("Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times"), dated October 1998, or WCAP-15376-P-A, Revision 1 ("Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times"), dated March 2003 (or a combination of the WCAPs). TVA has performed evaluations of the applicable changes associated with the two

Licensee Response/NRC Response/NRC Question Closure

Id	**80**
NRC Question Number	**KAB027**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**5/30/2014**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**5/30/2014 8:39 AM**
Date Modified	
Modified By	

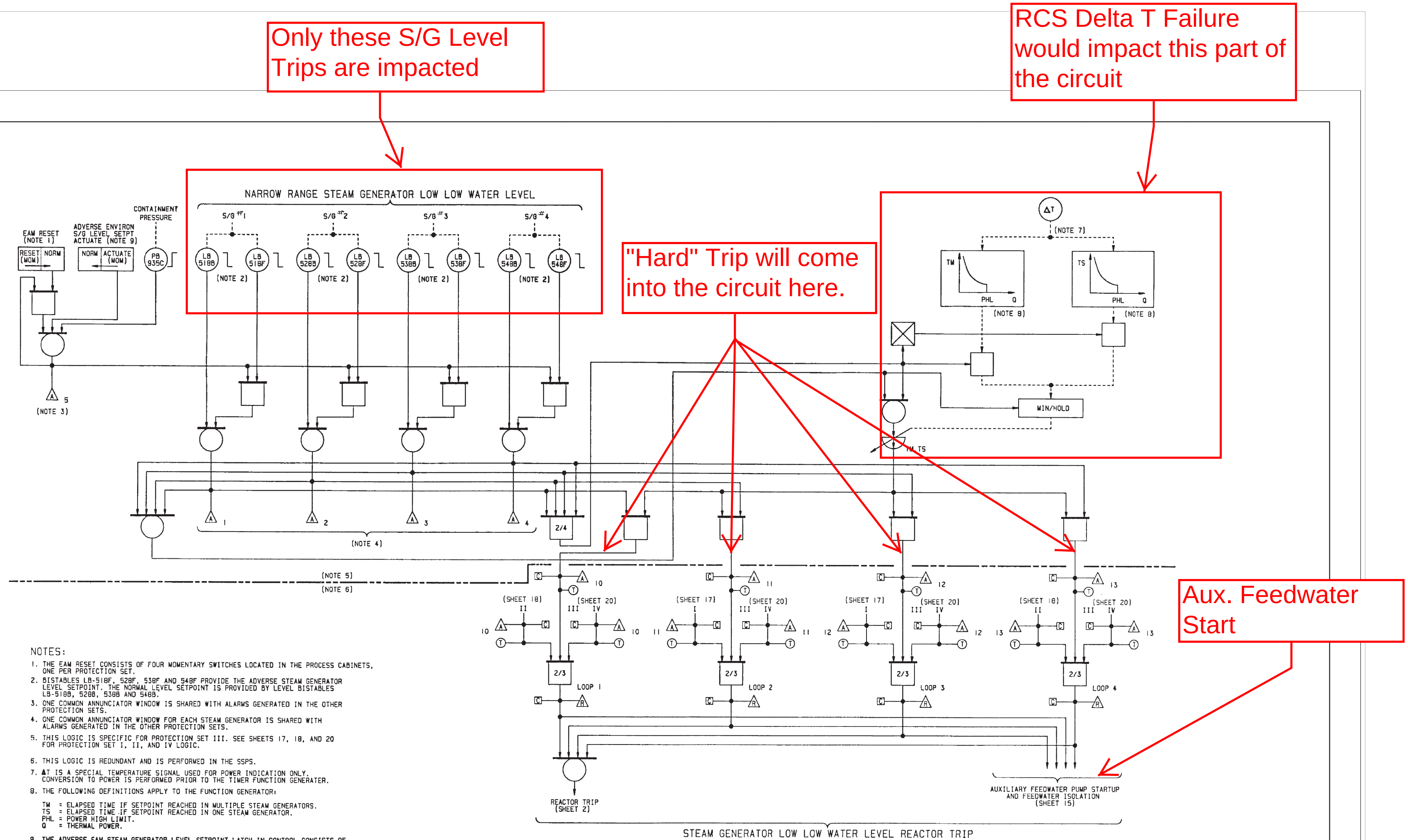
ITS NRC Questions

Id	**51**
NRC Question Number	**KAB028**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	**L-12**
JFD Number	
JFD Bases Number	
Page Number(s)	**443**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 443 of Enclosure 2, Volume 8, L12 provides the discussion of the proposed change that adds required action k.2, which allows placing the affected protection set, steam generator water level low low channel in trip within 6 hours. L12 states, "Once the channel is placed in the tripped condition the RCS ΔT TTD circuitry is removed from the active portion of the Steam Generator Low-Low Level channel, reference UFSAR Figure 7.2.1-1, Sheets 17 through 20 and this action is no longer necessary." Please explain how placing the steam generator low-low level channel in trip, removes the RCS ΔT TTD circuitry. In addition, explain how placing the steam generator low low level channel in trip will not affect the TTD circuitry for the other operable SG water level low low channels.**
Attach File 1	
Attach File 2	
Issue Date	**5/9/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/9/2014 8:55 AM**
Notification	**Scott Bowman** **Michelle Conner** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**66**
NRC Question Number	**KAB028**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 UFSAR and Training Documents for KAB028.pdf** (840KB)
Attachment 2	**Attachment 2 ITS DOC L12 Markup for KAB028.pdf** (1MB)
Response Statement	**Placing the Steam Generator Water Level Low-Low Channel in trip does not literally remove the RCS ΔT TTD circuitry from the active portion of the circuitry, as stated in discussion of change (DOC) L12. In the signal flow path for the Steam Generator Low-Low Level Channel trip, the manual trip is downstream of the RCS ΔT TTD input into the Eagle 21 System, thereby negating the RCS ΔT TTD effect on the trip circuit. The RCS ΔT TTD input remains in the circuit, but with the manual trip in place, the RCS ΔT TTD has no effect on the circuit. Therefore, DOC L12 will be revised to replace the sentence, "Once the channel is placed in the tripped condition the RCS ΔT TTD circuitry is removed from the active portion of the Steam Generator Low-Low Level channel, reference UFSAR Figure 7.2.1-1, Sheets 17 through 20 and this action is no longer necessary," with, "Once the channel is placed in the tripped condition, the RCS ΔT TTD input has no effect on the circuit, and this action is no longer necessary."** **Because of the location of the manual Steam Generator Low-Low Level Channel Trip in the circuitry, there is no impact on the RCS ΔT TTD setpoint selection for the other operable Steam Generator Low-Low Level channels. Each RCS ΔT TTD channel only impacts Steam Generator Low-Low Level Channels from the same Protection Set channel.** **Attachment 1 contains UFSAR Figure 7.2.1-1, Sheet 19 and 20 along with the Operations training material associated with the Eagle 21 System. The UFSAR figures depict the logic for Auxiliary Feedwater Start and are annotated to show where the manual trip would impact the circuit. It also shows that an RCS ΔT TTD channel only impacts the associated level channels. The Eagle 21 material illustrates the location of the manual trip within the Eagle 21 System.** **See Attachment 2 for a draft ITS DOC L12 markup.**
Response Date/Time	**5/29/2014 3:30 PM**
Closure Statement	
Question Closure Date	

Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**5/29/2014 2:27 PM**
Date Modified	
Modified By	



NOTES:

1. THE EAM RESET CONSISTS OF FOUR MOMENTARY SWITCHES LOCATED IN THE PROCESS CABINETS, ONE PER PROTECTION SET.
2. BISTABLES LB-518F, 528F, 538F AND 548F PROVIDE THE ADVERSE STEAM GENERATOR LEVEL SETPOINT. THE NORMAL LEVEL SETPOINT IS PROVIDED BY LEVEL BISTABLES LB-518B, 528B, 538B AND 548B.
3. ONE COMMON ANNUNCIATOR WINDOW IS SHARED WITH ALARMS GENERATED IN THE OTHER PROTECTION SETS.
4. ONE COMMON ANNUNCIATOR WINDOW FOR EACH STEAM GENERATOR IS SHARED WITH ALARMS GENERATED IN THE OTHER PROTECTION SETS.
5. THIS LOGIC IS SPECIFIC FOR PROTECTION SET III. SEE SHEETS 17, 18, AND 20 FOR PROTECTION SET I, II, AND IV LOGIC.
6. THIS LOGIC IS REDUNDANT AND IS PERFORMED IN THE SSPS.
7. ΔT IS A SPECIAL TEMPERATURE SIGNAL USED FOR POWER INDICATION ONLY. CONVERSION TO POWER IS PERFORMED PRIOR TO THE TIMER FUNCTION GENERATER.
8. THE FOLLOWING DEFINITIONS APPLY TO THE FUNCTION GENERATOR:

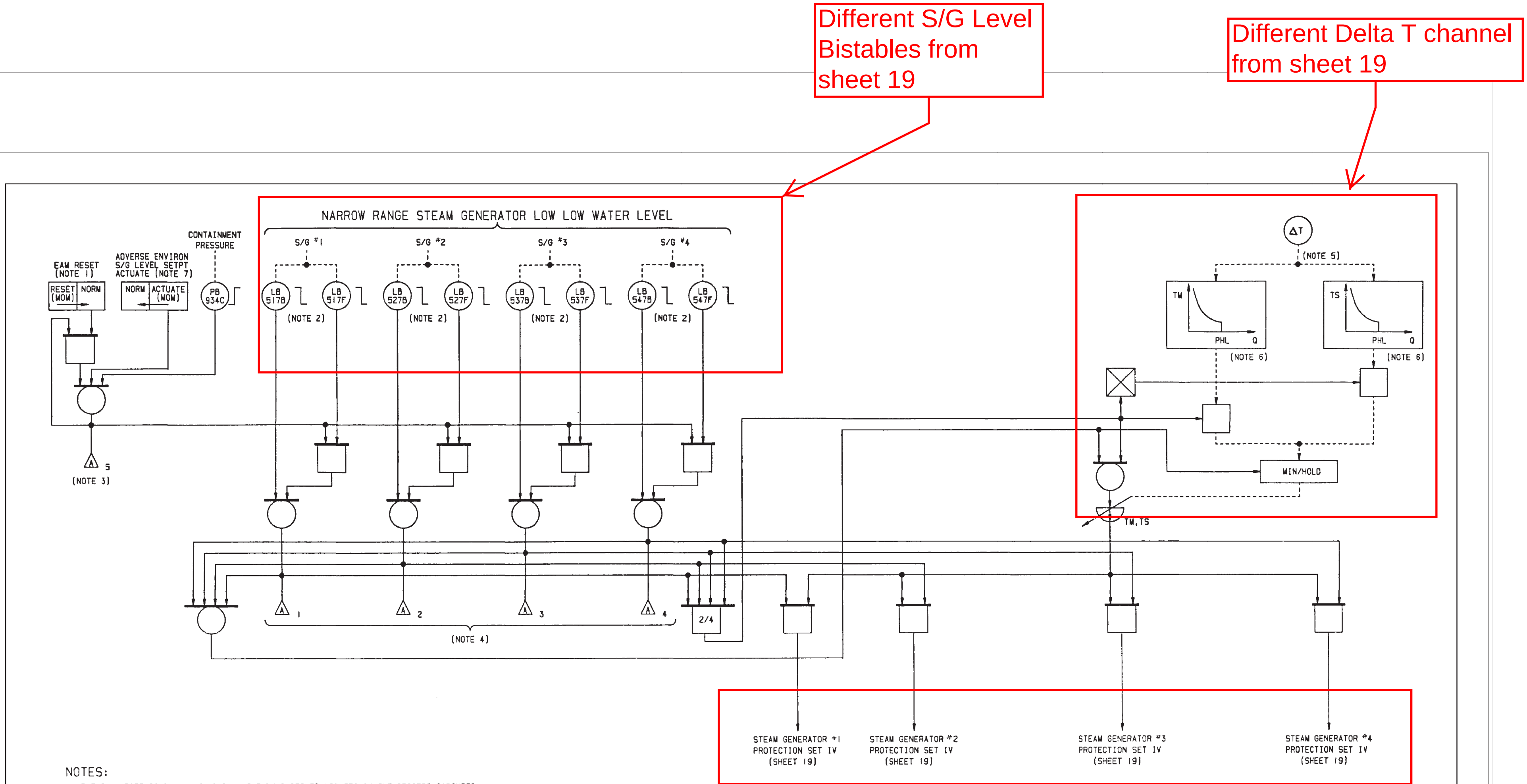
   TM = ELAPSED TIME IF SETPOINT REACHED IN MULTIPLE STEAM GENERATORS.
   TS = ELAPSED TIME IF SETPOINT REACHED IN ONE STEAM GENERATOR.
   PHL = POWER HIGH LIMIT.
   Q = THERMAL POWER.

9. THE ADVERSE EAM STEAM GENERATOR LEVEL SETPOINT LATCH-IN CONTROL CONSISTS OF FOUR MOMENTARY SWITCHES LOCATED IN THE PROCESS CABINETS, ONE SWITCH PER PROTECTION SET.

SEQUOYAH NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 7.2.1-1 SHEET 19
FUNCTIONAL DIAGRAMS ENVIRONMENT ALLOWANCE MOD & TRIP TIME DELAY LOGIC
(REVISED BY AMENDMENT 13)

PROCAD MAINTAINED DRAWING
THIS CONFIGURATION CONTROL DRAWING IS MAINTAINED BY THE SQN CAD UNIT AND IS PART OF THE TVA PROCADAM DATABASE.



NOTES:

1. THE EAM RESET CONSISTS OF FOUR MOMENTARY SWITCHES LOCATED IN THE PROCESS CABINETS, ONE PER PROTECTION SET.
2. BISTABLES LB-517F, 527F, 537F AND 547F PROVIDE THE ADVERSE STEAM GENERATOR LEVEL SETPOINT. THE NORMAL LEVEL SETPOINT IS PROVIDED BY LEVEL BISTABLES LB-517B, 527B, 537B AND 547B.
3. ONE COMMON ANNUNCIATOR WINDOW IS SHARED WITH ALARMS GENERATED IN THE OTHER PROTECTION SETS.
4. ONE COMMON ANNUNCIATOR WINDOW FOR EACH STEAM GENERATOR IS SHARED WITH ALARMS GENERATED IN THE OTHER PROTECTION SETS.
5. ΔT IS A SPECIAL TEMPERATURE SIGNAL USED FOR POWER INDICATION ONLY. CONVERSION TO POWER IS PERFORMED PRIOR TO THE TIMER FUNCTION GENERATER.
6. THE FOLLOWING DEFINITIONS APPLY TO THE FUNCTION GENERATOR:

   TM = ELAPSED TIME IF SETPOINT REACHED IN MULTIPLE STEAM GENERATORS.
   TS = ELAPSED TIME IF SETPOINT REACHED IN ONE STEAM GENERATOR.
   PHL = POWER HIGH LIMIT.
   Q = THERMAL POWER.

7. THE ADVERSE EAM STEAM GENERATOR LEVEL SETPOINT LATCH-IN CONTROL CONSISTS OF FOUR MOMENTARY SWITCHES LOCATED IN THE PROCESS CABINETS, ONE SWITCH PER PROTECTION SET.

Goes back to Sheet 19 for the Actuation Logic

SEQUOYAH NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

FIGURE 7.2.1-1 SHEET 20
FUNCTIONAL DIAGRAMS ENVIRONMENT ALLOWANCE MOD & TRIP TIME DELAY LOGIC
(REVISED BY AMENDMENT 13)

PROCAD MAINTAINED DRAWING

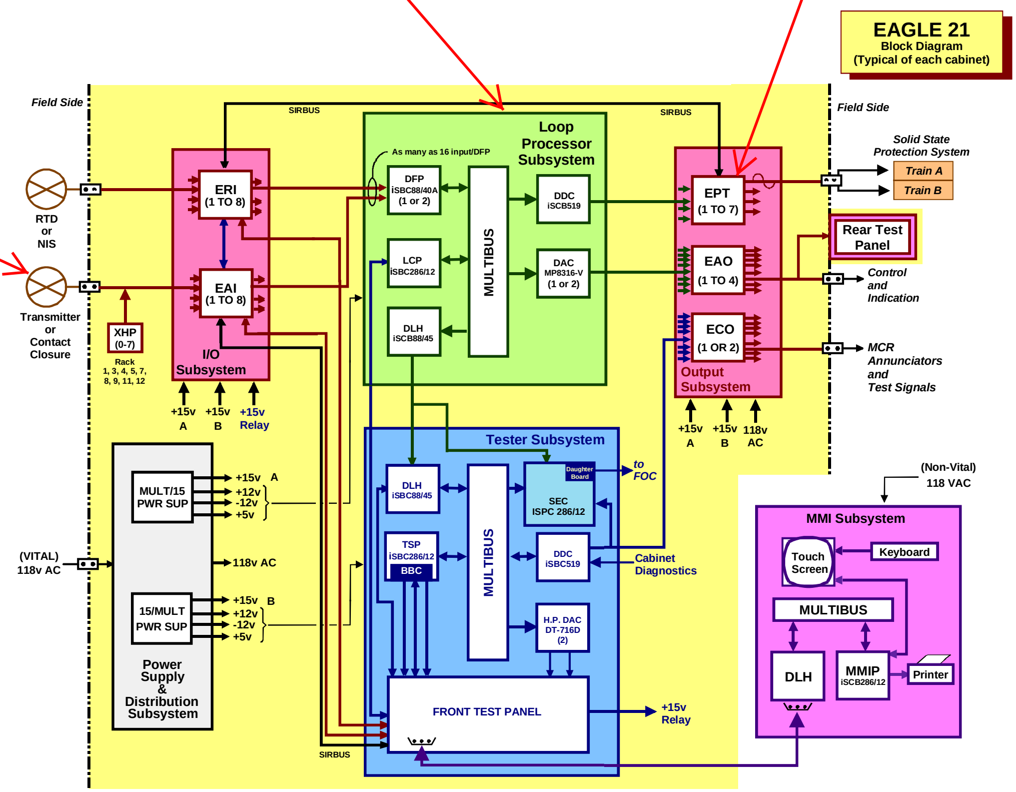
Eagle 21 Overview

All calculations done in Loop Processor

Manual Trip done in EPT Board

Block diagram The block diagram of an Eagle 21 channel is shown below. Only one channel is shown, other channels are similar.

Field Inputs, such as S/G Level, Containment Pressure and Delta T



Loop Processor Subsystem

Loop Processor Function Description

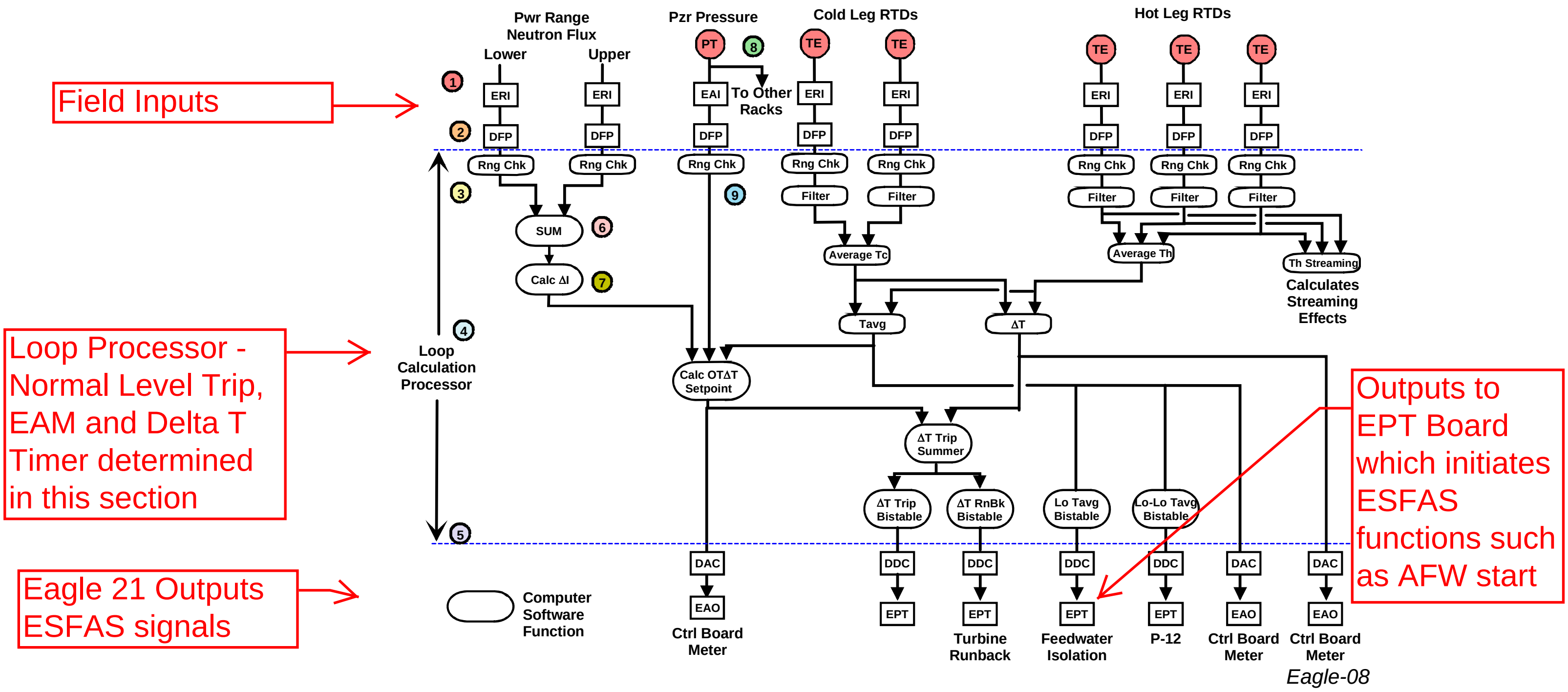
The Loop Processor Subsystem performs the following major functions:

- Converts analog inputs to numerical representations.
- Automatically calibrates the input signals and corrects for differences.
- Provides dynamic compensation (like OPΔT, OPΔT calculations)
- Provides algebraic calculations (Tavg).
- Compares inputs to trip setpoint values and provides a trip signal to the partial trip bistable (maintains reactor trip setpoints in memory for comparison).
- Provides analog outputs for indication and control.
- Provides data to Tester Subsystem.

Loop Processor Subsystem

Functional diagram of LCP

The functional diagram for a typical LCP is shown below.



Output Subsystem

Description

The EPT board will remove 118 VAC from SSPS, which would indicate a trip condition

The Output Subsystem consists of three types of output cards:

- EPT - Eagle Partial Trip board. This board provides 118 VAC output to SSPS except for 21 channel receive 118V AC from SSPS.
- EAO - Eagle Analog Output board. This board provides isolation from and out to the Foxbro control and indications racks.
- ECO - Eagle Contact Output board. This board provides outputs from the tester sysystem.

Diagram of EPT board

Each EPT board has four EPT circuits. The purpose of the Eagle Partial Trip Boards (EPT) is to:

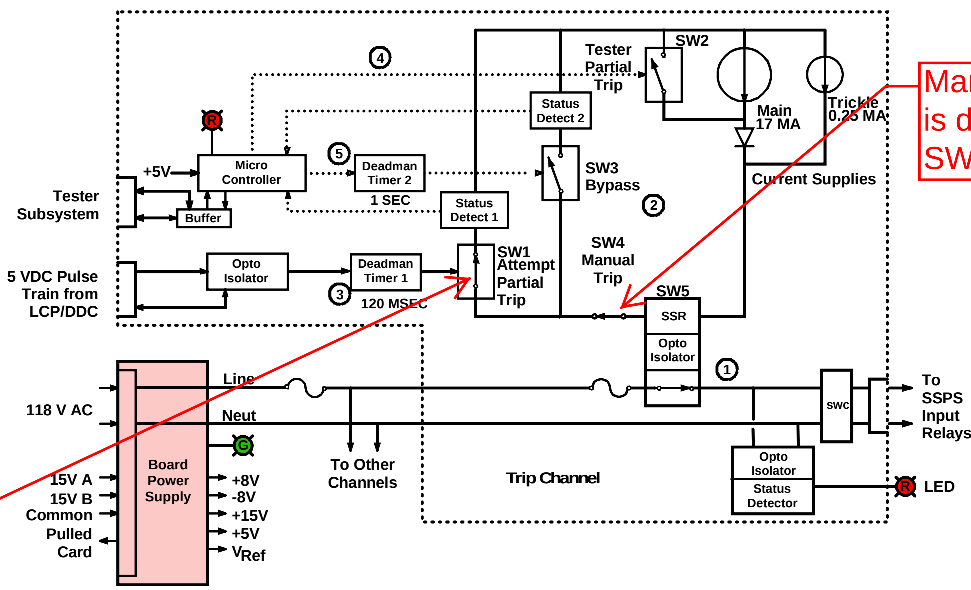
- control the 118 VAC to the SSPS input relays.
- allow the tester subsystem to remotely place any or all of the four channels in a trip or bypass state.
- allow personnel to manually place any channel in a trip condition.
- supply channel status information to the tester subsystem and provide local indication of the output state of each channel

The EPT circuit is described below.

Manual "Hard" Trip is done by opening SW4

Level Trip after the timer has timed out would come here from LCP

Then, SW1 would open initiating the trip on this channel



Manual "Hard" Trip

Automatic Trip from Eagle LCP

The current flow to maintain SW5 energized flows in a loop as follows:

- the main current supply which provides the power to maintain SW5 energized,
- through Manual Trip switch SW4 which is used to manually trip the channel,
- to Attempt Partial Trip switch SW1 which is the automatic trip signal from the LCP/DDC for the channel,

DISCUSSION OF CHANGES
ITS 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

WCAPs to justify the above changes. The evaluations supporting these changes are provided in Enclosure 4 of this submittal. This change is designated as less restrictive because more time is allowed in the ITS for the maintenance and testing of trains than was allowed in the CTS.

L12 *(Category 4 – Relaxation of Required Action)* CTS Table 3.3-3 ACTION 37 requires that with the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and 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. This action is applicable to CTS Functional Unit 6.c.i.c (Auxiliary Feedwater, Main Stm. Gen Water Level – Low-Low, Start Motor-Driven Pumps, RCS Loop ΔT) and Functional Unit 6.c.ii.c (Auxiliary Feedwater, Main Stm. Gen Water Level – Low-Low, Start Turbine-Driven Pump, RCS Loop ΔT). ITS 3.3.2 Required Action K.2 allows an alternative of placing the Steam Generator Water Level -- Low-Low channel in trip instead of adjusting the Trip Time Delays (T_S and T_M) threshold power level for zero seconds time delay to 0% RTP with the same Completion Time. This changes the CTS by adding an alternative to adjusting the TTD threshold power level for zero seconds.

Once the channel is placed in the tripped condition, the RCS ΔT TTD input has no effect on the circuit, and this action is no longer necessary.

The purpose of CTS Table 3.3-3 ACTION 37 is to limit the maximum time allowed for maintenance activities, in which the channel is unavailable prior to adjusting the affected protection sets Trip Time Delays (T_S and T_M) threshold power level for zero seconds time delay to 0% RTP. With the trip time delay adjusted to zero seconds the additional operational margin that allows the operator time to recover SG Water level is removed and the associated SG Water level channel is returned to OPERABLE. If the threshold power level for zero seconds time delay is not adjusted from 50% RTP to 0% RTP within the specified Completion Time this proposed change allows placing the affected protection set's SG Water Level Low-Low channels in the tripped condition. ~~Once the channel is placed in the tripped condition the RCS ΔT TTD circuitry is removed from the active portion of the Steam Generator Low-Low Level channel, reference UFSAR Figure 7.2.1-1, Sheets 17 through 20 and this action is no longer necessary.~~ The action of tripping the channel provides the protection sets input to the 2/3 logic gates located on UFSAR Figure 7.2.1-1 Sheet 19. The ITS Required Action K.2 Completion Time of 6 hours is consistent with CTS TABLE 3.3-3 ACTION 37 and the proposed ITS Required Action K.1. This change is designated as less restrictive because less stringent Required Actions are being applied in ITS than were applied in CTS.

L13 *(Category 4 – Relaxation of Required Action)* CTS Table 3.3-3 ACTION 38 requires that with the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and 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). This action is applicable to CTS Functional Unit 6.c.i.d (Auxiliary Feedwater, Main Stm. Gen Water Level – Low-Low, Start Motor-Driven Pumps, Containment Pressure (EAM)) and Functional Unit 6.c.ii.d (Auxiliary Feedwater, Main Stm. Gen Water Level – Low-Low, Start Turbine-Driven Pump, Containment Pressure (EAM)).

Licensee Response/NRC Response/NRC Question Closure

Id	**81**
NRC Question Number	**KAB028**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**5/30/2014**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**5/30/2014 8:39 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**52**
NRC Question Number	**KAB029**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	**L-13**
JFD Number	
JFD Bases Number	
Page Number(s)	**443**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 443 of Enclosure 2, Volume 8, L13 provides the discussion of the proposed change that adds required action j.2, which allows placing the affected protection set, steam generator water level Low-low channel(s) in trip within 6 hours. L13 states, "Once the channel is placed in the tripped condition the Steam Generator Water Level --Low-Low EAM/Adverse circuitry is removed from the active portion of the Steam Generator Water Level -- Low-Low channel, reference UFSAR Figure 7.2.1-1, Sheets 17 through 20, and these actions are no longer necessary." Please explain how placing the steam generator low low level channel in trip, removes the Steam Generator Low-Low EAM/Adverse circuitry. In addition, explain how placing the steam generator low low level channel in trip will not affect the EAM setpoint selection for the other operable SG water level low low channels.**
Attach File 1	
Attach File 2	
Issue Date	**5/9/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/9/2014 8:56 AM**
Notification	**Scott Bowman Michelle Conner Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**67**
NRC Question Number	**KAB029**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 UFSAR and Training Documents for KAB029.pdf** (362KB)
Attachment 2	**Attachment 2 ITS DOC L13 Markup for KAB029.pdf** (926KB)

Response Statement

Placing the Steam Generator Low-Low Level Channel in trip does not literally remove the EAM/Adverse circuitry from the active portion of the circuitry, as stated in the discussion of change (DOC) L13. In the signal flow path for the Steam Generator Low-Low Level Channel trip, the manual trip is downstream of the EAM/Adverse input into the Eagle 21 System, thereby negating the EAM/Adverse effect on the trip circuit. The EAM/Adverse input remains in the circuit, but with the manual trip in place, the EAM/Adverse has no effect on the circuit. Therefore, DOC L13 will be revised to replace the sentence, "Once the channel is placed in the tripped condition the Steam Generator Water Level Low-Low EAM/Adverse circuitry is removed from the active portion of the Steam Generator Water Level Low-Low channel, reference UFSAR Figure 7.2.1-1, Sheets 17 through 20 and these actions are no longer necessary," with, "Once the channel is placed in the tripped condition, the EAM/Adverse input has no effect on the circuit, and these actions are no longer necessary."

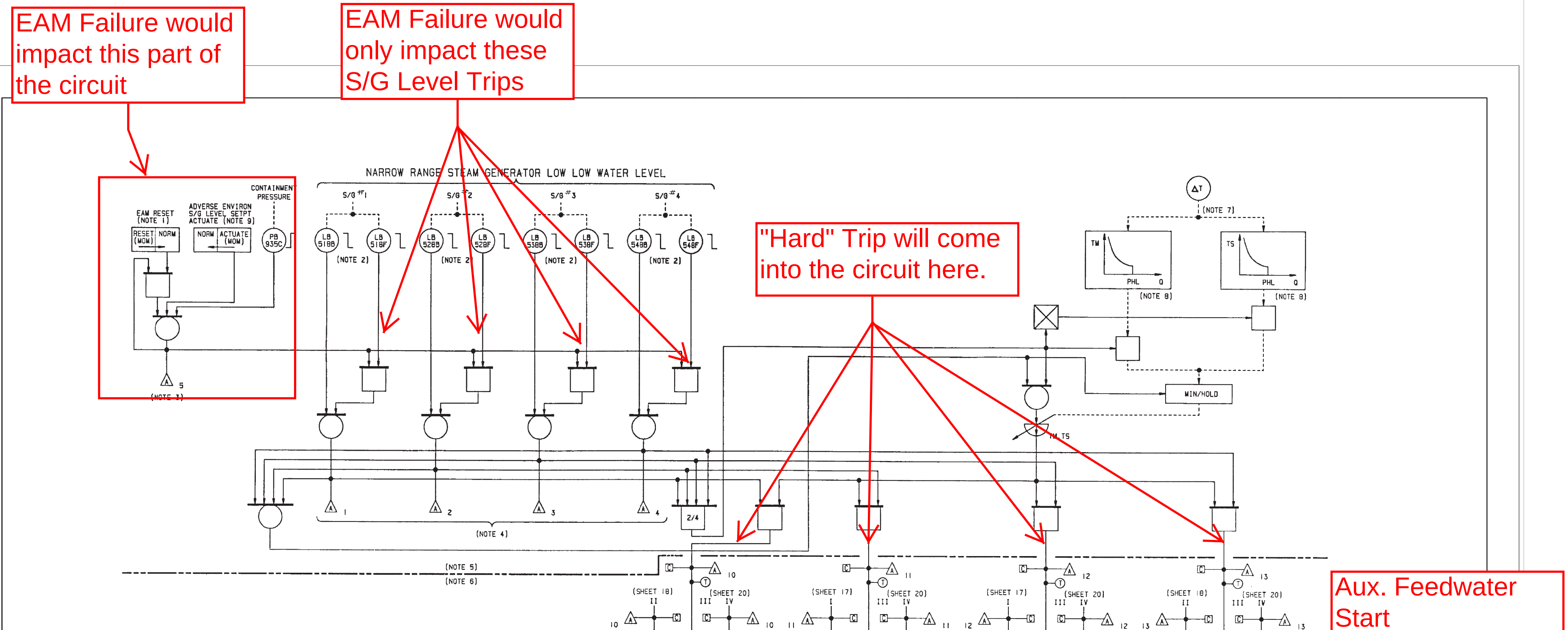
Because of the location of the manual Steam Generator Low-Low Level Channel Trip in the circuitry, there is no impact on the EAM setpoint selection for the other operable Steam Generator water level low-low channels. Each EAM channel only impacts Steam Generator Level Channels from the same Protection Set channel.

Attachment 1 contains UFSAR Figure 7.2.1-1, Sheet 19 and 20 along with the Operations training material associated with the Eagle 21 System. The UFSAR figures depict the logic for Auxiliary Feedwater Start and are annotated to show where the manual trip would impact the circuit. It also shows that an EAM channel only impacts the associated level channels. The Eagle 21 material illustrates the location of the manual trip within the Eagle 21 System.

See Attachment 2 for a draft ITS DOC L13 markup.

Response Date/Time	**5/29/2014 3:30 PM**
Closure Statement	
Question Closure	

Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**5/29/2014 2:29 PM**
Date Modified	
Modified By	



NOTES:

1. THE EAM RESET CONSISTS OF FOUR MOMENTARY SWITCHES LOCATED IN THE PROCESS CABINETS, ONE PER PROTECTION SET.
2. BISTABLES LB-518F, 528F, 538F AND 548F PROVIDE THE ADVERSE STEAM GENERATOR LEVEL SETPOINT. THE NORMAL LEVEL SETPOINT IS PROVIDED BY LEVEL BISTABLES LB-518B, 528B, 538B AND 548B.
3. ONE COMMON ANNUNCIATOR WINDOW IS SHARED WITH ALARMS GENERATED IN THE OTHER PROTECTION SETS.
4. ONE COMMON ANNUNCIATOR WINDOW FOR EACH STEAM GENERATOR IS SHARED WITH ALARMS GENERATED IN THE OTHER PROTECTION SETS.
5. THIS LOGIC IS SPECIFIC FOR PROTECTION SET III. SEE SHEETS 17, 18, AND 20 FOR PROTECTION SET I, II, AND IV LOGIC.
6. THIS LOGIC IS REDUNDANT AND IS PERFORMED IN THE SSPS.
7. ΔT IS A SPECIAL TEMPERATURE SIGNAL USED FOR POWER INDICATION ONLY. CONVERSION TO POWER IS PERFORMED PRIOR TO THE TIMER FUNCTION GENERATER.
8. THE FOLLOWING DEFINITIONS APPLY TO THE FUNCTION GENERATOR:

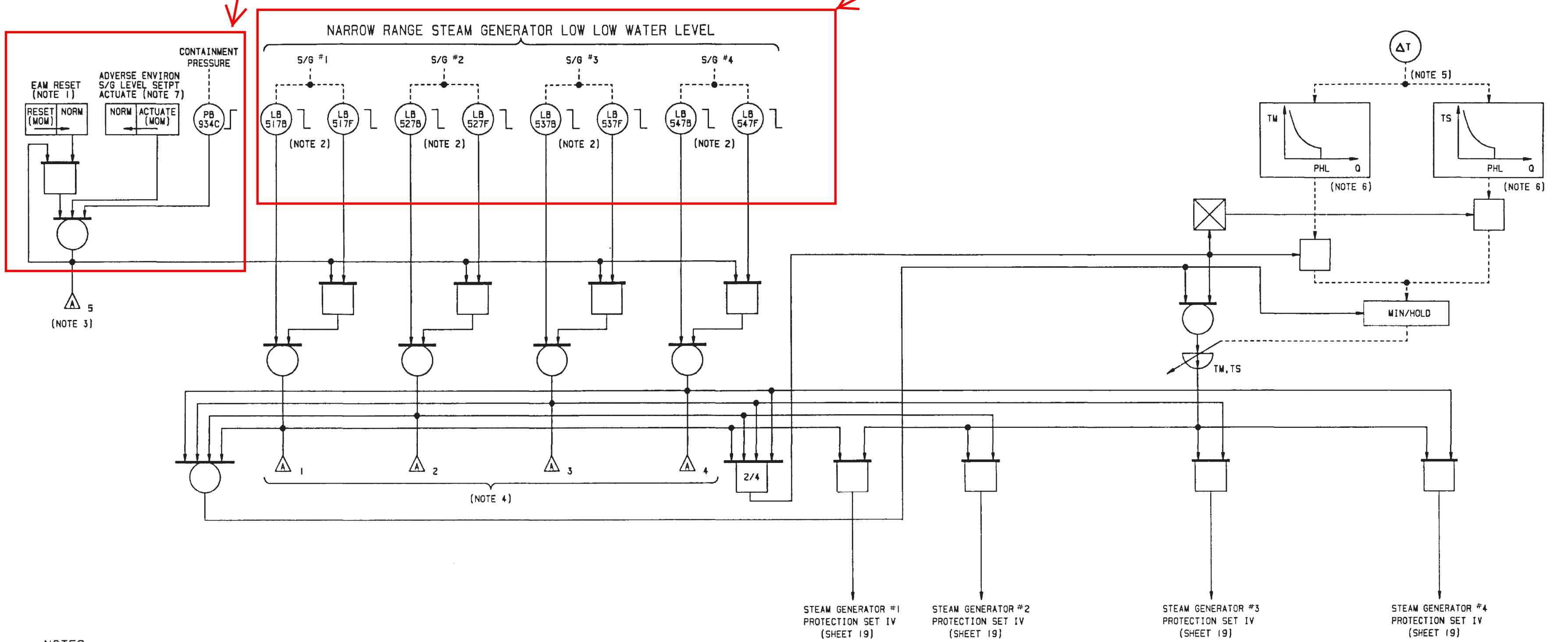
   TM = ELAPSED TIME IF SETPOINT REACHED IN MULTIPLE STEAM GENERATORS.
   TS = ELAPSED TIME IF SETPOINT REACHED IN ONE STEAM GENERATOR.
   PHL = POWER HIGH LIMIT.
   Q = THERMAL POWER.
9. THE ADVERSE EAM STEAM GENERATOR LEVEL SETPOINT LATCH-IN CONTROL CONSISTS OF FOUR MOMENTARY SWITCHES LOCATED IN THE PROCESS CABINETS, ONE SWITCH PER PROTECTION SET.

SEQUOYAH NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

FIGURE 7.2.1-1 SHEET 19
FUNCTIONAL DIAGRAMS ENVIRONMENT ALLOWANCE MOD & TRIP TIME DELAY LOGIC
(REVISED BY AMENDMENT 13)

Separate Containment pressure bistable from sheet 19

Different S/G Level Bistables from sheet 19



NOTES:

1. THE EAM RESET CONSISTS OF FOUR MOMENTARY SWITCHES LOCATED IN THE PROCESS CABINETS, ONE PER PROTECTION SET.
2. BISTABLES LB-517F, 527F, 537F AND 547F PROVIDE THE ADVERSE STEAM GENERATOR LEVEL SETPOINT. THE NORMAL LEVEL SETPOINT IS PROVIDED BY LEVEL BISTABLES LB-517B, 527B, 537B AND 547B.
3. ONE COMMON ANNUNCIATOR WINDOW IS SHARED WITH ALARMS GENERATED IN THE OTHER PROTECTION SETS.
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5. ΔT IS A SPECIAL TEMPERATURE SIGNAL USED FOR POWER INDICATION ONLY. CONVERSION TO POWER IS PERFORMED PRIOR TO THE TIMER FUNCTION GENERATER.
6. THE FOLLOWING DEFINITIONS APPLY TO THE FUNCTION GENERATOR:

   TM = ELAPSED TIME IF SETPOINT REACHED IN MULTIPLE STEAM GENERATORS.
   TS = ELAPSED TIME IF SETPOINT REACHED IN ONE STEAM GENERATOR.
   PHL = POWER HIGH LIMIT.
   Q = THERMAL POWER.

7. THE ADVERSE EAM STEAM GENERATOR LEVEL SETPOINT LATCH-IN CONTROL CONSISTS OF FOUR MOMENTARY SWITCHES LOCATED IN THE PROCESS CABINETS, ONE SWITCH PER PROTECTION SET.

SEQUOYAH NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

FIGURE 7.2.1-1 SHEET 20
FUNCTIONAL DIAGRAMS ENVIRONMENT ALLOWANCE MOD & TRIP TIME DELAY LOGIC
(REVISED BY AMENDMENT 13)

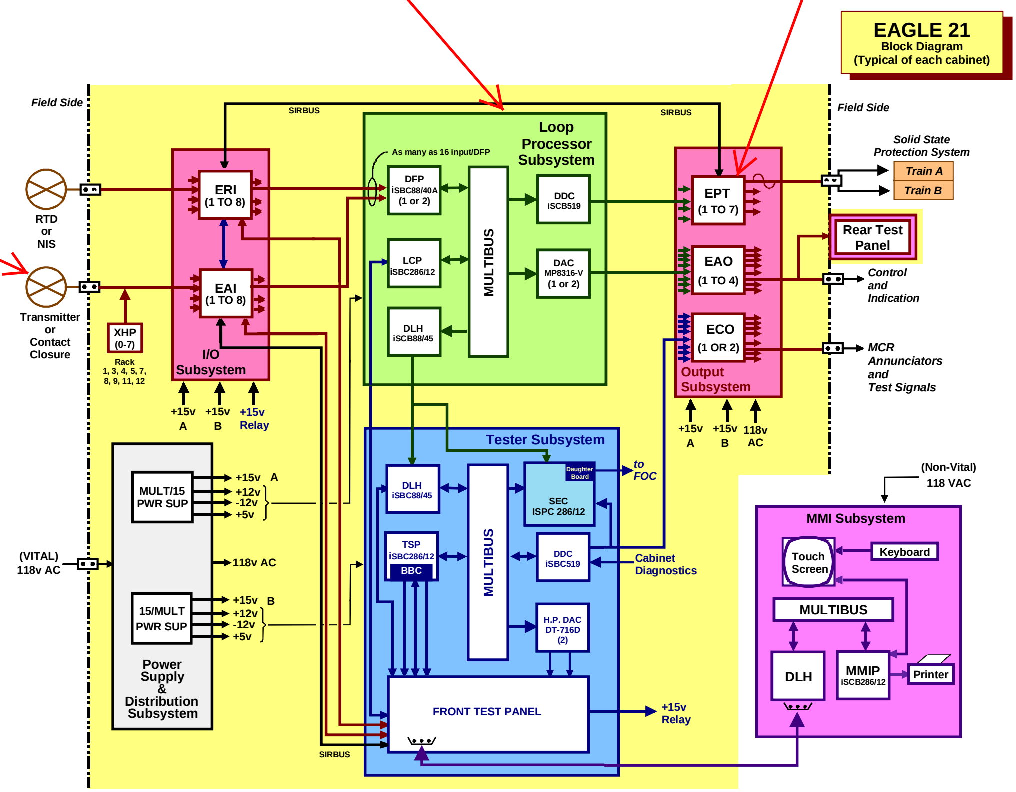
Eagle 21 Overview

All calculations done in Loop Processor

Manual Trip done in EPT Board

Block diagram The block diagram of an Eagle 21 channel is shown below. Only one channel is shown, other channels are similar.

Field Inputs, such as S/G Level, Containment Pressure and Delta T



Loop Processor Subsystem

Loop Processor Function Description

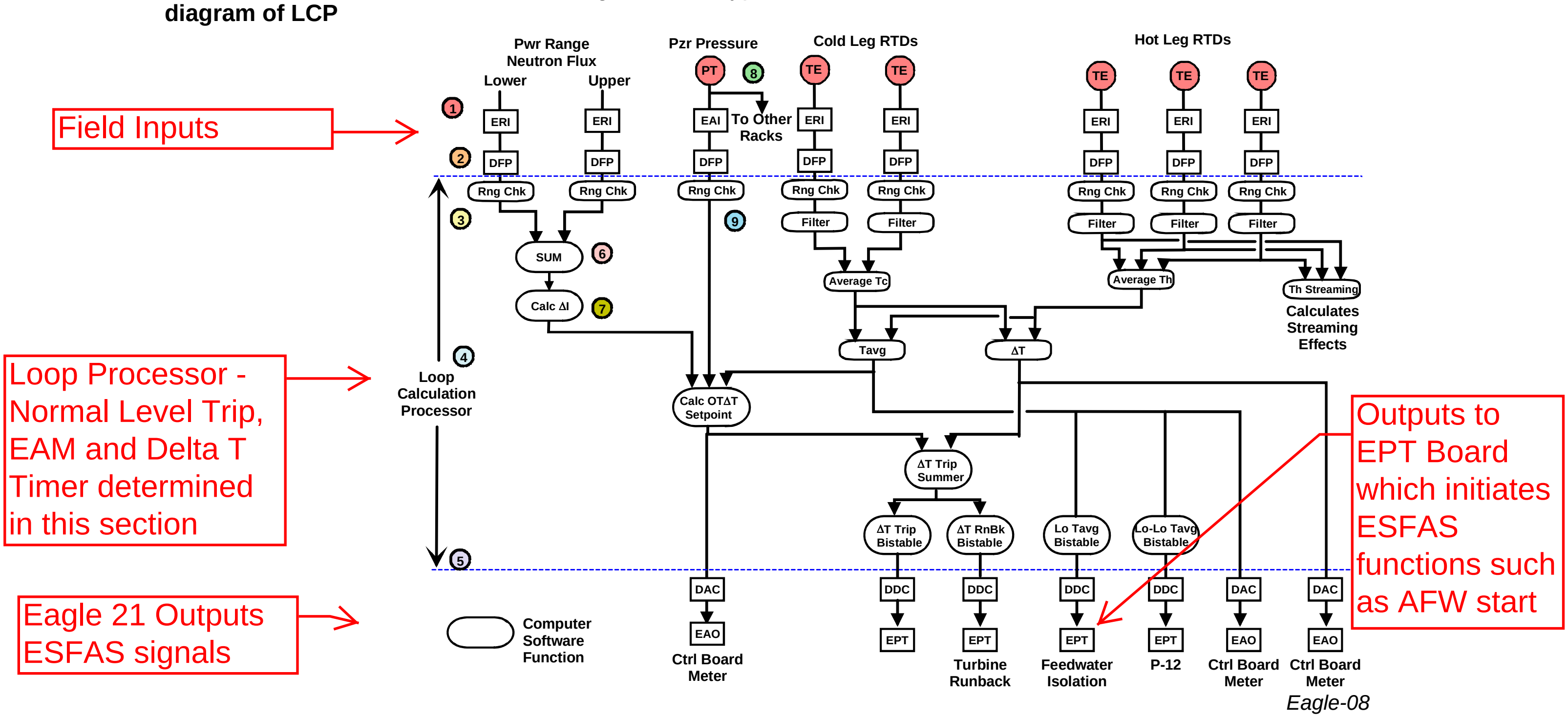
The Loop Processor Subsystem performs the following major functions:

- Converts analog inputs to numerical representations.
- Automatically calibrates the input signals and corrects for differences.
- Provides dynamic compensation (like OPΔT, OPΔT calculations)
- Provides algebraic calculations (Tavg).
- Compares inputs to trip setpoint values and provides a trip signal to the partial trip bistable (maintains reactor trip setpoints in memory for comparison).
- Provides analog outputs for indication and control.
- Provides data to Tester Subsystem.

Loop Processor Subsystem

Functional diagram of LCP

The functional diagram for a typical LCP is shown below.



Output Subsystem

The EPT board will remove 118 VAC from SSPS, which would indicate a trip condition

Description

The Output Subsystem consists of three types of output cards:

- EPT - Eagle Partial Trip board. This board provides 118 VAC output to SSPS except for 21 channel receive 118V AC from SSPS.
- EAO - Eagle Analog Output board. This board provides isolation from and out to the Foxbro control and indications racks.
- ECO - Eagle Contact Output board. This board provides outputs from the tester sysystem.

Diagram of EPT board

Each EPT board has four EPT circuits. The purpose of the Eagle Partial Trip Boards (EPT) is to:

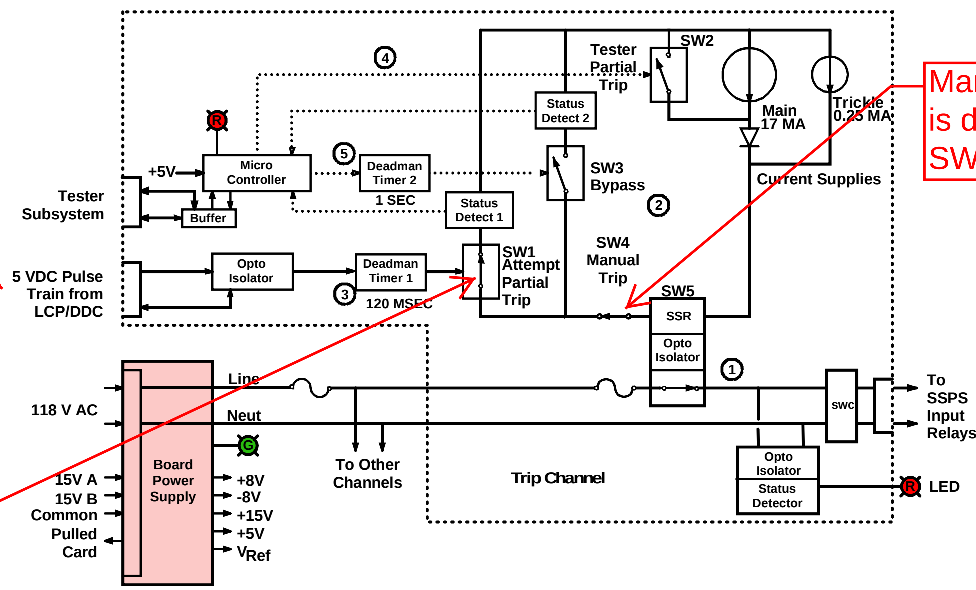
- control the 118 VAC to the SSPS input relays.
- allow the tester subsystem to remotely place any or all of the four channels in a trip or bypass state.
- allow personnel to manually place any channel in a trip condition.
- supply channel status information to the tester subsystem and provide local indication of the output state of each channel

The EPT circuit is described below.

Manual "Hard" Trip is done by opening SW4

Level Trip after the timer has timed out would come here from LCP

Then, SW1 would open initiating the trip on this channel



Manual "Hard" Trip

Automatic Trip from Eagle LCP

The current flow to maintain SW5 energized flows in a loop as follows:

- the main current supply which provides the power to maintain SW5 energized,
- through Manual Trip switch SW4 which is used to manually trip the channel,
- to Attempt Partial Trip switch SW1 which is the automatic trip signal from the LCP/DDC for the channel,

DISCUSSION OF CHANGES
ITS 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

WCAPs to justify the above changes. The evaluations supporting these changes are provided in Enclosure 4 of this submittal. This change is designated as less restrictive because more time is allowed in the ITS for the maintenance and testing of trains than was allowed in the CTS.

L12 *(Category 4 – Relaxation of Required Action)* CTS Table 3.3-3 ACTION 37 requires that with the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and 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. This action is applicable to CTS Functional Unit 6.c.i.c (Auxiliary Feedwater, Main Stm. Gen Water Level – Low-Low, Start Motor-Driven Pumps, RCS Loop ∆T) and Functional Unit 6.c.ii.c (Auxiliary Feedwater, Main Stm. Gen Water Level – Low-Low, Start Turbine-Driven Pump, RCS Loop ∆T). ITS 3.3.2 Required Action K.2 allows an alternative of placing the Steam Generator Water Level -- Low-Low channel in trip instead of adjusting the Trip Time Delays (T_S and T_M) threshold power level for zero seconds time delay to 0% RTP with the same Completion Time. This changes the CTS by adding an alternative to adjusting the TTD threshold power level for zero seconds.

The purpose of CTS Table 3.3-3 ACTION 37 is to limit the maximum time allowed for maintenance activities, in which the channel is unavailable prior to adjusting the affected protection sets Trip Time Delays (T_S and T_M) threshold power level for zero seconds time delay to 0% RTP. With the trip time delay adjusted to zero seconds the additional operational margin that allows the operator time to recover SG Water level is removed and the associated SG Water level channel is returned to OPERABLE. If the threshold power level for zero seconds time delay is not adjusted from 50% RTP to 0% RTP within the specified Completion Time this proposed change allows placing the affected protection set's SG Water Level Low-Low channels in the tripped condition. Once the channel is placed in the tripped condition the RCS ΔT TTD circuitry is removed from the active portion of the Steam Generator Low-Low Level channel, reference UFSAR Figure 7.2.1-1, Sheets 17 through 20 and this action is no longer necessary. The action of tripping the channel provides the protection sets input to the 2/3 logic gates located on UFSAR Figure 7.2.1-1 Sheet 19. The ITS Required Action K.2 Completion Time of 6 hours is consistent with CTS TABLE 3.3-3 ACTION 37 and the proposed ITS Required Action K.1. This change is designated as less restrictive because less stringent Required Actions are being applied in ITS than were applied in CTS.

L13 *(Category 4 – Relaxation of Required Action)* CTS Table 3.3-3 ACTION 38 requires that with the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and 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). This action is applicable to CTS Functional Unit 6.c.i.d (Auxiliary Feedwater, Main Stm. Gen Water Level – Low-Low, Start Motor-Driven Pumps, Containment Pressure (EAM)) and Functional Unit 6.c.ii.d (Auxiliary Feedwater, Main Stm. Gen Water Level – Low-Low, Start Turbine-Driven Pump, Containment Pressure (EAM)).

DISCUSSION OF CHANGES
ITS 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

ITS 3.3.2 Required Action J.2 allows an alternative of placing the Steam Generator Water Level -- Low-Low channel in trip instead of adjusting the Steam Generator Water Level -- Low-Low (EAM) channels trip setpoint to the same value as Steam Generator Water Level -- Low-Low (Adverse) with the same Completion Time for placing the channel in trip. This changes the CTS by adding an alternative to adjusting the Steam Generator Water Level -- Low-Low (EAM) channels trip setpoint to the same value as Steam Generator Water Level -- Low-Low (Adverse).

Once the channel is placed in the tripped condition, the EAM/ Adverse input has no effect on the circuit, and these actions are no longer necessary.

The purpose of CTS Table 3.3-3 ACTION 38 is to limit the maximum time allowed for maintenance activities, in which the channel is unavailable prior to adjusting the Steam Generator Water Level -Low-Low (EAM) channels trip setpoint to the same value as Steam Generator Water Level -- Low-Low (Adverse). If the Steam Generator Water Level -Low-Low (EAM) channels trip setpoint is not adjusted to the same value as Steam Generator Water Level -- Low-Low (Adverse) within the specified Completion Time this proposed change allows placing the affected protection sets SG Water Level -- Low-Low level channels in the tripped condition. ~~Once the channel is placed in the tripped condition the Steam Generator Water Level -- Low-Low EAM/Adverse circuitry is removed from the active portion of the Steam Generator Water Level -- Low-Low channel, reference UFSAR Figure 7.2.1-1, Sheets 17 through 20, and these actions are no longer necessary~~. The action of tripping the channel provides the protection sets input to the 2/3 logic gates located on UFSAR Figure 7.2.1-1 Sheet 19. The ITS Required Action J.2 Completion Time of 6 hours is consistent with CTS TABLE 3.3-3 ACTION 38 and the proposed ITS Required Action J.1. This change is designated as less restrictive because less stringent Required Actions are being applied in ITS than were applied in CTS.

L14 *(Category 9 – Allowed Outage Time, Surveillance Frequency, and Bypass Time Extensions Based on Generic Topical Reports)* CTS Table 4.3-2 requires a CHANNEL FUNCTIONAL TEST on a quarterly basis (Q) for Functional Units: 1.c (Containment Pressure-High), 1.d (Pressurizer Pressure--Low); 1.f (Steam Line Pressure—Low); 2.c (Containment Pressure--High-High); 3.b.3) (Containment Pressure--High-High); 4.c (Containment Pressure--High-High); 4.d (Steam Line Pressure--Low); 4.e (Negative Steam Line Pressure Rate--High); and 5.a (Steam Generator Water Level--High-High). ITS Table 3.3.2-1 requires performance of a COT (ITS SR 3.3.1.7 or SR 3.3.1.8) every 184 days for Functions: 1.c (Containment Pressure-High); 1.d (Pressurizer Pressure--Low); 1.e (Steam Line Pressure—Low); 2.c (Containment Pressure--High-High); 3.b.(3) (Containment Pressure--High-High); 4.c (Containment Pressure--High-High); 4.d.(1) (Steam Line Pressure--Low); 4.d.(2) (Steam Line Pressure Negative Rate--High); and 5.b (SG Water Level--High-High (P-14)). This changes the CTS by changing the Frequency of the Surveillances from quarterly to 184 days.

The purpose of the CHANNEL FUNCTIONAL TEST/COT is to ensure that the instrumentation is functioning properly. These changes are acceptable and are the result of WCAP-10271, Revision 0 ("Evaluation of Surveillance Frequencies and Out of Service Times for the Reactor Protection Instrumentation System"), dated May 1996, and supplements, WCAP-14333-P-A, Revision 1 ("Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times"), dated

Licensee Response/NRC Response/NRC Question Closure

Id	**82**
NRC Question Number	**KAB029**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**5/30/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**5/30/2014 8:40 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**53**
NRC Question Number	**KAB030**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	**504**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 504 of Enclosure 2, Volume 8, it was noticed that τ_1 was not included in ITS Table 3.3.2-1 footnote h, as it is in CTS Table 3.3-4 note 2. Please explain if this was intentional and if so, include the reasoning, and if it was not intentional, then provide a correction to ITS 3.3.2 footnote h.**
Attach File 1	
Attach File 2	
Issue Date	**5/9/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/9/2014 8:57 AM**
Notification	**Scott Bowman** **Michelle Conner** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**72**
NRC Question Number	**KAB030**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 revised ISTS pages for tau.pdf** (967KB)
Attachment 2	
Response Statement	**In response to KAB030, the ISTS markups for SQN, Units 1 and 2, on pages 470 and 504 of Enclosure 2, Volume 8, will be revised. Specifically, Footnote (h) for SQN, Unit 1, will be revised to read, "Time constant utilized in the rate/lag controller is $\tau \geq 50$ seconds." Footnote (h) for SQN, Unit 2, will be revised to read, "Time constant utilized in the rate/lag controller is $\tau_1 \geq 50$ seconds." This change is consistent with CTS Table 3.3-4 Note 2 for SQN, Units 1 and 2.** **See Attachment 1 for the draft revised ISTS markups for SQN, Units 1 and 2.**
Response Date/Time	**5/29/2014 4:05 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**5/29/2014 3:06 PM**
Date Modified	
Modified By	

CTS

ESFAS Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.2~~A~~

Table 3.3-3

Table 3.3.2-1 (page 5 of 11)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	~~[~~NOMINAL~~(l)~~ TRIP SETPOINT~~]~~ 3
4. Steam Line Isolation						
d. Steam Line Pressure						
4.d (1) Low	1,2~~(i)~~ e,3~~(i)~~ ~~(a)~~ f	3 per steam line	D	SR 3.3.2.1 4 SR 3.3.2.~~5~~ 8 SR 3.3.2.~~9~~ 9 SR 3.3.2.~~10~~ (b)(c) (b)(c)	≥ ~~[635]~~ 592.2~~(d)~~ psig	~~[675]~~ 600~~(d)~~ psig 3
4.e (2) Negative Rate - High	3 ~~(h)~~ g ~~(j)~~ e	3 per steam line	D	SR 3.3.2.1 4 SR 3.3.2.~~5~~ 8 SR 3.3.2.~~9~~ 9 SR 3.3.2.~~10~~ (b)(c) (b)(c)	≤ ~~[121.6]~~ 107.8~~(l)~~ h psi	~~[110]~~ 100.0~~(l)~~ h psi 3

2

Note # (~~a~~ f) ~~Above the P-11 (Pressurizer Pressure) interlock~~ When Steam Line Isolation on Steam Line Pressure, Negative Rate–High is blocked.

3.3.2.1, and ACTION (b) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

3.3.2.1, and ACTION (c) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The ~~NTSP and the~~ methodologies used to determine the as-found and as-left tolerances are specified in ~~[insert the facility FSAR reference or the name of any document incorporated into the facility FSAR by reference]~~ UFSAR Section 7.1.2. 2 3

Table 3.3-4 Note 1 (d) Time constants used in the lead/lag controller are τ ~~t~~$_1$ ≥ ~~[~~50~~]~~ seconds and ~~t~~$_2$ ≤ ~~[~~5~~]~~ seconds. 2 3

Table 3.3-3 Note ## (~~h~~ g) ~~Below the P-11 (Pressurizer Pressure) interlock~~ When Steam Line Isolation on Steam Line Pressure, Low is blocked. 2

Table 3.3-4 Note 2 (~~i~~ h) Time constant utilized in the rate/lag controller is τ ≥ ~~[~~50~~]~~ seconds. KAB-030 3

DOC L04 (~~j~~ e) Except when all MSIVs are closed ~~and [de-activated]~~. 3

~~REVIEWER'S NOTE~~
~~(l) Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.~~ 4

CTS

ESFAS Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.2~~A~~

Table 3.3-3

Table 3.3.2-1 (page 5 of 11)
Engineered Safety Feature Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	~~[~~NOMINAL~~(f)~~ TRIP SETPOINT~~]~~
	4. Steam Line Isolation						
	d. Steam Line Pressure						
4.d	(1) Low	1,2~~(j)~~ e,3~~(j)~~ ~~(a)~~ f	3 per steam line	D	SR 3.3.2.1 4 SR 3.3.2.~~5~~(b)(c) 8 SR 3.3.2.~~9~~(b)(c) 9 SR 3.3.2.~~10~~	≥ ~~[635]~~ 592.2(d) psig	~~[675]~~ 600(d) psig 3
4.e	(2) Negative Rate - High	3 ~~(h)~~ g ~~(j)~~ e	3 per steam line	D	SR 3.3.2.1 4 SR 3.3.2.~~5~~(b)(c) 8 SR 3.3.2.~~9~~(b)(c) 9 SR 3.3.2.~~10~~	≤ ~~[121.6]~~ 107.8~~(i)~~ h psi	~~[110]~~ 100.0~~(i)~~ h psi 3

2

Note # (~~a~~ f) ~~Above the P-11 (Pressurizer Pressure) interlock~~ When Steam Line Isolation on Steam Line Pressure, Negative Rate–High is blocked.

3.3.2.1, and ACTION (b) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

3.3.2.1, and ACTION (c) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The ~~NTSP and the~~ methodologies used to determine the as-found and as-left tolerances are specified in ~~[insert the facility FSAR reference or the name of any document incorporated into the facility FSAR by reference]~~ UFSAR Section 7.1.2. 2 3

Table 3.3-4 Note 1 (d) Time constants used in the lead/lag controller are ~~t~~ τ_1 ≥ ~~[~~50~~]~~ seconds and ~~t~~ τ_2 ≤ ~~[~~5~~]~~ seconds. 2 3

Table 3.3-3 Note ## (~~h~~ g) ~~Below the P-11 (Pressurizer Pressure) interlock~~ When Steam Line Isolation on Steam Line Pressure, Low is blocked. 2

Table 3.3-4 Note 2 (~~i~~ h) Time constant utilized in the rate/lag controller is τ_1 ≥ ~~[~~50~~]~~ seconds. KAB-030 3

DOC L04 (~~j~~ e) Except when all MSIVs are closed ~~and [de-activated]~~. 3

~~REVIEWER'S NOTE~~

~~(l) Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.~~ 4

Licensee Response/NRC Response/NRC Question Closure

Id	**83**
NRC Question Number	**KAB030**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**5/30/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**5/30/2014 8:40 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**54**
NRC Question Number	**KAB031**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	**L-14**
JFD Number	
JFD Bases Number	
Page Number (s)	**444**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 444 of Enclosure 2, Volume 8, L14 provides the discussion of the channel functional test in CTS Table 4.3-2 as compared to the ITS channel operational test in ITS 3.3.2. L14 states, "ITS Table 3.3.2-1 requires performance of a COT (ITS SR 3.3.1.7 or SR 3.3.1.8) every 184 days…" Please explain why ITS SR 3.3.1.7 or SR 3.3.1.8 are being referenced or provide a correction to L14.**
Attach File 1	
Attach File 2	
Issue Date	**5/9/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/9/2014 8:59 AM**
Notification	**Scott Bowman Michelle Conner Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**63**
NRC Question Number	**KAB031**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 revised 3.3.2 DOC L14.pdf** (17KB)
Attachment 2	
Response Statement	**In response to KAB031, discussion of change (DOC) L14, on page 444 of Enclosure 2, Volume 8, will be revised. Specifically, the reference to ITS SR 3.3.1.7 and SR 3.3.1.8 will be revised to reference ITS SR 3.3.2.4.** **See Attachment 1 for the draft revised DOC L14.**
Response Date/Time	**5/29/2014 12:15 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**5/29/2014 11:12 AM**
Date Modified	
Modified By	

DISCUSSION OF CHANGES
ITS 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

ITS 3.3.2 Required Action J.2 allows an alternative of placing the Steam Generator Water Level -- Low-Low channel in trip instead of adjusting the Steam Generator Water Level -- Low-Low (EAM) channels trip setpoint to the same value as Steam Generator Water Level -- Low-Low (Adverse) with the same Completion Time for placing the channel in trip. This changes the CTS by adding an alternative to adjusting the Steam Generator Water Level -- Low-Low (EAM) channels trip setpoint to the same value as Steam Generator Water Level -- Low-Low (Adverse).

The purpose of CTS Table 3.3-3 ACTION 38 is to limit the maximum time allowed for maintenance activities, in which the channel is unavailable prior to adjusting the Steam Generator Water Level -Low-Low (EAM) channels trip setpoint to the same value as Steam Generator Water Level -- Low-Low (Adverse). If the Steam Generator Water Level -Low-Low (EAM) channels trip setpoint is not adjusted to the same value as Steam Generator Water Level -- Low-Low (Adverse) within the specified Completion Time this proposed change allows placing the affected protection sets SG Water Level -- Low-Low level channels in the tripped condition. Once the channel is placed in the tripped condition the Steam Generator Water Level -- Low-Low EAM/Adverse circuitry is removed from the active portion of the Steam Generator Water Level -- Low-Low channel, reference UFSAR Figure 7.2.1-1, Sheets 17 through 20, and these actions are no longer necessary. The action of tripping the channel provides the protection sets input to the 2/3 logic gates located on UFSAR Figure 7.2.1-1 Sheet 19. The ITS Required Action J.2 Completion Time of 6 hours is consistent with CTS TABLE 3.3-3 ACTION 38 and the proposed ITS Required Action J.1. This change is designated as less restrictive because less stringent Required Actions are being applied in ITS than were applied in CTS.

KAB-031

L14 *(Category 9 – Allowed Outage Time, Surveillance Frequency, and Bypass Time Extensions Based on Generic Topical Reports)* CTS Table 4.3-2 requires a CHANNEL FUNCTIONAL TEST on a quarterly basis (Q) for Functional Units: 1.c (Containment Pressure-High), 1.d (Pressurizer Pressure--Low); 1.f (Steam Line Pressure—Low); 2.c (Containment Pressure--High-High); 3.b.3) (Containment Pressure--High-High); 4.c (Containment Pressure--High-High); 4.d (Steam Line Pressure--Low); 4.e (Negative Steam Line Pressure Rate--High); and 5.a (Steam Generator Water Level--High-High). ITS Table 3.3.2-1 requires performance of a COT (ITS SR 3.3.2.4 ~~SR 3.3.1.7 or SR 3.3.1.8~~) every 184 days for Functions: 1.c (Containment Pressure-High); 1.d (Pressurizer Pressure--Low); 1.e (Steam Line Pressure—Low); 2.c (Containment Pressure--High-High); 3.b.(3) (Containment Pressure--High-High); 4.c (Containment Pressure--High-High); 4.d.(1) (Steam Line Pressure--Low); 4.d.(2) (Steam Line Pressure Negative Rate--High); and 5.b (SG Water Level--High-High (P-14)). This changes the CTS by changing the Frequency of the Surveillances from quarterly to 184 days.

The purpose of the CHANNEL FUNCTIONAL TEST/COT is to ensure that the instrumentation is functioning properly. These changes are acceptable and are the result of WCAP-10271, Revision 0 ("Evaluation of Surveillance Frequencies and Out of Service Times for the Reactor Protection Instrumentation System"), dated May 1996, and supplements, WCAP-14333-P-A, Revision 1 ("Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times"), dated

Licensee Response/NRC Response/NRC Question Closure

Id	**84**
NRC Question Number	**KAB031**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**5/30/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**5/30/2014 8:40 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**55**
NRC Question Number	**KAB032**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	**L-15**
JFD Number	
JFD Bases Number	
Page Number (s)	**445**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 445 of Enclosure 2, Volume 8, L15 provides the discussion of the channel functional test in CTS Table 4.3-2 as compared to the ITS actuation logic test in ITS 3.3.2. L15 states, "The ITS STB definition requires an Automatic Actuation Logic and Actuation Relays Function to be tested every 62 days." However, ITS SR 3.3.2.2 is required 92 days on a staggered test basis. Please explain this discrepancy.**
Attach File 1	
Attach File 2	
Issue Date	**5/9/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/9/2014 9:01 AM**
Notification	**Scott Bowman** **Michelle Conner** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**61**
NRC Question Number	**KAB032**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 revised 3.3.2 DOC L15.pdf** (17KB)
Attachment 2	
Response Statement	**In response to KAB032, discussion of change (DOC) L15 will be revised. Specifically, the sentence in the second paragraph of L15 that states, "The ITS STB definition requires an Automatic Actuation Logic and Actuation Relays Function to be tested every 62 days." will be revised to state, "The ITS STB definition requires an Automatic Actuation Logic and Actuation Relays Function to be tested every 92 days." This was a typographical error.** **During review of DOC L15, the following issue was identified. CTS Functional Unit 9.b (Automatic Switchover to Containment Sump, Automatic Actuation Logic) corresponding to ITS Function 7.a (Automatic Switchover to Containment Sump, Automatic Actuation Logic and Actuation Relays) should be included in the first paragraph of DOC L15. CTS Table 4.3-2 requires a CHANNEL FUNCTIONAL TEST on a monthly basis (M) for Functional Unit 9.b (Automatic Switchover to Containment Sump, Automatic Actuation Logic). A Note (Note (1)) modifies this Frequency and states, "Each train or logic channel shall be tested at least every 62 days on a STAGGERED TEST BASIS." The monthly CHANNEL FUNCTIONAL TEST in combination with the modifying Note requires testing each Automatic Actuation Logic train every two months. ITS Table 3.3.2-1 requires performance of an ACTUATION LOGIC TEST (ITS SR 3.3.2.2) every 92 days on a STAGGERED TEST BASIS for Function 7.a (Automatic Switchover to Containment Sump, Automatic Actuation Logic and Actuation Relays).** **See Attachment 1 for a draft revised DOC L15.**
Response Date/Time	**5/28/2014 9:10 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon**

	Ray Schiele
Added By	**Scott Bowman**
Date Added	**5/28/2014 8:10 AM**
Date Modified	
Modified By	

DISCUSSION OF CHANGES
ITS 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

October 1998, WCAP-15376-P-A, Revision 1 ("Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times"), dated March 2003 (or a combination of the WCAPs), or a unit specific evaluation showing the applicability of these WCAPs to the change. TVA has performed evaluations of the applicable changes associated with the three WCAPs to justify the above changes. The evaluations supporting these changes are provided in Enclosure 4 of this submittal. This change is designated as less restrictive because less stringent Frequencies are being applied in the ITS than were applied in the CTS.

L15 *(Category 9 – Allowed Outage Time, Surveillance Frequency, and Bypass Time Extensions Based on Generic Topical Reports)* CTS Table 4.3-2 requires a CHANNEL FUNCTIONAL TEST on a monthly basis (M) for Functional Units: 1.b (Safety Injection, Automatic Actuation Logic); 2.b (Containment Spray, Automatic Actuation Logic); 3.b.2) (Containment Isolation, Automatic Actuation Logic); 4.b (Steam Line Isolation, Automatic Actuation Logic); 5.b (Turbine Trip and Feedwater Isolation, Automatic Actuation Logic); 6.b (Auxiliary Feedwater, Automatic Actuation Logic)

; and 9.b (Automatic Switchover to Containment Sump, Automatic Actuation Logic)

. A Note (Note (1)) modifies this Frequency and states, "Each train or logic channel shall be tested at least every 62 days on a STAGGERED TEST BASIS." The monthly CHANNEL FUNCTIONAL TEST in combination with the modifying Note requires testing each Automatic Actuation Logic train every two months. ITS Table 3.3.2-1 requires performance of an ACTUATION LOGIC TEST (ITS SR 3.3.2.2) every 92 days on a STAGGERED TEST BASIS for Functions: 1.b (Safety Injection, Automatic Actuation Logic and Actuation Relays); 2.b (Containment Spray, Automatic Actuation Logic and Actuation Relays); 3.b.(2) (Containment Isolation, Automatic Actuation Logic and Actuation Relays); 4.b (Steam Line Isolation, Automatic Actuation Logic and Actuation Relays); 5.a (Turbine Trip and Feedwater Isolation, Automatic Actuation Logic and Actuation Relays); ~~and~~ 6.a (Auxiliary Feedwater, Automatic Actuation Logic and Actuation Relays)

; and 7.a (Automatic Switchover to Containment Sump, Automatic Actuation Logic and Actuation Relays)

. This changes the CTS by changing the Frequency of the Surveillances from monthly (every 62 days on a STAGGERED TEST BASIS) for these Automatic Actuation Logics to every 92 days on a STAGGERED TEST BASIS.

The purpose of the Automatic Actuation Logic Test is to ensure that when various simulated or actual input combinations in conjunction with each possible interlock logic state required for OPERABILITY of a logic circuit are applied the required logic output is obtained. An important concept in this change is that the definition of STAGGERED TEST BASIS (STB) in CTS is not the same as in ITS. In CTS STAGGERED TEST BASIS is defined as, "A STAGGERED TEST BASIS shall consist of: a. A test schedule for n systems, subsystems, trains or other designated components obtained by dividing the specified test interval into n equal subintervals, b. The testing of one system, subsystem, train or other designated component at the beginning of each subinterval. Using the CTS STB definition there are two (2) Automatic Actuation Logic trains with the Note (1) frequency of 62 days on a STB, 62 days/2 trains = 31 days/train (or monthly), Table 4.3-2 Frequency. Therefore, in CTS, each month (31 days) an Automatic Actuation Logic train is tested and each Automatic Actuation Logic train is tested every two (2) months (62 days). In ITS, STB is defined as, "A STAGGERED TEST BASIS shall consist of the testing of one of the systems, subsystems,

DISCUSSION OF CHANGES
ITS 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

channels, or other designated components during the interval specified by the Surveillance Frequency, so that all systems, subsystems, channels, or other designated components are tested during *n* Surveillance Frequency intervals, where *n* is the total number of systems, subsystems, channels, or other designated components in the associated function." Using the ITS definition for the ITS SR 3.3.2.2 Frequency of "92 days on a STAGGERED TEST BASIS," changes the testing of each Automatic Actuation Logic and Actuation Relays 9 train to every 6 months (184 days). The ITS STB definition requires an Automatic Actuation Logic and Actuation Relays Function to be tested every ~~6~~2 days. Because there are two (2) Automatic Actuation Logic and Actuation Relays trains and the STB definition states that all designated trains are tested during *n* Surveillance Frequency Intervals where *n* is the number of trains, 92 days x 2 components = 184 days (or every 6 months). Therefore, this change decreases the Frequency for testing of each Automatic Actuation Logic and Actuation Relays train from every two months to every 6 months with the interaction between trains controlled by the STB definition. These changes are acceptable and are the result of WCAP-10271, Revision 0 ("Evaluation of Surveillance Frequencies and Out of Service Times for the Reactor Protection Instrumentation System"), dated May 1996, and supplements, WCAP-14333-P-A, Revision 1 ("Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times"), dated October 1998, or WCAP-15376-P-A, Revision 1 ("Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times"), dated March 2003 (or a combination of the WCAPs). TVA has performed evaluations of the applicable changes associated with the three WCAPs to justify the above changes. The evaluations supporting these changes are provided in Enclosure 4 of this submittal. This change is designated as less restrictive because less stringent Frequencies are being applied in the ITS than were applied in the CTS.

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Licensee Response/NRC Response/NRC Question Closure

Id	**85**
NRC Question Number	**KAB032**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**5/30/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**5/30/2014 8:41 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**56**
NRC Question Number	**KAB033**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**371, 411**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On pages 371 and 411 of Enclosure 2, Volume 8, CTS Table 4.3-2 note (2) has a reference to L01. Please explain how L01 is applicable.**
Attach File 1	
Attach File 2	
Issue Date	**5/9/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/9/2014 9:02 AM**
Notification	**Scott Bowman** **Michelle Conner** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**35**
NRC Question Number	**KAB033**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 revised CTS Table 4.3-2 Note (2) reference.pdf** (23KB)
Attachment 2	
Response Statement	**In response to KAB033, the CTS Table 4.3-2 Note (2) reference to discussion of change (DOC) L01 on pages 371 and 411 of Enclosure 2 will be revised to reference DOC L02.** **DOC L01 is not applicable because it discusses a change to the CTS Completion Time for the P-4 interlock.** **See Attachment 1 for draft revised CTS Table 4.3-2 Note (2) references.**
Response Date/Time	**5/23/2014 11:45 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**5/23/2014 10:42 AM**
Date Modified	
Modified By	

ITS

A01

ITS 3.3.2

TABLE 4 .3-2 (Continued)

TABLE NOTATION

In accordance with the Surveillance Frequency Control Program

LA02

~~92 days on a STAGGERED TEST BASIS~~

L15

SR 3.3.2.2 (1) Each train or logic channel shall be tested at least every ~~62 days on a STAGGERED TEST BASIS~~.

~~(2) The total interlock function shall be demonstrated OPERABLE during CHANNEL CALIBRATION testing of each channel affected by interlock operation.~~

~~L01~~

L02

Add proposed SR 3.3.2.6 Note

Add proposed SR 3.3.2.7 Note

Add proposed SR 3.3.2.10 Note

A18

Add proposed SR 3.3.2.8 Note

A19

Add proposed SR 3.3.2.9 Note

A20

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ITS

A01

ITS 3.3.2

TABLE 4.3-2 (Continued)
TABLE NOTATION

In accordance with the Surveillance Frequency Control Program LA02

~~92 days on a STAGGERED TEST BASIS~~ L15

SR 3.3.2.2 (1) Each train or logic channel shall be tested at least every ~~62 days on a STAGGERED TEST BASIS~~.

~~(2) The total interlock function shall be demonstrated OPERABLE during CHANNEL CALIBRATION testing of each channel affected by interlock operation.~~ ~~L01~~ L02

Add proposed SR 3.3.2.6 Note

Add proposed SR 3.3.2.7 Note

Add proposed SR 3.3.2.10 Note

A18

Add proposed SR 3.3.2.8 Note A19

Add proposed SR 3.3.2.9 Note A20

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Licensee Response/NRC Response/NRC Question Closure

Id	**55**
NRC Question Number	**KAB033**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**5/27/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**5/27/2014 2:18 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**57**
NRC Question Number	**KAB034**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**461, 495**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On pages 461 and 495 of Enclosure 2, Volume 8, Insert 8 for ITS Condition R is missing the underlining for the logical connector AND. Please provide a correction for Insert 8.**
Attach File 1	
Attach File 2	
Issue Date	**5/9/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/9/2014 9:03 AM**
Notification	**Scott Bowman** **Michelle Conner** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**36**
NRC Question Number	**KAB034**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 revised Insert 8.pdf** (16KB)
Attachment 2	
Response Statement	**In response to KAB034, the logical connector for Insert 8 on pages 461 and 495, associated with Condition R will be revised to change the connector "AND" to "AND."** **See Attachment 1 for draft revised Insert 8.**
Response Date/Time	**5/23/2014 1:30 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**5/23/2014 12:31 PM**
Date Modified	
Modified By	

2

INSERT 8

M11	R. Required Action and associated Completion Time of Condition I not met.	R.1 Be in MODE 3. AND R.2 Be in MODE 4.	6 hours 12 hours
ACTION 15	S. One train inoperable.	--------------------NOTE-------------------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. -- S.1 Be in MODE 3. AND S.2 Be in MODE 5.	 12 hours 42 hours

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CTS

2

INSERT 8

M11	R. Required Action and associated Completion Time of Condition I not met.	R.1 Be in MODE 3. AND R.2 Be in MODE 4.	6 hours 12 hours
ACTION 15	S. One train inoperable.	--------------------NOTE------------------- One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. --- S.1 Be in MODE 3. AND S.2 Be in MODE 5.	 12 hours 42 hours

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Licensee Response/NRC Response/NRC Question Closure

Id	**56**
NRC Question Number	**KAB034**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**5/27/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**5/27/2014 2:18 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**58**
NRC Question Number	**KAB035**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.3**
DOC Number	**L-2**
JFD Number	
JFD Bases Number	
Page Number(s)	**711**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 711 of Enclosure 2, Volume 8, L02 provides the discussion of channel calibrations in CTS 4.3.3.7.b as compared to the ITS channel calibration in ITS 3.3.3. L02 states, "ITS 3.3.3.2 requires performance of a channel calibration also but is modified be a Note stating…" However, ITS does not contain a LCO 3.3.3.2. ITS 3.3.3 does have a surveillance requirement 3.3.3.2 which requires a channel calibration. Please correct L02 to reference ITS SR 3.3.3.2 or explain why ITS 3.3.3.2 is the correct reference.**
Attach File 1	
Attach File 2	
Issue Date	**5/13/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/13/2014 12:00 PM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Lisa Regner** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**39**
NRC Question Number	**KAB035**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.3 revised L02.pdf** (11KB)
Attachment 2	
Response Statement	**In response to KAB035, discussion of change (DOC) L02, on page 711 of Enclosure 2, Volume 8, will be revised. Specifically, the reference to ITS 3.3.3.2 will be revised to, "ITS SR 3.3.3.2."** **See Attachment 1 for draft revised DOC L02.**
Response Date/Time	**5/23/2014 2:35 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**5/23/2014 1:33 PM**
Date Modified	
Modified By	

DISCUSSION OF CHANGES
ITS 3.3.3, POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

respond to the event is low. The addition of a report is acceptable because it advises the NRC of the cause of the inoperability and the plans and schedule for restoring the instrumentation channel to OPERABLE status. This change is designated as less restrictive because additional time is allowed to restore instrument channels to OPERABLE status than was allowed in the CTS.

L02 *(Category 6 – Relaxation of Surveillance Requirement Acceptance Criteria)* CTS 4.3.3.7.b requires that each accident monitoring instrument be demonstrated OPERABLE by performance of a CHANNEL CALIBRATION every 18 months. ITS 3.3.3.2 requires performance of a CHANNEL CALIBRATION also but is modified by a Note stating, "Neutron detectors are excluded from CHANNEL CALIBRATION." This changes the CTS by excluding Neutron detectors from the Source and Intermediate Range CHANNEL CALIBRATIONS.

SR

The purpose of a CHANNEL CALIBRATION is to ensure that the channel responds within the necessary range and accuracy to known values of the parameter that the channel monitors. Thus, to perform a channel calibration of a neutron flux channel would require including the neutron flux detector in the calibration. Inclusion of neutron flux detectors in the CHANNEL CALIBRATION process is impractical in power reactor applications because to do so would require subjecting the detectors to known neutron fluxes. Because of the hazards associated with exposing the neutron detectors, CTS Table 4.3-1 Note (6) excludes these detectors from CHANNEL CALIBRATION. The detectors excluded from CHANNEL CALIBRATION in CTS Table 4.3-1 are the same channels used to satisfy CTS Table 3.3-10. This proposed change is consistent with historical and current NRC staff requirements as reflected in ISTS. Explicitly stating the neutron detectors are excluded from CHANNEL CALIBRATION reiterates the allowance found in CTS Table 4.3-1. This change is designated as less restrictive because less stringent Surveillance Requirements are being applied in the ITS than were applied in the CTS.

L03 *(Category 1 – Relaxation of LCO Requirements)* CTS Table 3.3-10 Note ## is associated with Instrument 19 (Containment Isolation Valve Position) Minimum Required Channels and states, "Not required for isolation valves that are closed and deactivated." ITS includes a similar Footnote for Function 19 (Containment Isolation Valve Position) that states, "Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured." This changes the CTS by reducing the conditions under which the isolation valves indication must be OPERABLE by including exceptions of when the penetration is isolated by a closed manual valve, blind flange, or check valve with flow through the valve secured.

The purpose of CTS Table 3.3-10, Instrument 19 (Containment Isolation Valve Position) is for verification of containment isolation using the ability to monitor containment penetration isolation valve status through valve position indication. A closed and deactivated isolation valve provides evidence that the penetration is isolated and the requirement to provide indication of the valve position is no longer necessary. Similarly by isolating the penetration using a manual valve, blind flange, or check valve with the flow through it secured provides evidence that the penetration is isolated and the requirement to provide indication of the

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Licensee Response/NRC Response/NRC Question Closure

Id	**57**
NRC Question Number	**KAB035**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**5/27/2014**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**5/27/2014 2:19 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**59**
NRC Question Number	**KAB036**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.3**
DOC Number	**A-3**
JFD Number	
JFD Bases Number	
Page Number(s)	**703**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 703 of Enclosure 2, Volume 8, A03 provides the discussion of the minimum channels required for CTS Table 3.3-10 Instrument 11.b, "Auxiliary Feedwater Valve Position Indication," which is 3/steam generator. ITS Table 3.3.3-1 function 11.b, "Auxiliary Feedwater Valve Position Indication," required channels is 1 per steam generator. A03 states, "This changes the CTS by simplifying the presentation of the requirements for Auxiliary Feedwater (Valve Position Indication) instrumentation by requiring one channel per steam generator." The NRC staff does not agree that this change simplifies the presentation and does not result in technical changes. Please provide a correction to the required channels in ITS Table 3.3.3-1 for function 11.b, such that it matches the minimum channels required for CTS Table 3.3-10 Instrument 11.b or provide a change equivalent to the CTS Table 3.3-10 Instrument 11.b requirements such that it clearly describes that there is 1 required valve position indication for each auxiliary feedwater pump associated with each steam generator.**
Attach File 1	
Attach File 2	
Issue Date	**5/13/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	

Date Added	**5/13/2014 12:02 PM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Lisa Regner** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**130**
NRC Question Number	**KAB036**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 for 3.3.3 Footnotes R2.pdf** (1MB)
Attachment 2	
Response Statement	**In response to KAB036, ITS Table 3.3.3-1, Post Accident Monitoring Instrumentation, will be modified to add a Footnote to Function 11.b. ITS Table 3.3.3-1 Function 11.b, Auxiliary Feedwater Valve Position Indication, requires one OPERABLE channel per steam generator. The Footnote will describe that, "a channel consists of three valve position indicators (two level control valves for each motor driven AFW flow path and one level control valve for the turbine driven AFW flow path)." The footnote is consistent with CTS requirements for each AFW flow path associated with each steam generator.** **During review for the response to KAB036, it was noted that the sequencing of the footnotes for ITS Table 3.3.3-1 is not in accordance with the Writer's Guide, TSTF-GG-05-0, the footnotes are not sequenced in the order in which they appear in the Table. Therefore, to correct this issue, CTS and ISTS markups will be revised to correct the sequence of footnotes, as well as, corresponding revisions to the discussion of changes (DOCs). Footnote (d) will not be reflected in Attachment 1 to RAI KAB036. It will be shown in the response to RAI KAB037.** **Attachment 1 provides the markups for CTS Table 3.3-10 (pages 684 – 688 and 694 – 698 of Enclosure 2, Volume 8), ISTS Table 3.3.3-1 (pages 719 – 721 and 727 – 729) and the changes to DOCs A03, A04, and A06 (pages 703-706).**
Response Date/Time	**6/20/2014 4:45 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**

Date Added	**6/20/2014 3:42 AM**
Date Modified	
Modified By	

ITS

A01

ITS 3.3.3

Table 3.3.3-1

TABLE 3.3-10

ITS ACTION

ACCIDENT MONITORING INSTRUMENTATION

LA03 LA04

	INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION	ITS ACTION
1	1. Reactor Coolant T_{HOT} (Wide Range) ~~(Instrument Loops 68-001,-024,-043,-065)~~	~~4(1/RCS Loop)~~	4~~(1/RCS Loop)~~	1	A, B, C, and H
2	2. Reactor Coolant T_{COLD} (Wide Range) ~~(Instrument Loops 68-018,-041,-060,-083)~~	~~4(1/RCS Loop)~~	4~~(1/RCS Loop)~~	1	A, B, C, and H
3	3. Containment Pressure (Wide Range) ~~(Instrument Loops 30-310,-311)~~	~~2~~	2	1	A, B, C, and H
4	4. Containment Pressure (Narrow Range) ~~(Instrument Loops 30-044,-045)~~	~~2~~	2	1	A, B, C, and H
5	5. Refueling Water Storage Tank Level ~~(Instrument Loops 63-050,-051)~~	~~2~~	2	1	A, B, C, and H
6	6. Reactor Coolant Pressure (Wide Range) ~~(Instrument Loops 68-062,-066,-069)~~	~~3~~	3	2	A, B, C, D, and H
7	7. Pressurizer Level (Wide Range) ~~(Instrument Loops 68-320,-335,-339)~~	~~3~~	3	2	A, B, C, D, and H
8	8. Steam Line Pressure ~~(Instrument Loops 1-002A,-002B,-009A,-009B,-020A,-020B,-027A,-027B)~~	~~2/steam line~~	2/steam line	1	A, B, C, and H
9	9. Steam Generator Level - (Wide Range) ~~(Instrument Loops 3-043,-056,-098,-111)~~	~~4(1/steam generator)~~	4~~(1/steam generator)~~ (LA04)	1	A, B, C, and H
10	10. Steam Generator Level - (Narrow Range) ~~(Instrument Loops 3-039,-042,-052,-055,-094,-097,-107,-110)~~	~~2/steam generator~~	2/steam generator	1	A, B, C, and H
11	11. Auxiliary Feedwater				
	a. Flow Rate ~~(Instrument Loops 3-163,-155,-147,-170)~~	~~1/steam generator~~	1/steam generator	5	A, B, E, and H
	b. Valve Position Indication ~~(Instrument Loops 3-164,-164A,-172,-156,-156A,-173,-148,-148A,-174,-171,-171A,-175)~~	~~3/steam generator~~	~~3~~ 1/steam generator (a) (A03)	5	A, B, E, and H

LA05

Add proposed Table 3.3.3-1 Footnote (a) A03

ITS

A01

ITS 3.3.3

Table 3.3.3-1

TABLE 3.3-10 (Continued)

ITS ACTION

ACCIDENT MONITORING INSTRUMENTATION

LA03

	INSTRUMENT	~~TOTAL NO OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION
12	12. Reactor Coolant System Subcooling Margin Monitor ~~(Instrument Loops 94-101, -102)~~	~~2~~	2	1 A, B, C, and H
13	13. Containment Water Level (Wide Range) ~~(Instrument Loops 63-178, -179)~~	~~2~~	2	1 A, B, C, and H
14	14. Incore Thermocouples	~~65~~		
	a. Core Quadrant (1)		2~~(1/Train)~~	1 A, B, C, and H
	b. Core Quadrant (2)		2~~(1/Train)~~	1 A, B, C, and H
	c. Core Quadrant (3)		2~~(1/Train)~~	1 A, B, C, and H
	d. Core Quadrant (4)		2~~(1/Train)~~	1 A, B, C, and H
15	15. Reactor Vessel Level Instrumentation	~~6~~		
	a. Dynamic Range ~~(Instrument Loops 68-367, 370)~~		2	1 A, B, C, and H
	b. Lower Range ~~(Instrument Loops 68-368, 371)~~		2	1 A, B, C, and H
	c. Upper Range ~~(Instrument Loops 68-369, 372)~~		2	1 A, B, C, and H
16	16. Containment Area Radiation Monitors			
	a. Upper Compartment ~~(Instrument Loops 90-271, -272)~~	~~2~~	1	4 F and I
	b. Lower Compartment ~~(Instrument Loops 90-273, -274)~~	~~2~~	1	4 F and I

LA04

(b) ~~(c)~~ A04

LA05

Add proposed Table 3.3.3-1 Footnote ~~(c)~~ (b) A04

ITS A01 ITS 3.3.3

Table 3.3.3-1 TABLE 3.3-10 (Continued) ITS ACTION

ACCIDENT MONITORING INSTRUMENTATION

LA03

INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION
17 17. Neutron Flux			
a. Source Range ~~(Instrument Loops 92-5001, -5002)~~	~~2~~	$2^{\#}$	1 A, B, C, and H
b. Intermediate Range ~~(Instrument Loops 92-5003, -5004)~~	~~2~~	2	1 A, B, C, and H
18 18. ERCW to AFW Valve Position			
a. Motor Driven Pumps ~~(Instrument Loops 3-116A, -116B, -126A, -126B)~~	~~1/Train/Pump (2 Valves/Train)~~	2 ~~1/Train/Pump (2 Valves/Train)~~	1 A, B, C, and H
b. Turbine Driven Pumps ~~(Instrument Loops 3-136A, -136B, -179A, -179B)~~	~~2 Trains (2 Valves/Train)~~	2 ~~2 Trains (2 Valves/Train)~~	1 A, B, C, and H
19 19. Containment Isolation Valve Position ~~(Panels TR-A XX-55-6K & TR-B XX-55-6L)~~	~~1/Valve~~	(f) ~~(b)~~ 2 per penetration flow path ~~1/Valve~~##	3 A, C, and H

A05 LA04 A06 A06 LA05

Table 3.3.3-1 Footnote ~~(d)~~ (c)

#Source Range outputs may be disabled above the P-6 (Block of Source Range Reactor Trip) setpoint.

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

Table 3.3.3-1 Footnote ~~(a)~~ (e)

L03

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

A06

ITS

A01

ITS 3.3.3

TABLE 3.3-10 (Continued)

ACTION STATEMENTS

ACTION 1 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from Tables 3.3-1 and 3.3-3, and LCO 3.3.3.5 since they may contain more restrictive actions.~~ A07

ACTION A a. With the number of channels one less than the minimum channels required, restore the inoperable channel to OPERABLE status within 30 days or ~~be in at~~

ACTION B ~~least HOT STANDBY within the next 6 hours, and in HOT SHUTDOWN within the next 6 hours.~~ Initiate action in accordance with Specification 5.6.5 L01

ACTION C b. With the number of channels two less than the minimum channels required, restore at least one inoperable channel to OPERABLE status within 7 days, or

ACTION H be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION 2 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from Tables 3.3-1 since it may contain more restrictive actions.~~ A07

ACTION A a. With the number of channels one less than the minimum channels required, restore the inoperable channel to OPERABLE status within 30 days or ~~be in at~~

ACTION B ~~least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.~~ Initiate action in accordance with Specification 5.6.5 L01

ACTION C b. With the number of channels two less than the minimum channels required, restore at least one inoperable channel to OPERABLE status within 7 days or

ACTION H be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION D c. With the number of channels three less than the minimum channels required, restore one channel to OPERABLE status within 48 hours or

ACTION H be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

A07

ACTION 3 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from LCO 3.6.3 since it may contain more restrictive actions.~~

A06

ACTION A ### a. With the accident monitoring indication for one of the penetration ~~inboard or outboard~~ valve~~(s)~~ inoperable, restore the inoperable valve(s) accident indication to OPERABLE status within 30 days,

Table 3.3.3-1 (e) Footnote ~~(a)~~ or isolate each affected penetration within 30 days by use of at least one deactivated automatic valve secured in the isolated position, or isolate each

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ITS | A01 | ITS 3.3.3

TABLE 3.3-10 (Continued)

ACTION STATEMENTS
(Continued)

Initiate action in accordance with Specification 5.6.5 — L01

Table 3.3.3-1 Footnote ~~(a)~~ (e)
ACTION B

affected penetration within 30 days by use of at least one closed manual valve or blind flange, ~~or be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the next 6 hours~~.

two — A06

ACTION C

b. With the accident monitoring indication for ~~both an inboard and outboard~~ valve~~(s)~~ on the same penetration inoperable, restore at least the inboard or outboard inoperable valve(s) indication to OPERABLE status within 7 days, or isolate each affected penetration within 7 days by use of at least one deactivated automatic valve secured in the isolated position, or isolate each affected penetration within 7 days by use of at least one closed manual valve or blind flange, or be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the next 6 hours.

Table 3.3.3-1 Footnote ~~(a)~~ (e)
ACTION H

Table 3.3.3-1 Footnote ~~(b)~~ (f)

~~On a penetration where accident indication is declared INOPERABLE on a valve but on the opposite side of the penetration an accident indication valve does not exist (such as with a closed system or a check valve), only ACTION 3(a) must be entered.~~ — A06

~~However, valves FCV-63-158 & -172 are both inboard penetration valves, but if both valves have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's accident indication is restored to OPERABLE status. Valves FCV-30-46 & VLV-30-571, FCV-30-47 & VLV-30-572, and FCV-30-48 & VLV-30-573 are all outboard penetration valves, but if both valves have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's accident indication is restored to OPERABLE status.~~ — LA06

ITS

Table 3.3.3-1

A01

ITS 3.3.3

ITS ACTION

TABLE 3.3-10

ACCIDENT MONITORING INSTRUMENTATION

LA03

	INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION	ITS ACTION
1	1. Reactor Coolant T_{HOT} (Wide Range) ~~(Instrument Loops 68-001, 024, 043, 065)~~	~~4(1/RCS Loop)~~	4~~(1/RCS Loop)~~	1	A, B, C, and H
2	2. Reactor Coolant T_{COLD} (Wide Range) ~~(Instrument Loops 68-018, 041, 060, 083)~~	~~4(1/RCS Loop)~~	4~~(1/RCS Loop)~~	1	A, B, C, and H
3	3. Containment Pressure (Wide Range) ~~(Instrument Loops 30-310, 311)~~	~~2~~	2	1	A, B, C, and H
4	4. Containment Pressure (Narrow Range) ~~(Instrument Loops 30-044, 045)~~	~~2~~	2	1	A, B, C, and H
5	5. Refueling Water Storage Tank Level ~~(Instrument Loops 63-050, 051)~~	~~2~~	2	1	A, B, C, and H
6	6. Reactor Coolant Pressure (Wide Range) ~~(Instrument Loops 68-062, 066, 069)~~	~~3~~	3	2	A, B, C, D, and H
7	7. Pressurizer Level (Wide Range) ~~(Instrument Loops 68-320, 335, 339)~~	~~3~~	3	2	A, B, C, D, and H
8	8. Steam Line Pressure ~~(Instrument Loops 1-002A, 002B, 009A, 009B, 020A, 020B, 027A, 027B)~~	~~2/steam line~~	2/steam line	1	A, B, C, and H
9	9. Steam Generator Level - (Wide Range) ~~(Instrument Loops 3-043, 056, 098, 111)~~	~~4(1/steam generator)~~	4~~(1/steam generator)~~	1	A, B, C, and H
10	10. Steam Generator Level - (Narrow Range) ~~(Instrument Loops 3-039, 042, 052, 055, 094, 097, 107, 110)~~	~~2/steam generator~~	2/steam generator	1	A, B, C, and H
11	11. Auxiliary Feedwater				
	a. Flow Rate ~~(Instrument Loops 3-163, 155, 147, 170)~~	~~1/steam generator~~	1/steam generator	5	A, B, E, and H
	b. Valve Position Indication ~~(Instrument Loops 3-164, 164A, 172, 156, 156A, 173, 148, 148A, 174, 171, 171A, 175)~~	~~3/steam generator~~	1 ~~3~~/steam generator (a)	5	A, B, E, and H

LA04

LA04

A03

LA05

Add proposed Table 3.3.3-1 Footnote (a) A03

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ITS | A01 | ITS 3.3.3

Table 3.3.3-1

TABLE 3.3-10 (Continued) | ITS ACTION

ACCIDENT MONITORING INSTRUMENTATION

LA03

	INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION
12	12. Reactor Coolant System Subcooling Margin Monitor ~~(Instrument Loops 94-101, -102)~~	~~2~~	2	1 A, B, C, and H
13	13. Containment Water Level (Wide Range) ~~(Instrument Loops 63-178, -179)~~	~~2~~	2	1 A, B, C, and H
14	14. Incore Thermocouples	~~65~~		
	a. Core Quadrant (1)		2~~(1/Train)~~	1 A, B, C, and H
	b. Core Quadrant (2)		2~~(1/Train)~~	1 A, B, C, and H
	c. Core Quadrant (3)		2~~(1/Train)~~	1 A, B, C, and H
	d. Core Quadrant (4)		2~~(1/Train)~~	1 A, B, C, and H
15	15. Reactor Vessel Level Instrumentation System	~~6~~		
	a. Dynamic Range ~~(Instrument Loops 68- 367, 370)~~		2	1 A, B, C, and H
	b. Lower Range ~~(Instrument Loops 68-368, 371)~~		2	1 A, B, C, and H
	c. Upper Range ~~(Instrument Loops 68-369, 372)~~		2	1 A, B, C, and H
16	16. Containment Area Radiation Monitors			
	a. Upper Compartment ~~(Instrument Loops 90-271, -272)~~	~~2~~	1	4 F and I
	b. Lower Compartment ~~(Instrument Loops 90-273, -274)~~	~~2~~	1	4 F and I

LA04

(b) ~~(c)~~ A04

LA05

Add proposed Table 3.3.3-1 Footnote ~~(c)~~ (b) A04

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Table 3.3.3-1 ITS ACTION

TABLE 3.3-10 (Continued)

ACCIDENT MONITORING INSTRUMENTATION

LA03

	INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION
17	17. Neutron Flux			
	a. Source Range ~~(Instrument Loops 92-5001, -5002)~~	~~2~~	2#	1 A, B, C, and H
	b. Intermediate Range ~~(Instrument Loops 92-5003, -5004)~~	~~2~~	2	1 A, B, C, and H
18	18. ERCW to AFW Valve Position		A05	
	a) Motor Driven Pumps ~~(Instrument Loops 3-116A, -116B, -126A, -126B)~~	~~1/Train/Pump (2 Valves/Train)~~	2 ~~1/Train/Pump (2 Valves/Train)~~	1 A, B, C, and H
			LA04	
	b) Turbine Driven Pumps ~~(Instrument Loops 3-136A, -136B, -179A, -179B)~~	~~2 Trains (2 Valves/Train)~~	2 ~~2 Trains (2 Valves/Train)~~	1 A, B, C, and H
			~~(b)~~ (f) A06	
19	19. Containment Isolation Valve Position ~~(Panels TR-A XX-55-6K & TR-B XX-55-6L)~~	~~1/Valve~~	~~1/Valve~~## 2 per penetration flow path A06	3 A, C, and H

LA05

Table 3.3.3-Footnote ~~(d)~~ (c) # Source Range outputs may be disabled above the P-6 (Block of Source Range Reactor Trip) setpoint.

Table 3.3.3-Footnote ~~(a)~~ (e) ## Not required for isolation valves ~~that are~~ whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. L03

~~(b)~~ (f) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel. A06

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ITS

A01

ITS 3.3.3

TABLE 3.3-10 (Continued)

ACTION STATEMENTS

ACTION 1 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from Tables 3.3-1 and 3.3-3, and LCO 3.3.3.5 since they may contain more restrictive actions.~~ A07

ACTION A a. With the number of channels one less than the minimum channels required, restore the inoperable channel to OPERABLE status within 30 days or ~~be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours~~. Initiate action in accordance with Specification 5.6.5 L01

ACTION B

ACTION C b. With the number of channels two less than the minimum channels required, restore at least one inoperable channel to OPERABLE status within 7 days or be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION H

ACTION 2 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from Tables 3.3-1 since it may contain more restrictive actions.~~ A07

ACTION A a. With the number of channels one less than the minimum channels required, restore the inoperable channel to OPERABLE status within 30 days or ~~be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours~~. Initiate action in accordance with Specification 5.6.5 L01

ACTION B

ACTION C b. With the number of channels two less than the minimum channels required, restore at least one inoperable channel to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION H

ACTION D c. With the number of channels three less than the minimum channels required, restore one channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION H

ACTION 3 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from LCO 3.6.3 since it may contain more restrictive actions.~~ A07

A06

ACTION A ### a. With the accident monitoring indication for one of the penetration ~~inboard or outboard~~ valve~~(s)~~ inoperable, restore the inoperable valve(s) accident indication to OPERABLE status within 30 days, or isolate each affected penetration within 30 days by use of at least one deactivated automatic valve secured in the isolated position, or isolate each

Table 3.3-3 Footnote ~~(a)~~ (e)

ITS

A01

ITS 3.3.3

TABLE 3.3-10 (Continued)

ACTION STATEMENTS

(Continued)

Initiate action in accordance with Specification 5.6.5

L01

Table 3.3.3-1 Footnote ~~(a)~~ (e)

ACTION B

affected penetration within 30 days by use of at least one closed manual valve or blind flange, or ~~be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the next 6 hours~~.

two

A06

ACTION C

b. With the accident monitoring indication for ~~both an inboard and outboard~~ valve~~(s)~~ on the same penetration inoperable, restore at least the inboard or outboard inoperable valve(s) indication to OPERABLE status within 7 days, or isolate each affected penetration within 7 days by use of at least one deactivated automatic valve secured in the isolated position, or isolate each affected penetration within 7 days by use of at least one closed manual valve or blind flange, or be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the next 6 hours.

Table 3.3.3-1 Footnote ~~(a)~~ (e)

ACTION H

Table 3.3.3-1 Footnote ~~(b)~~ (f)

~~On a penetration where accident indication is declared INOPERABLE on a valve but on the opposite side of the penetration an accident indication valve does not exist (such as with a closed system or a check valve), only ACTION 3(a) must be entered.~~ ~~However, valves FCV-63-158 & -172 are both inboard penetration valves, but if both valves have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's accident indication is restored to OPERABLE status. Valves FCV-30-46 & VLV-30-571, FCV-30-47 & VLV-30-572, and FCV-30-48 & VLV-30-573 are all outboard penetration valves, but if both valves have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's accident indication is restored to OPERABLE status.~~

A06

LA06

DISCUSSION OF CHANGES
ITS 3.3.3, POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1431, Rev. 4.0, "Standard Technical Specifications-Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

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

A02 CTS 3.3.3.7 ACTIONS, as shown in CTS Table 3.3-10, provide the compensatory actions to take when PAM instrumentation is inoperable. ITS 3.3.3 ACTIONS provide the compensatory actions for inoperable PAM Instrumentation. The ITS 3.3.3 ACTIONS include a Note that allows separate Condition entry for each Function. In addition, separate Condition entry is allowed within a Function on a "per" bases as listed for Functions 8 (Steam Line Pressure (per steam line)), 10 (Steam Generator Level (Narrow Range) (per steam generator)) 11 (Auxiliary Feedwater (per steam generator)), and 19 (Containment Isolation Valve Position (per penetration flowpath)). This modifies the CTS by providing a specific allowance to enter the Action for each inoperable PAM instrumentation Function and for certain Functions on a "per" steam line, steam generator, or penetration flowpath basis.

This change is acceptable because it clearly states the current requirement. The CTS considers each PAM instrumentation Function to be separate and independent from the others. In addition, the channels associated with Functions 8, 10, 11, and 19 are allowed separate Condition entry on a steam line, steam generator, or penetration flowpath basis, which is consistent with the intent of the CTS. This change is designated as administrative because it does not result in technical changes to the CTS.

and is modified by Footnote (a). Footnote (a) states, "A channel consists of three valve position indicators (two level control valves for each motor driven AFW flow path and one level control valve for the turbine driven AFW flow path).

A03 CTS Table 3.3-10 Instrument 11.b (Auxiliary Feedwater (Valve Position Indication)) "Minimum Channels Required" column states that the minimum channels required is 3/steam generator. ITS Table 3.3.3-1 Function 11.b (Auxiliary Feedwater (Valve Position Indication)) "Required Channels" column requires one channel per steam generator ~~(consisting of 3 valve position indications)~~. This changes the CTS by simplifying the presentation of the requirements for Auxiliary Feedwater (Valve Position Indication) instrumentation by requiring one channel per steam generator.

and explicitly stating the number of valve position indicators included in a channel

The purpose of CTS Table 3.3-10 "Minimum Channels Required" column is to list the number of channels required to be OPERABLE for the associated instrument per steam generator. CTS Table 3.3-10 "Minimum Required Channels" column lists "3/steam generator" as the minimum required channels for Instrument 11.b (Auxiliary Feedwater (Valve Position Indication)). At SQN a channel consists of three valves per steam generator, two from the motor driven auxiliary feedwater pump and one from the turbine driven auxiliary feedwater pump. Therefore, to fulfill the "Minimum Required Channels" requirement for Instrument 11.b

DISCUSSION OF CHANGES
ITS 3.3.3, POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

requiring one channel per steam generator, all three valves position indication must be OPERABLE. This change is acceptable because the requirements contained in ITS are the same as in CTS when a required auxiliary feedwater valve position indicator is inoperable. This change is designated as administrative because it does not result in technical changes to the CTS.

A04 CTS Table 3.3-10 Instrument 14 (Incore Thermocouples) "Minimum Channels Required" column states, in part, that the minimum channels required is 2 (1 per train) in each of the four core quadrants. ITS Table 3.3.3-1 Function 14 (Incore Thermocouples) "Required Channel" column also requires two channels in each of the four core quadrants and is modified by Footnote ~~(c)~~ (b). ITS Table 3.3.3-1 Footnote ~~(c)~~ (b) states, "A channel consists of one incore thermocouple. The required channels in each quadrant shall be in different trains." This changes the CTS by explicitly stating the number of incore thermocouples included in a channel.

The purpose of CTS Table 3.3-10 "Minimum Channels Required" column is to list the number of channels required to be OPERABLE for the associated instrument. CTS Table 3.3-10 "Minimum Required Channels" column lists "2(1/train)" as the minimum required channels for Instrument 14 (Incore Thermocouples) in each core quadrant. At SQN a channel consists of one incore thermocouple, therefore to fulfill the "Minimum Required Channels" requirement for Instrument 14 requires two incore thermocouples in each core quadrant, one from each train, to be OPERABLE. ITS Table 3.3.3-1 "Required Channel" column for Function 14 (Incore Thermocouples) requires two channels to be OPERABLE in each of the four core quadrants and is modified by Footnote ~~(c)~~ (b). ITS Table 3.3.3-1 Footnote ~~(c)~~ (b) states that a channel consists of one incore thermocouple from different trains. The addition of Footnote ~~(c)~~ (b) explicitly states the channel requirement of CTS. This change is designated as administrative because it does not result in technical changes to the CTS.

A05 CTS Table 3.3-10 Instrument 18.a (ERCW to AFW Valve Position (Motor Driven Pumps)), "Minimum Channels Required" column states, in part, that the minimum channels required are 1/Train/Pump (2 Valves/Train). ITS Table 3.3.3-1 Function 18.a (ERCW to AFW Valve Position (Motor Driven Pumps)), "Required Channel" column requires 2 channels. CTS Table 3.3-10 Instrument 18.b (ERCW to AFW Valve Position (Turbine Driven Pump)), "Minimum Channels Required" column states that the minimum channels required are 2 Trains (2 Valves/Train). ITS Table 3.3.3-1 Function 18.b (ERCW to AFW Valve Position (Turbine Driven Pump)), "Required Channel" column requires 2 channels. This changes the CTS by simplifying the presentation of the channel requirements for ERCW to AFW Valve Position for the Motor Driven Pumps and the Turbine Driven Pump.

The purpose of CTS Table 3.3-10 "Minimum Channels Required" column is to designate the number of channels required to be OPERABLE for the associated instrument. CTS Table 3.3-10 "Minimum Required Channels" column lists "1/Train/Pump (2 Valves/Train)" as the minimum required channels for Instrument 18.a (ERCW to AFW Valve Position (Motor Driven Pumps,)). At SQN there are two motor driven auxiliary feedwater pumps. Each motor driven pump has two valves in series between the AFW pump and the ERCW supply. CTS Table 3.3-10 lists them as 3-116A and 3-116B, which are in the ERCW supply

DISCUSSION OF CHANGES
ITS 3.3.3, POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

line to the 1A-A AFW Pump, and 3-126A and 3-126B, which are in the ERCW supply line to the 1B-B AFW pump. The ITS Bases defines a channel as consisting of these two valves in series in the ERCW to AFW flow path for each motor driven pump, therefore 2 channels are required. CTS Table 3.3-10 "Minimum Required Channels" column lists "2 Trains (2 Valves/Train)" as the minimum required channels for Instrument 18.b (ERCW to AFW Valve Position (Turbine Driven Pump,)). At SQN there is one turbine driven auxiliary feedwater pump. The turbine driven pump has two supply lines from ERCW, one from each train with two valves in series between the AFW pump and the ERCW supply. CTS Table 3.3-10 lists them as 3-136A and 3-136B, which are in the ERCW supply line from the 1A ERCW header to the turbine driven AFW Pump, and 3-179A and 3-179B, which are in the ERCW supply line from the 1B ERCW header to the turbine driven AFW pump. The ITS Bases defines a channel as two valves in series for each ERCW supply line to the turbine driven AFW pump, therefore 2 channels are required. This change is acceptable because the requirements contained in ITS are the same as in CTS when an ERCW to AFW Valve Position channel is inoperable. This change is designated as administrative because it does not result in technical changes to the CTS.

A06 CTS Table 3.3-10 Instrument 19 (Containment Isolation Valve Position) "Minimum Channels Required" column requires one valve position indication channel OPERABLE per valve and lists ACTION 3 as the ACTION to follow if one channel per valve is inoperable. CTS Table 3.3-10 ACTION 3.a provides the required ACTIONS for one of the penetration inboard or outboard valve(s) inoperable (i.e., one channel inoperable per penetration) one part of which is restoring the inoperable valve(s) accident indication to OPERABLE status within 30 days. CTS Table 3.3-10 ACTION 3.b provides the required ACTIONS for both an inboard and outboard valve(s) on the same penetration inoperable (i.e., two channels inoperable per penetration) one part of which is restoring at least the inboard or outboard inoperable valve(s) indication to OPERABLE status within 7 days. ITS LCO 3.3.3 ACTION A, applicable to Function 19 (Containment Isolation Valve Position), states that with one or more Functions with one required channel inoperable restore required channel to OPERABLE status within 30 days. ITS LCO 3.3.3 ACTION C, applicable to Function 19 (Containment Isolation Valve Position), states that with one or more Functions with two required channels inoperable to restore one channel to OPERABLE status within 7 days. CTS Table 3.3-10 Note ### states, in part, that on a penetration where accident indication is declared inoperable on a valve but on the opposite side of the penetration an accident indication valve does not exist (such as with a closed system or a check valve), only ACTION 3(a) must be entered. ITS Table 3.3.3-1 Function 19 (Containment Isolation Valve Position) "Required Channels" column requires two channels to be OPERABLE per penetration and is modified by Footnote ~~(b)~~ (f) which states that only one position indication channel is required for penetration flow paths with only one installed control room indication channel. CTS Table 3.3-10 ACTION 3.a references an inboard or outboard valve. CTS Table 3.3-10 ACTION 3.b references both an inboard and outboard valve(s). CTS Table 3.3-10 Note ###, in part, references penetrations whose valves are either both inboard (FCV 63-158 and FCV 63-172) or both outboard (FCV 30-46 and VLV 30-571, FCV 30-47 and VLV 30-572, FCV 30-48 and VLV 30-573) and states that if both valves (two) have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's

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ITS 3.3.3, POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

accident indication is restored to OPERABLE status. ITS LCO 3.3.3 ACTION C, applicable to Function 19 (Containment Isolation Valve Position), states that with one or more Functions with two required channels inoperable to restore one channel to OPERABLE status within 7 days, similar to CTS Table 3.3-10 ACTION 3.b. This changes the CTS by simplifying the presentation of the requirements for Containment Isolation Valve Position instrumentation by requiring two channels per penetration, except where ITS Table 3.3.3-1 Footnote ~~(b)~~ (f) is applicable for those penetration flow paths with only one installed control room indication channel, and eliminating reference to inboard and outboard valve combinations.

The purpose of CTS Table 3.3-10 is to provide requirements for Post-Accident Monitoring instruments. One of these instruments is Containment Isolation Valve Position. CTS requires one position indication channel per valve to be OPERABLE where normally there are two valves per penetration. Similarly, ITS requires two channels per penetration. CTS Note ###, in part, states that on a penetration where accident indication is declared INOPERABLE on a valve but on the opposite side of the penetration an accident indication valve does not exist (such as with a closed system or a check valve), only ACTION 3(a) must be entered. ITS Table 3.3.3-1 Footnote ~~(b)~~ (f) similarly states that only one position indication channel is required for penetration flow paths with only one installed control room indication channel. CTS Table 3.3-10 Note ###, in part, requires entry into ACTION 3.b when two required valve position indicators per penetration are inoperable because ACTION 3.b entry condition is when both an inboard and outboard valve(s) on the same penetration inoperable (i.e., two position indicator per penetration). ITS LCO 3.3.3 ACTION C condition entry is when one or more Functions have two required channels inoperable, similar to CTS. This change is acceptable because the requirements contained in ITS are the same as in CTS when Containment Isolation Valve Position channel are inoperable for penetrations with two isolation valves per penetration and penetrations with one isolation valve per penetration. This change is designated as administrative because it does not result in technical changes to the CTS.

A07 CTS Table 3.3-10 ACTION 1, ACTION 2, ACTION 3, and ACTION 5 contain a Note referring to applicable action requirements from reference LCOs that may contain more restrictive actions. ITS Table 3.3.3-1 does not retain this information. This changes the CTS by not including the information referring to other potentially applicable action requirements to the Bases.

The purpose of CTS Table 3.3-10 ACTION 1, ACTION 2, ACTION 3, and ACTION 5 Note is to reference potentially associated Technical Specifications. It is an ITS convention to not include these types of notes or cross-references. This change is designated as administrative change because it does not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

None

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CTS

Unit 1 ITS Table

Table 3.3-10

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

FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION ~~D~~.1 G
~~1. Power Range Neutron Flux~~	~~2~~	~~E~~
INSERT 4		
~~2. Source Range Neutron Flux~~	~~2~~	~~E~~
~~3. Reactor Coolant System (RCS) Hot Leg Temperature~~	~~2 per loop~~	~~E~~
~~4. RCS Cold Leg Temperature~~	~~2 per loop~~	~~E~~
~~5. RCS Pressure (Wide Range)~~	~~2~~	~~E~~
~~6. Reactor Vessel Water Level~~	~~2~~	~~F~~
~~7. Containment Sump Water Level (Wide Range)~~	~~2~~	~~E~~
~~8. Containment Pressure (Wide Range)~~	~~2~~	~~E~~
~~9. Penetration Flow Path Containment Isolation Valve Position~~	~~2 per penetration flow path(a)(b)~~	~~E~~
~~10. Containment Area Radiation (High Range)~~	~~2~~	~~F~~
~~11. Pressurizer Level~~	~~2~~	~~E~~
~~12. Steam Generator Water Level (Wide Range)~~	~~2 per steam generator~~	~~E~~
~~13. Condensate Storage Tank Level~~	~~2~~	~~E~~
~~14. Core Exit Temperature - Quadrant [1]~~	~~2(c)~~	~~E~~
~~15. Core Exit Temperature - Quadrant [2]~~	~~2(c)~~	~~E~~
~~16. Core Exit Temperature - Quadrant [3]~~	~~2(c)~~	~~E~~
~~17. Core Exit Temperature - Quadrant [4]~~	~~2(c)~~	~~E~~
~~18. Auxiliary Feedwater Flow~~	~~2~~	~~E~~

1

Note ##
ACTION 3.a
ACTION 3.b

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

Note ###

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

DOC A03

~~(c)~~ b A channel consists of ~~two core exit~~ one incore thermocouple~~s (CETs)~~. The required channels in each quadrant shall be in different trains. 1

~~REVIEWER'S NOTE~~
~~Table 3.3.3-1 shall be amended for each unit as necessary to list:~~
~~1. All Regulatory Guide 1.97, Type A instruments and~~
~~2. All Regulatory Guide 1.97, Category I, non-Type A instruments in accordance with the unit's Regulatory Guide 1.97, Safety Evaluation Report.~~

3

Note #

~~(d)~~ c Source Range outputs may be disabled above the P-6 (Block of Source Range Reactor Trip) setpoint. 1

(a) A channel consists of three valve position indicators (two level control valves for each motor driven AFW flow path and one level control valve for the turbine driven AFW flow path). XX 1

CTS | Insert 4 for Unit 1 ITS | ITS 3.3.3

Table 3.3-10

1

INSERT 4

		FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION G.1
1	1.	Reactor Coolant T_{HOT} (Wide Range)	4	H
2	2.	Reactor Coolant T_{COLD} (Wide Range)	4	H
3	3.	Containment Pressure (Wide Range)	2	H
4	4.	Containment Pressure (Narrow Range)	2	H
5	5.	Refueling Water Storage Tank Level	2	H
6	6.	Reactor Coolant Pressure (Wide Range)	3	H
7	7.	Pressurizer Level (Wide Range)	3	H
8	8.	Steam Line Pressure	2 per steam line	H
9	9.	Steam Generator Level - (Wide Range)	4	H
10	10.	Steam Generator Level - (Narrow Range)	2 per steam generator	H
11	11.	Auxiliary Feedwater		
		a. Flow Rate	1 per steam generator	H
		b. Valve Position Indication	1 per steam generator (a)	H

CTS ITS 3.3.3

Table 3.3-10

1

INSERT 4 continued

CTS	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION G.1
12	12. Reactor Coolant System Subcooling Margin Monitor	2	H
13	13. Containment Water Level (Wide Range)	2	H
14	14. Incore Thermocouples		
	a. Core Quadrant (1)	2~~(c)~~ (b)	H
	b. Core Quadrant (2)	2~~(c)~~ (b)	H
	c. Core Quadrant (3)	2~~(c)~~ (b)	H
	d. Core Quadrant (4)	2~~(c)~~ (b)	H
15	15. Reactor Vessel Level Instrumentation		
	a. Dynamic Range	2	H
	b. Lower Range	2	H
	c. Upper Range	2	H
16	16. Containment Area Radiation Monitors		
	a. Upper Compartment	1	I
	b. Lower Compartment	1	I
17	17. Neutron Flux		
	a. Source Range	2~~(d)~~ (c)	H
	b. Intermediate Range	2	H
18	18. ERCW to AFW Valve Position		
	a. Motor Driven Pumps	2	H
	b. Turbine Driven Pump	2	H
19	19. Containment Isolation Valve Position	2 per penetration flowpath~~(a)(b)~~ (e)(f)	H

CTS

Unit 2 ITS Table

PAM Instrumentation
3.3.3

Table 3.3-10

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

FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION ~~D~~.1 G
~~1. Power Range Neutron Flux~~	~~2~~	~~E~~
INSERT 4		
~~2. Source Range Neutron Flux~~	~~2~~	~~E~~
~~3. Reactor Coolant System (RCS) Hot Leg Temperature~~	~~2 per loop~~	~~E~~
~~4. RCS Cold Leg Temperature~~	~~2 per loop~~	~~E~~
~~5. RCS Pressure (Wide Range)~~	~~2~~	~~E~~
~~6. Reactor Vessel Water Level~~	~~2~~	~~F~~
~~7. Containment Sump Water Level (Wide Range)~~	~~2~~	~~E~~
~~8. Containment Pressure (Wide Range)~~	~~2~~	~~E~~
~~9. Penetration Flow Path Containment Isolation Valve Position~~	~~2 per penetration flow path(a)(b)~~	~~E~~
~~10. Containment Area Radiation (High Range)~~	~~2~~	~~F~~
~~11. Pressurizer Level~~	~~2~~	~~E~~
~~12. Steam Generator Water Level (Wide Range)~~	~~2 per steam generator~~	~~E~~
~~13. Condensate Storage Tank Level~~	~~2~~	~~E~~
~~14. Core Exit Temperature - Quadrant [1]~~	~~2(c)~~	~~E~~
~~15. Core Exit Temperature - Quadrant [2]~~	~~2(c)~~	~~E~~
~~16. Core Exit Temperature - Quadrant [3]~~	~~2(c)~~	~~E~~
~~17. Core Exit Temperature - Quadrant [4]~~	~~2(c)~~	~~E~~
~~18. Auxiliary Feedwater Flow~~	~~2~~	~~E~~

1

Note ## ACTION 3.a ACTION 3.b — ~~(a)~~ e Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

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

DOC A03 — ~~(c)~~ b A channel consists of ~~two core exit~~ one incore thermocouple~~s (CETs)~~. The required channels in each quadrant shall be in different trains. 1

~~REVIEWER'S NOTE~~
~~Table 3.3.3-1 shall be amended for each unit as necessary to list:~~
~~1. All Regulatory Guide 1.97, Type A instruments and~~
~~2. All Regulatory Guide 1.97, Category I, non-Type A instruments in accordance with the unit's Regulatory Guide 1.97, Safety Evaluation Report.~~

3

Note # — ~~(d)~~ c Source Range outputs may be disabled above the P-6 (Block of Source Range Reactor Trip) setpoint. 1

(a) A channel consists of three valve position indicators (two level control valves for each motor driven AFW flow path and one level control valve for the turbine driven AFW flow path). XX 1

CTS Insert 4 for Unit 2 ITS ITS 3.3.3

Table 3.3-10 1

INSERT 4

	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION G.1
1	1. Reactor Coolant T_{HOT} (Wide Range)	4	H
2	2. Reactor Coolant T_{COLD} (Wide Range)	4	H
3	3. Containment Pressure (Wide Range)	2	H
4	4. Containment Pressure (Narrow Range)	2	H
5	5. Refueling Water Storage Tank Level	2	H
6	6. Reactor Coolant Pressure (Wide Range)	3	H
7	7. Pressurizer Level (Wide Range)	3	H
8	8. Steam Line Pressure	2 per steam line	H
9	9. Steam Generator Level - (Wide Range)	4	H
10	10. Steam Generator Level - (Narrow Range)	2 per steam generator	H
11	11. Auxiliary Feedwater		
	a. Flow Rate	1 per steam generator	H
	b. Valve Position Indication	1 per steam generator (a)	H

ITS Insert Page 3.3.3-4a

CTS

ITS 3.3.3

Table 3.3-10

1

INSERT 4 continued

CTS	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION G.1
12	12. Reactor Coolant System Subcooling Margin Monitor	2	H
13	13. Containment Water Level (Wide Range)	2	H
14	14. Incore Thermocouples		
	a. Core Quadrant (1)	2~~(c)~~ (b)	H
	b. Core Quadrant (2)	2~~(c)~~ (b)	H
	c. Core Quadrant (3)	2~~(c)~~ (b)	H
	d. Core Quadrant (4)	2~~(c)~~ (b)	H
15	15. Reactor Vessel Level Instrumentation		
	a. Dynamic Range	2	H
	b. Lower Range	2	H
	c. Upper Range	2	H
16	16. Containment Area Radiation Monitors		
	a. Upper Compartment	1	I
	b. Lower Compartment	1	I
17	17. Neutron Flux		
	a. Source Range	2~~(d)~~ (c)	H
	b. Intermediate Range	2	H
18	18. ERCW to AFW Valve Position		
	a. Motor Driven Pumps	2	H
	b. Turbine Driven Pump	2	H
19	19. Containment Isolation Valve Position	2 per penetration flowpath~~(a)(b)~~ (e)(f)	H

Licensee Response/NRC Response/NRC Question Closure

Id	**138**
NRC Question Number	**KAB036**
Select Application	**NRC Response**
Attachment 1	
Attachment 2	
Response Statement	**The NRC staff agrees that a footnote would provide the clarity needed for function 11.b. It seems like the proposed footnote wording conflicts with itself. The footnote states that a channel consists of 3 valve position indicators. The NRC staff agrees. However, it then states, in parenthesis, two level control valves for each motor driven AFW flow path. This seems to be inaccurate and implies 4 valves are required for the motor driven AFW flow paths. It seems more appropriate to state one of the following in the parenthesis:** **two level control valves, *one* for each motor driven AFW flow path** **or** ***one* level control valve for each motor driven AFW flow path** **Please take this into consideration and review the wording proposed for footnote (a), and confirm that this is the wording you prefer using in ITS.**
Response Date/Time	**6/20/2014 6:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/20/2014 7:57 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**161**
NRC Question Number	**KAB036**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 for 3.3.3 Footnotes supplement.pdf** (1MB)
Attachment 2	**Attachment 2 KAB036 Drawing.pdf** (806KB)
Response Statement	**This response supplements the first response to KAB036 based on NRC response dated June 29, 2014.** **Proposed ITS Table 3.3.3-1, Post Accident Monitoring Instrumentation, Footnote (a) will be revised to state, “a channel consists of three valve position indicators (two level control valves for the motor driven AFW flow path and one level control valve for the turbine driven AFW flow path).” Each steam generator has an auxiliary feedwater (AFW) flow path from one motor driven AFW pump and from the turbine driven AFW pump. Attachment 2 illustrates the AFW flow paths and the associated level control valves.** **Attachment 1 provides the markups for CTS Table 3.3-10 (pages 684 – 688 and 694 – 698 of Enclosure 2, Volume 8), ISTS Table 3.3.3-1 (pages 719 – 721 and 727 – 729) and the changes to DOCs A03, A04, and A06 (pages 703-706).**
Response Date/Time	**6/30/2014 1:15 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/30/2014 12:14 PM**
Date Modified	
Modified By	

ITS A01 ITS 3.3.3

Table 3.3.3-1

TABLE 3.3-10

ITS ACTION

ACCIDENT MONITORING INSTRUMENTATION

LA03 LA04

ITS	INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION	ITS ACTION
1	1. Reactor Coolant T_{HOT} (Wide Range) ~~(Instrument Loops 68-001, -024, -043, -065)~~	~~4(1/RCS Loop)~~	4~~(1/RCS Loop)~~	1	A, B, C, and H
2	2. Reactor Coolant T_{COLD} (Wide Range) ~~(Instrument Loops 68-018, -041, -060, -083)~~	~~4(1/RCS Loop)~~	4~~(1/RCS Loop)~~	1	A, B, C, and H
3	3. Containment Pressure (Wide Range) ~~(Instrument Loops 30-310, -311)~~	~~2~~	2	1	A, B, C, and H
4	4. Containment Pressure (Narrow Range) ~~(Instrument Loops 30-044, -045)~~	~~2~~	2	1	A, B, C, and H
5	5. Refueling Water Storage Tank Level ~~(Instrument Loops 63-050, -051)~~	~~2~~	2	1	A, B, C, and H
6	6. Reactor Coolant Pressure (Wide Range) ~~(Instrument Loops 68-062, -066, -069)~~	~~3~~	3	2	A, B, C, D, and H
7	7. Pressurizer Level (Wide Range) ~~(Instrument Loops 68-320, -335, -339)~~	~~3~~	3	2	A, B, C, D, and H
8	8. Steam Line Pressure ~~(Instrument Loops 1-002A, -002B, -009A, -009B, -020A, -020B, -027A, -027B)~~	~~2/steam line~~	2/steam line	1	A, B, C, and H
9	9. Steam Generator Level - (Wide Range) ~~(Instrument Loops 3-043, -056, -098, -111)~~	~~4(1/steam generator)~~	4~~(1/steam generator)~~	1	A, B, C, and H
10	10. Steam Generator Level - (Narrow Range) ~~(Instrument Loops 3-039, -042, -052, -055, -094, -097, -107, -110)~~	~~2/steam generator~~	2/steam generator	1	A, B, C, and H
11	11. Auxiliary Feedwater				
	a. Flow Rate ~~(Instrument Loops 3-163, -155, -147, -170)~~	~~1/steam generator~~	1/steam generator	5	A, B, E, and H
	b. Valve Position Indication ~~(Instrument Loops 3-164, -164A, -172, -156, -156A, -173, -148, -148A, -174, -171, -171A, -175)~~	~~3/steam generator~~	1 ~~3~~/steam generator (a)	5	A, B, E, and H

LA04 A03 LA05

Add proposed Table 3.3.3-1 Footnote (a) A03

ITS A01 ITS 3.3.3

Table 3.3.3-1

TABLE 3.3-10 (Continued)

ITS ACTION

ACCIDENT MONITORING INSTRUMENTATION

LA03

	INSTRUMENT	~~TOTAL NO OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION	ITS ACTION
12	12. Reactor Coolant System Subcooling Margin Monitor ~~(Instrument Loops 94-101, -102)~~	~~2~~	2	1	A, B, C, and H
13	13. Containment Water Level (Wide Range) ~~(Instrument Loops 63-178, -179)~~	~~2~~	2	1	A, B, C, and H
14	14. Incore Thermocouples	~~65~~			
	a. Core Quadrant (1)		2~~(1/Train)~~	1	A, B, C, and H
	b. Core Quadrant (2)		2~~(1/Train)~~	1	A, B, C, and H
	c. Core Quadrant (3)		2~~(1/Train)~~	1	A, B, C, and H
	d. Core Quadrant (4)		2~~(1/Train)~~	1	A, B, C, and H
15	15. Reactor Vessel Level Instrumentation	~~6~~			
	a. Dynamic Range ~~(Instrument Loops 68-367, 370)~~		2	1	A, B, C, and H
	b. Lower Range ~~(Instrument Loops 68-368, 371)~~		2	1	A, B, C, and H
	c. Upper Range ~~(Instrument Loops 68-369, 372)~~		2	1	A, B, C, and H
16	16. Containment Area Radiation Monitors				
	a. Upper Compartment ~~(Instrument Loops 90-271, -272)~~	~~2~~	1	4	F and I
	b. Lower Compartment ~~(Instrument Loops 90-273, -274)~~	~~2~~	1	4	F and I

LA04

(b) ~~(c)~~ A04

LA05

(b)

Add proposed Table 3.3.3-1 Footnote ~~(c)~~ A04

ITS A01 ITS 3.3.3

Table 3.3.3-1 TABLE 3.3-10 (Continued) ITS ACTION

ACCIDENT MONITORING INSTRUMENTATION

LA03

INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION
17 17. Neutron Flux			
a. Source Range ~~(Instrument Loops 92-5001, -5002)~~	~~2~~	2#	1 A, B, C, and H
b. Intermediate Range ~~(Instrument Loops 92-5003, -5004)~~	~~2~~	2	1 A, B, C, and H
18 18. ERCW to AFW Valve Position			
a. Motor Driven Pumps ~~(Instrument Loops 3-116A, -116B, -126A, -126B)~~	~~1/Train/Pump (2 Valves/Train)~~	2 ~~1/Train/Pump (2 Valves/Train)~~	1 A, B, C, and H
b. Turbine Driven Pumps ~~(Instrument Loops 3-136A, -136B, -179A, -179B)~~	~~2 Trains (2 Valves/Train)~~	2 ~~2 Trains (2 Valves/Train)~~ (f) ~~(b)~~	1 A, B, C, and H
19 19. Containment Isolation Valve Position ~~(Panels TR-A XX-55-6K & TR-B XX-55-6L)~~	~~1/Valve~~	~~1/Valve~~## 2 per penetration flow path	3 A, C, and H

A05 LA04 A06 A06 LA05

Table 3.3.3-1 Footnote ~~(d)~~ (c)

#Source Range outputs may be disabled above the P-6 (Block of Source Range Reactor Trip) setpoint.

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

Table 3.3.3-1 Footnote ~~(a)~~ (e) L03

(f) ~~(b)~~ Only one position indication channel is required for penetration flow paths with only one installed control room indication channel. A06

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ITS A01 ITS 3.3.3

TABLE 3.3-10 (Continued)

ACTION STATEMENTS

ACTION 1 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from Tables 3.3-1 and 3.3-3, and LCO 3.3.3.5 since they may contain more restrictive actions.~~ A07

ACTION A a. With the number of channels one less than the minimum channels required, restore the inoperable channel to OPERABLE status within 30 days or ~~be in at~~
ACTION B ~~least HOT STANDBY within the next 6 hours, and in HOT SHUTDOWN within the next 6 hours.~~ Initiate action in accordance with Specification 5.6.5 L01

ACTION C b. With the number of channels two less than the minimum channels required, restore at least one inoperable channel to OPERABLE status within 7 days, or
ACTION H be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION 2 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from Tables 3.3-1 since it may contain more restrictive actions.~~ A07

ACTION A a. With the number of channels one less than the minimum channels required, restore the inoperable channel to OPERABLE status within 30 days or ~~be in at~~
ACTION B ~~least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.~~ Initiate action in accordance with Specification 5.6.5 L01

ACTION C b. With the number of channels two less than the minimum channels required, restore at least one inoperable channel to OPERABLE status within 7 days or
ACTION H be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION D c. With the number of channels three less than the minimum channels required, restore one channel to OPERABLE status within 48 hours or
ACTION H be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

A07

ACTION 3 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from LCO 3.6.3 since it may contain more restrictive actions.~~

A06

ACTION A ### a. With the accident monitoring indication for one of the penetration ~~inboard or outboard~~ valve~~(s)~~ inoperable, restore the inoperable valve(s) accident indication to OPERABLE status within 30 days,
Table 3.3.3-1 (e) Footnote ~~(a)~~ or isolate each affected penetration within 30 days by use of at least one deactivated automatic valve secured in the isolated position, or isolate each

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ITS A01 ITS 3.3.3

TABLE 3.3-10 (Continued)

ACTION STATEMENTS
(Continued)

Initiate action in accordance with Specification 5.6.5 L01

Table 3.3.3-1 (e) Footnote ~~(a)~~
ACTION B

affected penetration within 30 days by use of at least one closed manual valve or blind flange, ~~or be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the next 6 hours~~.

ACTION C

b. With the accident monitoring indication for two ~~both an inboard and outboard~~ valve~~(s)~~ on the same penetration inoperable, restore at least the inboard or outboard inoperable valve(s) indication to OPERABLE status within 7 days, or isolate each affected penetration within 7 days by use of at least one deactivated automatic valve secured in the isolated position, or isolate each affected penetration within 7 days by use of at least one closed manual valve or blind flange, or be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the next 6 hours. A06

Table 3.3.3-1 (e) Footnote ~~(a)~~
ACTION H

Table 3.3.3-1 (f) Footnote ~~(b)~~

~~On a penetration where accident indication is declared INOPERABLE on a valve but on the opposite side of the penetration an accident indication valve does not exist (such as with a closed system or a check valve), only ACTION 3(a) must be entered.~~ ~~However, valves FCV-63-158 & -172 are both inboard penetration valves, but if both valves have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's accident indication is restored to OPERABLE status. Valves FCV-30-46 & VLV-30-571, FCV-30-47 & VLV-30-572, and FCV-30-48 & VLV-30-573 are all outboard penetration valves, but if both valves have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's accident indication is restored to OPERABLE status.~~

A06
LA06

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ITS

Table 3.3.3-1

A01

ITS 3.3.3

ITS ACTION

TABLE 3.3-10

ACCIDENT MONITORING INSTRUMENTATION

LA03

LA04

	INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION	ITS ACTION
1	1. Reactor Coolant T_{HOT} (Wide Range) ~~(Instrument Loops 68-001,-024,-043,-065)~~	~~4(1/RCS Loop)~~	4~~(1/RCS Loop)~~	1	A, B, C, and H
2	2. Reactor Coolant T_{COLD} (Wide Range) ~~(Instrument Loops 68-018,-041,-060,-083)~~	~~4(1/RCS Loop)~~	4~~(1/RCS Loop)~~	1	A, B, C, and H
3	3. Containment Pressure (Wide Range) ~~(Instrument Loops 30-310,-311)~~	~~2~~	2	1	A, B, C, and H
4	4. Containment Pressure (Narrow Range) ~~(Instrument Loops 30-044,-045)~~	~~2~~	2	1	A, B, C, and H
5	5. Refueling Water Storage Tank Level ~~(Instrument Loops 63-050,-051)~~	~~2~~	2	1	A, B, C, and H
6	6. Reactor Coolant Pressure (Wide Range) ~~(Instrument Loops 68-062,-066,-069)~~	~~3~~	3	2	A, B, C, D, and H
7	7. Pressurizer Level (Wide Range) ~~(Instrument Loops 68-320,-335,-339)~~	~~3~~	3	2	A, B, C, D, and H
8	8. Steam Line Pressure ~~(Instrument Loops 1-002A,-002B,-009A,-009B, -020A,-020B,-027A,-027B)~~	~~2/steam line~~	2/steam line	1	A, B, C, and H
9	9. Steam Generator Level - (Wide Range) ~~(Instrument Loops 3-043,-056,-098,-111)~~	~~4(1/steam generator)~~	4~~(1/steam generator)~~	1	A, B, C, and H
10	10. Steam Generator Level - (Narrow Range) ~~(Instrument Loops 3-039,-042,-052,-055,-094, -097,-107,-110)~~	~~2/steam generator~~	2/steam generator	1	A, B, C, and H
11	11. Auxiliary Feedwater				
	a. Flow Rate ~~(Instrument Loops 3-163,-155, -147,-170)~~	~~1/steam generator~~	1/steam generator	5	A, B, E, and H
	b. Valve Position Indication ~~(Instrument Loops 3-164,-164A,-172,-156,-156A,-173,-148,-148A,-174,-171, -171A,-175)~~	~~3/steam generator~~	1 ~~3~~/steam generator (a)	5	A, B, E, and H

LA04

A03

LA05

Add proposed Table 3.3.3-1 Footnote (a) A03

ITS | A01 | ITS 3.3.3

Table 3.3.3-1 | ITS ACTION

TABLE 3.3-10 (Continued)

ACCIDENT MONITORING INSTRUMENTATION

LA03

ITS	INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION	ITS ACTION
12	12. Reactor Coolant System Subcooling Margin Monitor ~~(Instrument Loops 94-101, 102)~~	~~2~~	2	1	A, B, C, and H
13	13. Containment Water Level (Wide Range) ~~(Instrument Loops 63-178, 179)~~	~~2~~	2	1	A, B, C, and H
14	14. Incore Thermocouples	~~65~~			
	a. Core Quadrant (1)		2~~(1/Train)~~	1	A, B, C, and H
	b. Core Quadrant (2)		2~~(1/Train)~~	1	A, B, C, and H
	c. Core Quadrant (3)		2~~(1/Train)~~	1	A, B, C, and H
	d. Core Quadrant (4)		2~~(1/Train)~~	1	A, B, C, and H
15	15. Reactor Vessel Level Instrumentation System	~~6~~			
	a. Dynamic Range ~~(Instrument Loops 68- 367, 370)~~		2	1	A, B, C, and H
	b. Lower Range ~~(Instrument Loops 68-368, 371)~~		2	1	A, B, C, and H
	c. Upper Range ~~(Instrument Loops 68-369, 372)~~		2	1	A, B, C, and H
16	16. Containment Area Radiation Monitors				
	a. Upper Compartment ~~(Instrument Loops 90-271, 272)~~	~~2~~	1	4	F and I
	b. Lower Compartment ~~(Instrument Loops 90-273, 274)~~	~~2~~	1	4	F and I

LA04

(b) ~~(c)~~ A04

LA05

(b)

Add proposed Table 3.3.3-1 Footnote ~~(c)~~ A04

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ITS (A01) ITS 3.3.3

Table 3.3.3-1 ITS ACTION

TABLE 3.3-10 (Continued)

ACCIDENT MONITORING INSTRUMENTATION

INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION
17 17. Neutron Flux			
a. Source Range ~~(Instrument Loops 92-5001, -5002)~~	~~2~~	2#	1 A, B, C, and H
b. Intermediate Range ~~(Instrument Loops 92-5003, -5004)~~	~~2~~	2	1 A, B, C, and H
18 18. ERCW to AFW Valve Position			
a) Motor Driven Pumps ~~(Instrument Loops 3-116A, -116B, -126A, -126B)~~	~~1/Train/Pump (2 Valves/Train)~~	2 ~~1/Train/Pump (2 Valves/Train)~~	1 A, B, C, and H
b) Turbine Driven Pumps ~~(Instrument Loops 3-136A, -136B, -179A, -179B)~~	~~2 Trains (2 Valves/Train)~~	2 ~~2 Trains (2 Valves/Train)~~	1 A, B, C, and H
19 19. Containment Isolation Valve Position ~~(Panels TR-A XX-55-6K & TR-B XX-55-6L)~~	~~1/Valve~~	~~(b)~~ (f) ~~1/Valve~~## 2 per penetration flow path	3 A, C, and H

LA03 A05 LA04 A06 A06 LA05

Table 3.3.3- Footnote ~~(d)~~ (c) # Source Range outputs may be disabled above the P-6 (Block of Source Range Reactor Trip) setpoint.

Table 3.3.3- Footnote ~~(a)~~ (e) ## Not required for isolation valves ~~that are~~ whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. (L03)

~~(b)~~ (f) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel. (A06)

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ITS A01 ITS 3.3.3

TABLE 3.3-10 (Continued)

ACTION STATEMENTS

ACTION 1 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from Tables 3.3-1 and 3.3-3, and LCO 3.3.3.5 since they may contain more restrictive actions.~~ A07

ACTION A a. With the number of channels one less than the minimum channels required, restore the inoperable channel to OPERABLE status within 30 days or ~~be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours~~ Initiate action in accordance with Specification 5.6.5. L01

ACTION B

ACTION C b. With the number of channels two less than the minimum channels required, restore at least one inoperable channel to OPERABLE status within 7 days or be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION H

ACTION 2 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from Tables 3.3-1 since it may contain more restrictive actions.~~ A07

ACTION A a. With the number of channels one less than the minimum channels required, restore the inoperable channel to OPERABLE status within 30 days or ~~be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours~~ Initiate action in accordance with Specification 5.6.5. L01

ACTION B

ACTION C b. With the number of channels two less than the minimum channels required, restore at least one inoperable channel to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION H

ACTION D c. With the number of channels three less than the minimum channels required, restore one channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION H

ACTION 3 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from LCO 3.6.3 since it may contain more restrictive actions.~~ A07

A06

ACTION A ### a. With the accident monitoring indication for one of the penetration ~~inboard or outboard~~ valve~~(s)~~ inoperable, restore the inoperable valve(s) accident indication to OPERABLE status within 30 days, or isolate each affected penetration within 30 days by use of at least one deactivated automatic valve secured in the isolated position, or isolate each

Table 3.3-(e) Footnote ~~(a)~~

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ITS | A01 | ITS 3.3.3

TABLE 3.3-10 (Continued)

ACTION STATEMENTS

(Continued)

Initiate action in accordance with Specification 5.6.5 | L01

Table 3.3.3-1 Footnote ~~(a)~~ (e) | ACTION B

affected penetration within 30 days by use of at least one closed manual valve or blind flange, or ~~be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the next 6 hours~~.

ACTION C

b. With the accident monitoring indication for ~~both an inboard and outboard~~ two valve~~(s)~~ on the same penetration inoperable, restore at least the inboard or outboard inoperable valve(s) indication to OPERABLE status within 7 days, or isolate each affected penetration within 7 days by use of at least one deactivated automatic valve secured in the isolated position, or isolate each affected penetration within 7 days by use of at least one closed manual valve or blind flange, or be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the next 6 hours.

A06

Table 3.3.3-1 Footnote ~~(a)~~ (e) | ACTION H

Table 3.3.3- Footnote ~~(b)~~ (f)

~~On a penetration where accident indication is declared INOPERABLE on a valve but on the opposite side of the penetration an accident indication valve does not exist (such as with a closed system or a check valve), only ACTION 3(a) must be entered.~~ ~~However, valves FCV-63-158 & -172 are both inboard penetration valves, but if both valves have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's accident indication is restored to OPERABLE status. Valves FCV-30-46 & VLV-30-571, FCV-30-47 & VLV-30-572, and FCV-30-48 & VLV-30-573 are all outboard penetration valves, but if both valves have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's accident indication is restored to OPERABLE status.~~

A06 | LA06

DISCUSSION OF CHANGES
ITS 3.3.3, POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1431, Rev. 4.0, "Standard Technical Specifications-Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

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

A02 CTS 3.3.3.7 ACTIONS, as shown in CTS Table 3.3-10, provide the compensatory actions to take when PAM instrumentation is inoperable. ITS 3.3.3 ACTIONS provide the compensatory actions for inoperable PAM Instrumentation. The ITS 3.3.3 ACTIONS include a Note that allows separate Condition entry for each Function. In addition, separate Condition entry is allowed within a Function on a "per" bases as listed for Functions 8 (Steam Line Pressure (per steam line)), 10 (Steam Generator Level (Narrow Range) (per steam generator)) 11 (Auxiliary Feedwater (per steam generator)), and 19 (Containment Isolation Valve Position (per penetration flowpath)). This modifies the CTS by providing a specific allowance to enter the Action for each inoperable PAM instrumentation Function and for certain Functions on a "per" steam line, steam generator, or penetration flowpath basis.

and is modified by Footnote (a). Footnote (a) states, "A channel consists of three valve position indicators (two level control valves for the motor driven AFW flow path and one level control valve for the turbine driven AFW flow path).

This change is acceptable because it clearly states the current requirement. The CTS considers each PAM instrumentation Function to be separate and independent from the others. In addition, the channels associated with Functions 8, 10, 11, and 19 are allowed separate Condition entry on a steam line, steam generator, or penetration flowpath basis, which is consistent with the intent of the CTS. This change is designated as administrative because it does not result in technical changes to the CTS.

A03 CTS Table 3.3-10 Instrument 11.b (Auxiliary Feedwater (Valve Position Indication)) "Minimum Channels Required" column states that the minimum channels required is 3/steam generator. ITS Table 3.3.3-1 Function 11.b (Auxiliary Feedwater (Valve Position Indication)) "Required Channels" column requires one channel per steam generator ~~(consisting of 3 valve position indications)~~. This changes the CTS by simplifying the presentation of the requirements for Auxiliary Feedwater (Valve Position Indication) instrumentation by requiring one channel per steam generator.

and explicitly stating the number of valve position indicators included in a channel

The purpose of CTS Table 3.3-10 "Minimum Channels Required" column is to list the number of channels required to be OPERABLE for the associated instrument per steam generator. CTS Table 3.3-10 "Minimum Required Channels" column lists "3/steam generator" as the minimum required channels for Instrument 11.b (Auxiliary Feedwater (Valve Position Indication)). At SQN a channel consists of three valves per steam generator, two from the motor driven auxiliary feedwater pump and one from the turbine driven auxiliary feedwater pump. Therefore, to fulfill the "Minimum Required Channels" requirement for Instrument 11.b

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DISCUSSION OF CHANGES
ITS 3.3.3, POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

requiring one channel per steam generator, all three valves position indication must be OPERABLE. This change is acceptable because the requirements contained in ITS are the same as in CTS when a required auxiliary feedwater valve position indicator is inoperable. This change is designated as administrative because it does not result in technical changes to the CTS.

A04 CTS Table 3.3-10 Instrument 14 (Incore Thermocouples) "Minimum Channels Required" column states, in part, that the minimum channels required is 2 (1 per train) in each of the four core quadrants. ITS Table 3.3.3-1 Function 14 (Incore Thermocouples) "Required Channel" column also requires two channels in each of the four core quadrants and is modified by Footnote ~~(c)~~ (b). ITS Table 3.3.3-1 Footnote ~~(c)~~ (b) states, "A channel consists of one incore thermocouple. The required channels in each quadrant shall be in different trains." This changes the CTS by explicitly stating the number of incore thermocouples included in a channel.

The purpose of CTS Table 3.3-10 "Minimum Channels Required" column is to list the number of channels required to be OPERABLE for the associated instrument. CTS Table 3.3-10 "Minimum Required Channels" column lists "2(1/train)" as the minimum required channels for Instrument 14 (Incore Thermocouples) in each core quadrant. At SQN a channel consists of one incore thermocouple, therefore to fulfill the "Minimum Required Channels" requirement for Instrument 14 requires two incore thermocouples in each core quadrant, one from each train, to be OPERABLE. ITS Table 3.3.3-1 "Required Channel" column for Function 14 (Incore Thermocouples) requires two channels to be OPERABLE in each of the four core quadrants and is modified by Footnote ~~(c)~~ (b). ITS Table 3.3.3-1 Footnote ~~(c)~~ (b) states that a channel consists of one incore thermocouple from different trains. The addition of Footnote ~~(c)~~ (b) explicitly states the channel requirement of CTS. This change is designated as administrative because it does not result in technical changes to the CTS.

A05 CTS Table 3.3-10 Instrument 18.a (ERCW to AFW Valve Position (Motor Driven Pumps)), "Minimum Channels Required" column states, in part, that the minimum channels required are 1/Train/Pump (2 Valves/Train). ITS Table 3.3.3-1 Function 18.a (ERCW to AFW Valve Position (Motor Driven Pumps)), "Required Channel" column requires 2 channels. CTS Table 3.3-10 Instrument 18.b (ERCW to AFW Valve Position (Turbine Driven Pump)), "Minimum Channels Required" column states that the minimum channels required are 2 Trains (2 Valves/Train). ITS Table 3.3.3-1 Function 18.b (ERCW to AFW Valve Position (Turbine Driven Pump)), "Required Channel" column requires 2 channels. This changes the CTS by simplifying the presentation of the channel requirements for ERCW to AFW Valve Position for the Motor Driven Pumps and the Turbine Driven Pump.

The purpose of CTS Table 3.3-10 "Minimum Channels Required" column is to designate the number of channels required to be OPERABLE for the associated instrument. CTS Table 3.3-10 "Minimum Required Channels" column lists "1/Train/Pump (2 Valves/Train)" as the minimum required channels for Instrument 18.a (ERCW to AFW Valve Position (Motor Driven Pumps,)). At SQN there are two motor driven auxiliary feedwater pumps. Each motor driven pump has two valves in series between the AFW pump and the ERCW supply. CTS Table 3.3-10 lists them as 3-116A and 3-116B, which are in the ERCW supply

DISCUSSION OF CHANGES
ITS 3.3.3, POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

line to the 1A-A AFW Pump, and 3-126A and 3-126B, which are in the ERCW supply line to the 1B-B AFW pump. The ITS Bases defines a channel as consisting of these two valves in series in the ERCW to AFW flow path for each motor driven pump, therefore 2 channels are required. CTS Table 3.3-10 "Minimum Required Channels" column lists "2 Trains (2 Valves/Train)" as the minimum required channels for Instrument 18.b (ERCW to AFW Valve Position (Turbine Driven Pump,)). At SQN there is one turbine driven auxiliary feedwater pump. The turbine driven pump has two supply lines from ERCW, one from each train with two valves in series between the AFW pump and the ERCW supply. CTS Table 3.3-10 lists them as 3-136A and 3-136B, which are in the ERCW supply line from the 1A ERCW header to the turbine driven AFW Pump, and 3-179A and 3-179B, which are in the ERCW supply line from the 1B ERCW header to the turbine driven AFW pump. The ITS Bases defines a channel as two valves in series for each ERCW supply line to the turbine driven AFW pump, therefore 2 channels are required. This change is acceptable because the requirements contained in ITS are the same as in CTS when an ERCW to AFW Valve Position channel is inoperable. This change is designated as administrative because it does not result in technical changes to the CTS.

A06 CTS Table 3.3-10 Instrument 19 (Containment Isolation Valve Position) "Minimum Channels Required" column requires one valve position indication channel OPERABLE per valve and lists ACTION 3 as the ACTION to follow if one channel per valve is inoperable. CTS Table 3.3-10 ACTION 3.a provides the required ACTIONS for one of the penetration inboard or outboard valve(s) inoperable (i.e., one channel inoperable per penetration) one part of which is restoring the inoperable valve(s) accident indication to OPERABLE status within 30 days. CTS Table 3.3-10 ACTION 3.b provides the required ACTIONS for both an inboard and outboard valve(s) on the same penetration inoperable (i.e., two channels inoperable per penetration) one part of which is restoring at least the inboard or outboard inoperable valve(s) indication to OPERABLE status within 7 days. ITS LCO 3.3.3 ACTION A, applicable to Function 19 (Containment Isolation Valve Position), states that with one or more Functions with one required channel inoperable restore required channel to OPERABLE status within 30 days. ITS LCO 3.3.3 ACTION C, applicable to Function 19 (Containment Isolation Valve Position), states that with one or more Functions with two required channels inoperable to restore one channel to OPERABLE status within 7 days. CTS Table 3.3-10 Note ### states, in part, that on a penetration where accident indication is declared inoperable on a valve but on the opposite side of the penetration an accident indication valve does not exist (such as with a closed system or a check valve), only ACTION 3(a) must be entered. ITS Table 3.3.3-1 Function 19 (Containment Isolation Valve Position) "Required Channels" column requires two channels to be OPERABLE per penetration and is modified by Footnote ~~(b)~~ (f) which states that only one position indication channel is required for penetration flow paths with only one installed control room indication channel. CTS Table 3.3-10 ACTION 3.a references an inboard or outboard valve. CTS Table 3.3-10 ACTION 3.b references both an inboard and outboard valve(s). CTS Table 3.3-10 Note ###, in part, references penetrations whose valves are either both inboard (FCV 63-158 and FCV 63-172) or both outboard (FCV 30-46 and VLV 30-571, FCV 30-47 and VLV 30-572, FCV 30-48 and VLV 30-573) and states that if both valves (two) have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's

DISCUSSION OF CHANGES
ITS 3.3.3, POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

accident indication is restored to OPERABLE status. ITS LCO 3.3.3 ACTION C, applicable to Function 19 (Containment Isolation Valve Position), states that with one or more Functions with two required channels inoperable to restore one channel to OPERABLE status within 7 days, similar to CTS Table 3.3-10 ACTION 3.b. This changes the CTS by simplifying the presentation of the requirements for Containment Isolation Valve Position instrumentation by requiring two channels per penetration, except where ITS Table 3.3.3-1 Footnote ~~(b)~~ (f) is applicable for those penetration flow paths with only one installed control room indication channel, and eliminating reference to inboard and outboard valve combinations.

The purpose of CTS Table 3.3-10 is to provide requirements for Post-Accident Monitoring instruments. One of these instruments is Containment Isolation Valve Position. CTS requires one position indication channel per valve to be OPERABLE where normally there are two valves per penetration. Similarly, ITS requires two channels per penetration. CTS Note ###, in part, states that on a penetration where accident indication is declared INOPERABLE on a valve but on the opposite side of the penetration an accident indication valve does not exist (such as with a closed system or a check valve), only ACTION 3(a) must be entered. ITS Table 3.3.3-1 Footnote ~~(b)~~ (f) similarly states that only one position indication channel is required for penetration flow paths with only one installed control room indication channel. CTS Table 3.3-10 Note ###, in part, requires entry into ACTION 3.b when two required valve position indicators per penetration are inoperable because ACTION 3.b entry condition is when both an inboard and outboard valve(s) on the same penetration inoperable (i.e., two position indicator per penetration). ITS LCO 3.3.3 ACTION C condition entry is when one or more Functions have two required channels inoperable, similar to CTS. This change is acceptable because the requirements contained in ITS are the same as in CTS when Containment Isolation Valve Position channel are inoperable for penetrations with two isolation valves per penetration and penetrations with one isolation valve per penetration. This change is designated as administrative because it does not result in technical changes to the CTS.

A07 CTS Table 3.3-10 ACTION 1, ACTION 2, ACTION 3, and ACTION 5 contain a Note referring to applicable action requirements from reference LCOs that may contain more restrictive actions. ITS Table 3.3.3-1 does not retain this information. This changes the CTS by not including the information referring to other potentially applicable action requirements to the Bases.

The purpose of CTS Table 3.3-10 ACTION 1, ACTION 2, ACTION 3, and ACTION 5 Note is to reference potentially associated Technical Specifications. It is an ITS convention to not include these types of notes or cross-references. This change is designated as administrative change because it does not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

None

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CTS

Unit 1 ITS Table

PAM Instrumentation
3.3.3

Table 3.3-10

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

FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION ~~D~~G.1
~~1. Power Range Neutron Flux~~	~~2~~	~~E~~
INSERT 4		
~~2. Source Range Neutron Flux~~	~~2~~	~~E~~
~~3. Reactor Coolant System (RCS) Hot Leg Temperature~~	~~2 per loop~~	~~E~~
~~4. RCS Cold Leg Temperature~~	~~2 per loop~~	~~E~~
~~5. RCS Pressure (Wide Range)~~	~~2~~	~~E~~
~~6. Reactor Vessel Water Level~~	~~2~~	~~F~~
~~7. Containment Sump Water Level (Wide Range)~~	~~2~~	~~E~~
~~8. Containment Pressure (Wide Range)~~	~~2~~	~~E~~
~~9. Penetration Flow Path Containment Isolation Valve Position~~	~~2 per penetration flow path(a)(b)~~	~~E~~
~~10. Containment Area Radiation (High Range)~~	~~2~~	~~F~~
~~11. Pressurizer Level~~	~~2~~	~~E~~
~~12. Steam Generator Water Level (Wide Range)~~	~~2 per steam generator~~	~~E~~
~~13. Condensate Storage Tank Level~~	~~2~~	~~E~~
~~14. Core Exit Temperature - Quadrant [1]~~	~~2(c)~~	~~E~~
~~15. Core Exit Temperature - Quadrant [2]~~	~~2(c)~~	~~E~~
~~16. Core Exit Temperature - Quadrant [3]~~	~~2(c)~~	~~E~~
~~17. Core Exit Temperature - Quadrant [4]~~	~~2(c)~~	~~E~~
~~18. Auxiliary Feedwater Flow~~	~~2~~	~~E~~

1 1

Note ##
ACTION 3.a
ACTION 3.b

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

Note ###

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

DOC A03

~~(c)~~ b A channel consists of ~~two core exit~~ one incore thermocouple~~s (CETs)~~. The required channels in each quadrant shall be in different trains. 1

~~REVIEWER'S NOTE~~
~~Table 3.3.3-1 shall be amended for each unit as necessary to list:~~
~~1. All Regulatory Guide 1.97, Type A instruments and~~
~~2. All Regulatory Guide 1.97, Category I, non-Type A instruments in accordance with the unit's Regulatory Guide 1.97, Safety Evaluation Report.~~ 3

Note #

~~(d)~~ c Source Range outputs may be disabled above the P-6 (Block of Source Range Reactor Trip) setpoint. 1

(a) A channel consists of three valve position indicators (two level control valves for the motor driven AFW flow path and one level control valve for the turbine driven AFW flow path). XX 1

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CTS Insert 4 for Unit 1 ITS ITS 3.3.3

Table 3.3-10

1

INSERT 4

	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION G.1
1	1. Reactor Coolant T_{HOT} (Wide Range)	4	H
2	2. Reactor Coolant T_{COLD} (Wide Range)	4	H
3	3. Containment Pressure (Wide Range)	2	H
4	4. Containment Pressure (Narrow Range)	2	H
5	5. Refueling Water Storage Tank Level	2	H
6	6. Reactor Coolant Pressure (Wide Range)	3	H
7	7. Pressurizer Level (Wide Range)	3	H
8	8. Steam Line Pressure	2 per steam line	H
9	9. Steam Generator Level - (Wide Range)	4	H
10	10. Steam Generator Level - (Narrow Range)	2 per steam generator	H
11	11. Auxiliary Feedwater		
	a. Flow Rate	1 per steam generator	H
	b. Valve Position Indication	1 per steam generator (a)	H

CTS

ITS 3.3.3

Table 3.3-10

1

INSERT 4 continued

CTS	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION G.1
12	12. Reactor Coolant System Subcooling Margin Monitor	2	H
13	13. Containment Water Level (Wide Range)	2	H
14	14. Incore Thermocouples		
	a. Core Quadrant (1)	2~~(c)~~ (b)	H
	b. Core Quadrant (2)	2~~(c)~~ (b)	H
	c. Core Quadrant (3)	2~~(c)~~ (b)	H
	d. Core Quadrant (4)	2~~(c)~~ (b)	H
15	15. Reactor Vessel Level Instrumentation		
	a. Dynamic Range	2	H
	b. Lower Range	2	H
	c. Upper Range	2	H
16	16. Containment Area Radiation Monitors		
	a. Upper Compartment	1	I
	b. Lower Compartment	1	I
17	17. Neutron Flux		
	a. Source Range	2~~(d)~~ (c)	H
	b. Intermediate Range	2	H
18	18. ERCW to AFW Valve Position		
	a. Motor Driven Pumps	2	H
	b. Turbine Driven Pump	2	H
19	19. Containment Isolation Valve Position	2 per ~~penetration~~ flowpath~~(a)(b)~~ (e)(f)	H

ITS Insert Page 3.3.3-4b

CTS

Unit 2 ITS Table

PAM Instrumentation
3.3.3

Table 3.3-10

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

FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION ~~D~~.1 G	
~~1. Power Range Neutron Flux~~	~~2~~	~~E~~ INSERT 4	1
~~2. Source Range Neutron Flux~~	~~2~~	~~E~~	
~~3. Reactor Coolant System (RCS) Hot Leg Temperature~~	~~2 per loop~~	~~E~~	
~~4. RCS Cold Leg Temperature~~	~~2 per loop~~	~~E~~	
~~5. RCS Pressure (Wide Range)~~	~~2~~	~~E~~	
~~6. Reactor Vessel Water Level~~	~~2~~	~~F~~	
~~7. Containment Sump Water Level (Wide Range)~~	~~2~~	~~E~~	
~~8. Containment Pressure (Wide Range)~~	~~2~~	~~E~~	
~~9. Penetration Flow Path Containment Isolation Valve Position~~	~~2 per penetration flow path(a)(b)~~	~~E~~	1
~~10. Containment Area Radiation (High Range)~~	~~2~~	~~F~~	
~~11. Pressurizer Level~~	~~2~~	~~E~~	
~~12. Steam Generator Water Level (Wide Range)~~	~~2 per steam generator~~	~~E~~	
~~13. Condensate Storage Tank Level~~	~~2~~	~~E~~	
~~14. Core Exit Temperature - Quadrant [1]~~	~~2(c)~~	~~E~~	
~~15. Core Exit Temperature - Quadrant [2]~~	~~2(c)~~	~~E~~	
~~16. Core Exit Temperature - Quadrant [3]~~	~~2(c)~~	~~E~~	
~~17. Core Exit Temperature - Quadrant [4]~~	~~2(c)~~	~~E~~	
~~18. Auxiliary Feedwater Flow~~	~~2~~	~~E~~	

Note ##
ACTION 3.a
ACTION 3.b
~~(a)~~ e Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

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

DOC A03
~~(c)~~ b A channel consists of one incore ~~two core exit~~ thermocouple~~s (CETs)~~. The required channels in each quadrant shall be in different trains. 1

~~REVIEWER'S NOTE~~
~~Table 3.3.3-1 shall be amended for each unit as necessary to list:~~
~~1. All Regulatory Guide 1.97, Type A instruments and~~
~~2. All Regulatory Guide 1.97, Category I, non-Type A instruments in accordance with the unit's Regulatory Guide 1.97, Safety Evaluation Report.~~ 3

Note #
~~(d)~~ c Source Range outputs may be disabled above the P-6 (Block of Source Range Reactor Trip) setpoint. 1

(a) A channel consists of three valve position indicators (two level control valves for the motor driven AFW flow path and one level control valve for the turbine driven AFW flow path). XX 1

CTS Insert 4 for Unit 2 ITS ITS 3.3.3

Table 3.3-10

1

INSERT 4

		FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION G.1
1	1.	Reactor Coolant T_{HOT} (Wide Range)	4	H
2	2.	Reactor Coolant T_{COLD} (Wide Range)	4	H
3	3.	Containment Pressure (Wide Range)	2	H
4	4.	Containment Pressure (Narrow Range)	2	H
5	5.	Refueling Water Storage Tank Level	2	H
6	6.	Reactor Coolant Pressure (Wide Range)	3	H
7	7.	Pressurizer Level (Wide Range)	3	H
8	8.	Steam Line Pressure	2 per steam line	H
9	9.	Steam Generator Level - (Wide Range)	4	H
10	10.	Steam Generator Level - (Narrow Range)	2 per steam generator	H
11	11.	Auxiliary Feedwater		
		a. Flow Rate	1 per steam generator	H
		b. Valve Position Indication	1 per steam generator (a)	H

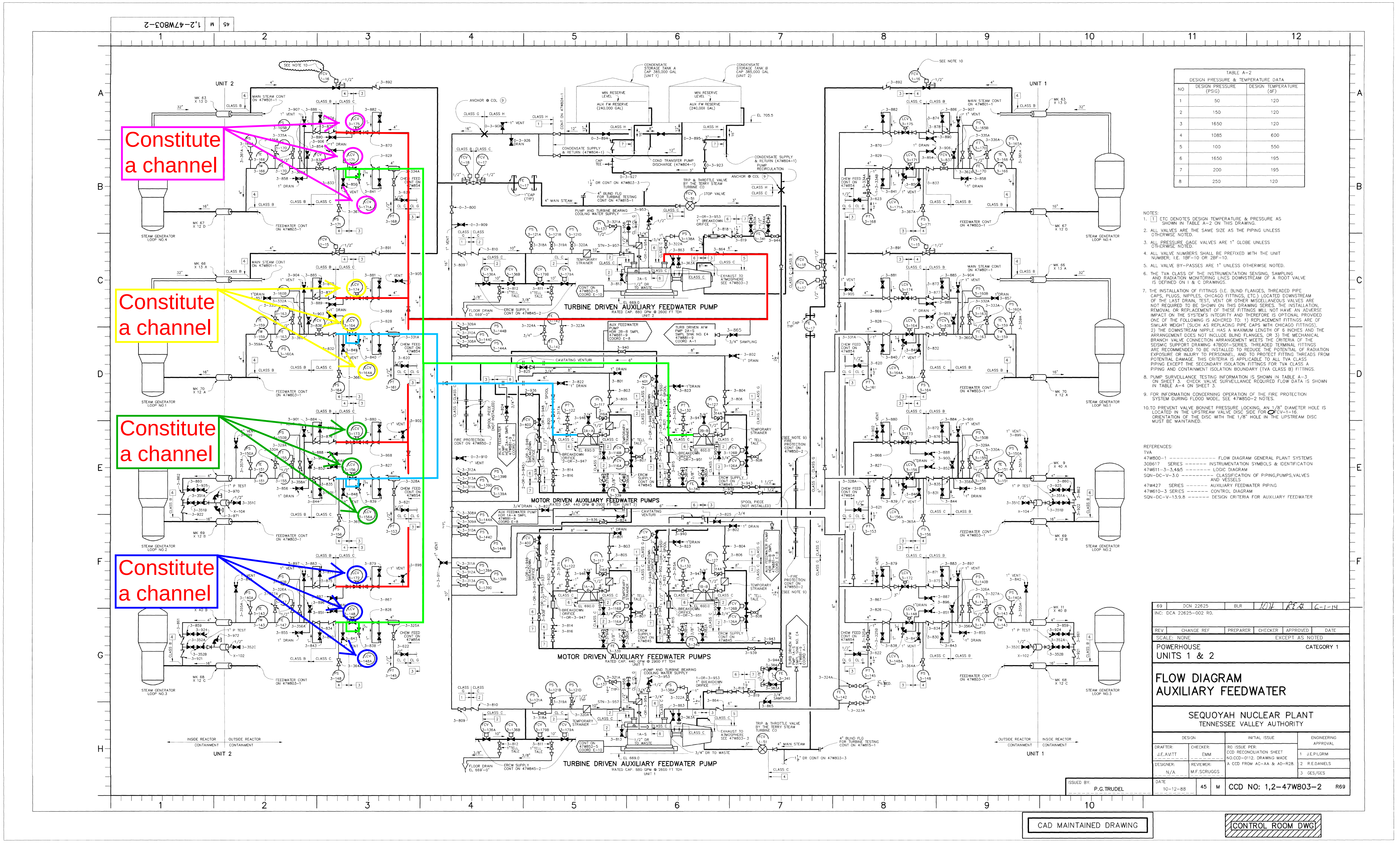
CTS ITS 3.3.3

Table 3.3-10

1

INSERT 4 continued

CTS	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION G.1
12	12. Reactor Coolant System Subcooling Margin Monitor	2	H
13	13. Containment Water Level (Wide Range)	2	H
14	14. Incore Thermocouples		
	a. Core Quadrant (1)	2~~(c)~~ (b)	H
	b. Core Quadrant (2)	2~~(c)~~ (b)	H
	c. Core Quadrant (3)	2~~(c)~~ (b)	H
	d. Core Quadrant (4)	2~~(c)~~ (b)	H
15	15. Reactor Vessel Level Instrumentation		
	a. Dynamic Range	2	H
	b. Lower Range	2	H
	c. Upper Range	2	H
16	16. Containment Area Radiation Monitors		
	a. Upper Compartment	1	I
	b. Lower Compartment	1	I
17	17. Neutron Flux		
	a. Source Range	2~~(d)~~ (c)	H
	b. Intermediate Range	2	H
18	18. ERCW to AFW Valve Position		
	a. Motor Driven Pumps	2	H
	b. Turbine Driven Pump	2	H
19	19. Containment Isolation Valve Position	2 per ~~penetration~~ flowpath~~(a)(b)~~ (e)(f)	H


Constitute a channel
Constitute a channel
Constitute a channel
Constitute a channel
UNIT 2
UNIT 1
TURBINE DRIVEN AUXILIARY FEEDWATER PUMP
MOTOR DRIVEN AUXILIARY FEEDWATER PUMPS
TABLE A-2
DESIGN PRESSURE & TEMPERATURE DATA
NO | DESIGN PRESSURE (PSIG) | DESIGN TEMPERATURE (ºF)
1 | 50 | 120
2 | 150 | 120
3 | 1650 | 120
4 | 1085 | 600
5 | 100 | 550
6 | 1650 | 195
7 | 200 | 195
8 | 250 | 120
NOTES:
1. [1] ETC DENOTES DESIGN TEMPERATURE & PRESSURE AS SHOWN IN TABLE A-2 ON THIS DRAWING.
2. ALL VALVES ARE THE SAME SIZE AS THE PIPING UNLESS OTHERWISE NOTED.
3. ALL PRESSURE GAGE VALVES ARE 1" GLOBE UNLESS OTHERWISE NOTED.
4. ALL VALVE NUMBERS SHALL BE PREFIXED WITH THE UNIT NUMBER; I.E. 1BF-10 OR 2BF-10.
5. ALL VALVE BY-PASSES ARE 1" UNLESS OTHERWISE NOTED.
6. THE TVA CLASS OF THE INSTRUMENTATION SENSING, SAMPLING AND RADIATION MONITORING LINES DOWNSTREAM OF A ROOT VALVE IS DEFINED ON I & C DRAWINGS.
7. THE INSTALLATION OF FITTINGS (I.E. BLIND FLANGES, THREADED PIPE CAPS, PLUGS, NIPPLES, CHICAGO FITTINGS, ETC.) LOCATED DOWNSTREAM OF THE LAST DRAIN, TEST, VENT OR OTHER MISCELLANEOUS VALVES ARE NOT REQUIRED TO BE SHOWN ON THIS DRAWING SERIES. THE INSTALLATION, REMOVAL OR REPLACEMENT OF THESE FITTINGS WILL NOT HAVE AN ADVERSE IMPACT ON THE SYSTEM'S INTEGRITY AND THEREFORE IS OPTIONAL PROVIDED ONE OF THE FOLLOWING IS ADHERED TO: 1) REPLACEMENT FITTINGS ARE OF SIMILAR WEIGHT (SUCH AS REPLACING PIPE CAPS WITH CHICAGO FITTINGS), 2) THE DOWNSTREAM NIPPLE HAS A MAXIMUM LENGTH OF 6 INCHES AND THE ARRANGEMENT DOES NOT INCLUDE BLIND FLANGES, OR 3) THE MECHANICAL BRANCH VALVE CONNECTION ARRANGEMENT MEETS THE CRITERIA OF THE SEISMIC SUPPORT DRAWING 47B001-SERIES. THREADED TERMINAL FITTINGS ARE RECOMMENDED TO BE INSTALLED TO REDUCE THE POTENTIAL OF RADIATION EXPOSURE OR INJURY TO PERSONNEL, AND TO PROTECT FITTING THREADS FROM POTENTIAL DAMAGE. THIS CRITERIA IS APPLICABLE TO ALL TVA CLASS PIPING EXCEPT THE SECONDARY ISOLATION FITTINGS FOR TVA CLASS A PIPING AND CONTAINMENT ISOLATION BOUNDARY (TVA CLASS B) FITTINGS.
8. PUMP SURVEILLANCE TESTING INFORMATION IS SHOWN IN TABLE A-3 ON SHEET 3. CHECK VALVE SURVEILLANCE REQUIRED FLOW DATA IS SHOWN IN TABLE A-4 ON SHEET 3.
9. FOR INFORMATION CONCERNING OPERATION OF THE FIRE PROTECTION SYSTEM DURING FLOOD MODE, SEE 47W850-2 NOTES.
10. TO PREVENT VALVE BONNET PRESSURE LOCKING, AN 1/8" DIAMETER HOLE IS LOCATED IN THE UPSTREAM VALVE DISC SIDE FOR FCV-1-16. ORIENTATION OF THE DISC WITH THE 1/8" HOLE IN THE UPSTREAM DISC MUST BE MAINTAINED.
REFERENCES:
TVA
47W800-1 -------------- FLOW DIAGRAM GENERAL PLANT SYSTEMS
30B617 SERIES ------ INSTRUMENTATION SYMBOLS & IDENTIFICATION
47W611-3-3,4&5 ------- LOGIC DIAGRAM
SQN-DC-V-3.0 ---------- CLASSIFICATION OF PIPING,PUMPS,VALVES AND VESSELS
47W427 SERIES ------- AUXILIARY FEEDWATER PIPING
47W610-3 SERIES ------- CONTROL DIAGRAM
SQN-DC-V-13.9.8 ------ DESIGN CRITERIA FOR AUXILIARY FEEDWATER
POWERHOUSE
UNITS 1 & 2
CATEGORY 1
FLOW DIAGRAM
AUXILIARY FEEDWATER
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
CCD NO: 1,2-47W803-2
R69
CAD MAINTAINED DRAWING
CONTROL ROOM DWG

Licensee Response/NRC Response/NRC Question Closure

Id	**168**
NRC Question Number	**KAB036**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**7/2/2014**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**7/2/2014 3:15 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**60**
NRC Question Number	**KAB037**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.3**
DOC Number	**A-4**
JFD Number	
JFD Bases Number	
Page Number(s)	**704**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 704 of Enclosure 2, Volume 8, A04 provides the discussion of the minimum channels required for CTS Table 3.3-10 Instrument 18, "ERCW to AFW Valve Position," which is 1/train/pump (2 valves/train) for the motor driven pumps and 2 trains (2 valves/train) for the turbine driven pump. ITS Table 3.3.3-1 function 18, "ERCW to AFW Valve Position," required channels is 2 for the motor driven pump and 2 for the turbine driven pump. A04 states, "This changes the CTS by simplifying the presentation of the channel requirements for ERCW to AFW Valve Position for the motor driven pumps and the turbine driven pump." The NRC staff does not agree that this change simplifies the presentation and does not result in technical changes. Please provide a correction to the required channels in ITS Table 3.3.3-1 for function 18, such that it matches the minimum channels required for CTS Table 3.3-10 Instrument 18 or provide a change equivalent to the CTS Table 3.3-10 Instrument 18 requirements such that it clearly describes that there is 1 required valve position indication per train per motor driven pump and 2 required valve position indication per train for each train of the turbine driven pump.**
Attach File 1	
Attach File 2	
Issue Date	**5/13/2014**
Added By	**Kristy Bucholtz**
Date Modified	

Modified By	
Date Added	**5/13/2014 12:04 PM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**162**
NRC Question Number	**KAB037**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 for KAB037 R2.pdf** (2MB)
Attachment 2	
Response Statement	**In response to KAB037, ITS Table 3.3.3-1, Post Accident Monitoring Instrumentation, will be modified to add a Footnote to Functions 18.a and 18.b. ITS Function 18.a, ERCW to AFW Valve Position for the Motor Driven Pumps, requires two OPERABLE channels. The footnote describes that a single channel consists of two valve position indicators associated with the in-series valves in a single suction line. ITS Function 18.b, ERCW to AFW Valve Position for the Turbine Driven Pump, requires two OPERABLE channels. The footnote describes that a single channel consists of two valve position indicators associated with the in-series valves in a single suction line. These footnotes are consistent with CTS requirements for each ERCW to AFW valve position.** **During the review for the response to KAB036, it was noted that the sequencing of the footnotes for ITS Table 3.3.3-1 is not in accordance with the Writer's Guide, TSTF-GG-05-0, the footnotes are not sequenced in the order in which they appear in the Table. Therefore, to correct this issue, CTS and ISTS markups will be revised to correct the sequence of footnotes, as well as, corresponding revisions to the discussion of changes (DOCs). Attachment 1 will include the changes associated with this RAI response, associated changes for footnote sequencing, and the changes associated with the response to RAI KAB036.** **Attachment 1 provides the markups for CTS Table 3.3-10 (pages 684 - 688 and 694 - 698 of Enclosure 2, Volume 8), ISTS Table 3.3.3-1 (pages 719 - 721 and 727 - 729), and changes to DOCs A03, A04, A05, and A06 (pages 703 - 706).**
Response Date/Time	**6/30/2014 1:20 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz**

	Michelle Conner **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/30/2014 12:16 PM**
Date Modified	
Modified By	

ITS

A01

ITS 3.3.3

Table 3.3.3-1

TABLE 3.3-10

ITS ACTION

ACCIDENT MONITORING INSTRUMENTATION

LA03

LA04

	INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION	ITS ACTION
1	1. Reactor Coolant T_{HOT} (Wide Range) ~~(Instrument Loops 68-001,-024,-043,-065)~~	~~4(1/RCS Loop)~~	4~~(1/RCS Loop)~~	1	A, B, C, and H
2	2. Reactor Coolant T_{COLD} (Wide Range) ~~(Instrument Loops 68-018,-041,-060,-083)~~	~~4(1/RCS Loop)~~	4~~(1/RCS Loop)~~	1	A, B, C, and H
3	3. Containment Pressure (Wide Range) ~~(Instrument Loops 30-310,-311)~~	~~2~~	2	1	A, B, C, and H
4	4. Containment Pressure (Narrow Range) ~~(Instrument Loops 30-044,-045)~~	~~2~~	2	1	A, B, C, and H
5	5. Refueling Water Storage Tank Level ~~(Instrument Loops 63-050,-051)~~	~~2~~	2	1	A, B, C, and H
6	6. Reactor Coolant Pressure (Wide Range) ~~(Instrument Loops 68-062,-066,-069)~~	~~3~~	3	2	A, B, C, D, and H
7	7. Pressurizer Level (Wide Range) ~~(Instrument Loops 68-320,-335,-339)~~	~~3~~	3	2	A, B, C, D, and H
8	8. Steam Line Pressure ~~(Instrument Loops 1-002A,-002B,-009A,-009B,-020A,-020B,-027A,-027B)~~	~~2/steam line~~	2/steam line	1	A, B, C, and H
9	9. Steam Generator Level - (Wide Range) ~~(Instrument Loops 3-043,-056,-098,-111)~~	~~4(1/steam generator)~~	4~~(1/steam generator)~~	1	A, B, C, and H
10	10. Steam Generator Level - (Narrow Range) ~~(Instrument Loops 3-039,-042,-052,-055,-094,-097,-107,-110)~~	~~2/steam generator~~	2/steam generator	1	A, B, C, and H
11	11. Auxiliary Feedwater				
	a. Flow Rate ~~(Instrument Loops 3-163,-155,-147,-170)~~	~~1/steam generator~~	1/steam generator	5	A, B, E, and H
	b. Valve Position Indication ~~(Instrument Loops 3-164,-164A,-172,-156,-156A,-173,-148,-148A,-174,-171,-171A,-175)~~	~~3/steam generator~~	~~3~~ 1/steam generator (a)	5	A, B, E, and H

LA04

A03

LA05

Add proposed Table 3.3.3-1 Footnote (a) A03

Enclosure 2, Volume 8, Rev. 0, Page 684 of 1148

ITS | A01 | ITS 3.3.3

Table 3.3.3-1

TABLE 3.3-10 (Continued) | ITS ACTION

ACCIDENT MONITORING INSTRUMENTATION

LA03

	INSTRUMENT	~~TOTAL NO OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION	ITS ACTION
12	12. Reactor Coolant System Subcooling Margin Monitor ~~(Instrument Loops 94-101, -102)~~	~~2~~	2	1	A, B, C, and H
13	13. Containment Water Level (Wide Range) ~~(Instrument Loops 63-178, -179)~~	~~2~~	2	1	A, B, C, and H
14	14. Incore Thermocouples	~~65~~			
	a. Core Quadrant (1)		2~~(1/Train)~~ (b)	1	A, B, C, and H
	b. Core Quadrant (2)		2~~(1/Train)~~ (b)	1	A, B, C, and H
	c. Core Quadrant (3)		2~~(1/Train)~~ (b)	1	A, B, C, and H
	d. Core Quadrant (4)		2~~(1/Train)~~ (b)	1	A, B, C, and H
15	15. Reactor Vessel Level Instrumentation	~~6~~			
	a. Dynamic Range ~~(Instrument Loops 68-367, 370)~~		2	1	A, B, C, and H
	b. Lower Range ~~(Instrument Loops 68-368, 371)~~		2	1	A, B, C, and H
	c. Upper Range ~~(Instrument Loops 68-369, 372)~~		2	1	A, B, C, and H
16	16. Containment Area Radiation Monitors				
	a. Upper Compartment ~~(Instrument Loops 90-271, -272)~~	~~2~~	1	4	F and I
	b. Lower Compartment ~~(Instrument Loops 90-273, -274)~~	~~2~~	1	4	F and I

LA04

~~(c)~~ (b) A04

LA05

Add proposed Table 3.3.3-1 Footnote ~~(c)~~ (b) A04

ITS | A01 | ITS 3.3.3

Table 3.3.3-1

TABLE 3.3-10 (Continued)

ITS ACTION

ACCIDENT MONITORING INSTRUMENTATION

LA03

INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION	ITS ACTION
17 17. Neutron Flux				
a. Source Range ~~(Instrument Loops 92-5001, -5002)~~	~~2~~	$2^{\#}$	1	A, B, C, and H
b. Intermediate Range ~~(Instrument Loops 92-5003, -5004)~~	~~2~~	2	1	A, B, C, and H
18 18. ERCW to AFW Valve Position				
a. Motor Driven Pumps ~~(Instrument Loops 3-116A, -116B, -126A, -126B)~~	~~1/Train/Pump (2 Valves/Train)~~	2 (d) ~~1/Train/Pump (2 Valves/Train)~~	1	A, B, C, and H
b. Turbine Driven Pumps ~~(Instrument Loops 3-136A, -136B, -179A, -179B)~~	~~2 Trains (2 Valves/Train)~~	2 (d) ~~2 Trains (2 Valves/Train)~~	1	A, B, C, and H
19 19. Containment Isolation Valve Position ~~(Panels TR-A XX-55-6K & TR-B XX-55-6L)~~	~~1/Valve~~	~~(b)~~ (f) 2 per penetration flow path ~~1/Valve~~##	3	A, C, and H

A05   LA04   A06   A06   LA05

Table 3.3.3-1 Footnote ~~(d)~~ (c)

#Source Range outputs may be disabled above the P-6 (Block of Source Range Reactor Trip) setpoint.

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

Table 3.3.3-1 Footnote ~~(a)~~ (e)   L03

(f) ~~(b)~~ Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.   A06

Add Note (d)

(d) A channel consists of two valve position indicators associated with the in-series valves in a single suction line.   A05

TABLE 3.3-10 (Continued)

ACTION STATEMENTS

ACTION 1 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from Tables 3.3-1 and 3.3-3, and LCO 3.3.3.5 since they may contain more restrictive actions.~~ A07

ACTION A a. With the number of channels one less than the minimum channels required, restore the inoperable channel to OPERABLE status within 30 days or ~~be in at least HOT STANDBY within the next 6 hours, and in HOT SHUTDOWN within the next 6 hours.~~ Initiate action in accordance with Specification 5.6.5 L01

ACTION B

ACTION C b. With the number of channels two less than the minimum channels required, restore at least one inoperable channel to OPERABLE status within 7 days, or

ACTION H be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION 2 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from Tables 3.3-1 since it may contain more restrictive actions.~~ A07

ACTION A a. With the number of channels one less than the minimum channels required, restore the inoperable channel to OPERABLE status within 30 days or ~~be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.~~ Initiate action in accordance with Specification 5.6.5 L01

ACTION B

ACTION C b. With the number of channels two less than the minimum channels required, restore at least one inoperable channel to OPERABLE status within 7 days or

ACTION H be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION D c. With the number of channels three less than the minimum channels required, restore one channel to OPERABLE status within 48 hours or

ACTION H be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

A07

ACTION 3 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from LCO 3.6.3 since it may contain more restrictive actions.~~

A06

ACTION A ### a. With the accident monitoring indication for one of the penetration ~~inboard or outboard~~ valve~~(s)~~ inoperable, restore the inoperable valve(s) accident indication to OPERABLE status within 30 days, or isolate each affected

Table 3.3.3-1 Footnote ~~(a)~~ (e) penetration within 30 days by use of at least one deactivated automatic valve secured in the isolated position, or isolate each

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ITS A01 ITS 3.3.3

TABLE 3.3-10 (Continued)

ACTION STATEMENTS
(Continued)

Initiate action in accordance with Specification 5.6.5 L01

Table 3.3.3-1 (e) Footnote ~~(a)~~
ACTION B

affected penetration within 30 days by use of at least one closed manual valve or blind flange, ~~or be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the next 6 hours~~.

two A06

ACTION C ### b. With the accident monitoring indication for ~~both an inboard and outboard~~ valve~~(s)~~ on the same penetration inoperable, restore at least the inboard or outboard inoperable valve(s) indication to OPERABLE status within 7 days, or isolate each affected penetration within 7 days by use of at least one deactivated automatic valve secured in the isolated position, or isolate each affected penetration within 7 days by use of at least one closed manual valve or blind flange, or be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the next 6 hours.

Table 3.3.3-1 (e) Footnote ~~(a)~~
ACTION H

Table 3.3.3-1 (f) Footnote ~~(b)~~ ### ~~On a penetration where accident indication is declared INOPERABLE on a valve but on the opposite side of the penetration an accident indication valve does not exist (such as with a closed system or a check valve), only ACTION 3(a) must be entered.~~ A06 ~~However, valves FCV-63-158 & -172 are both inboard penetration valves, but if both valves have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's accident indication is restored to OPERABLE status. Valves FCV-30-46 & VLV-30-571, FCV-30-47 & VLV-30-572, and FCV-30-48 & VLV-30-573 are all outboard penetration valves, but if both valves have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's accident indication is restored to OPERABLE status.~~ LA06

ITS

Table 3.3.3-1

A01

ITS 3.3.3

ITS ACTION

TABLE 3.3-10

ACCIDENT MONITORING INSTRUMENTATION

LA03

LA04

ITS	INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION	ITS ACTION
1	1. Reactor Coolant T_{HOT} (Wide Range) ~~(Instrument Loops 68-001, 024, 043, 065)~~	~~4(1/RCS Loop)~~	4~~(1/RCS Loop)~~	1	A, B, C, and H
2	2. Reactor Coolant T_{COLD} (Wide Range) ~~(Instrument Loops 68-018, 041, 060, 083)~~	~~4(1/RCS Loop)~~	4~~(1/RCS Loop)~~	1	A, B, C, and H
3	3. Containment Pressure (Wide Range) ~~(Instrument Loops 30-310, 311)~~	~~2~~	2	1	A, B, C, and H
4	4. Containment Pressure (Narrow Range) ~~(Instrument Loops 30-044, 045)~~	~~2~~	2	1	A, B, C, and H
5	5. Refueling Water Storage Tank Level ~~(Instrument Loops 63-050, 051)~~	~~2~~	2	1	A, B, C, and H
6	6. Reactor Coolant Pressure (Wide Range) ~~(Instrument Loops 68-062, 066, 069)~~	~~3~~	3	2	A, B, C, D, and H
7	7. Pressurizer Level (Wide Range) ~~(Instrument Loops 68-320, 335, 339)~~	~~3~~	3	2	A, B, C, D, and H
8	8. Steam Line Pressure ~~(Instrument Loops 1-002A, 002B, 009A, 009B, 020A, 020B, 027A, 027B)~~	~~2/steam line~~	2/steam line	1	A, B, C, and H
9	9. Steam Generator Level - (Wide Range) ~~(Instrument Loops 3-043, 056, 098, 111)~~	~~4(1/steam generator)~~	4~~(1/steam generator)~~	1	A, B, C, and H
10	10. Steam Generator Level - (Narrow Range) ~~(Instrument Loops 3-039, 042, 052, 055, 094, 097, 107, 110)~~	~~2/steam generator~~	2/steam generator	1	A, B, C, and H
11	11. Auxiliary Feedwater a. Flow Rate ~~(Instrument Loops 3-163, 155, 147, 170)~~	~~1/steam generator~~	1/steam generator	5	A, B, E, and H
	b. Valve Position Indication ~~(Instrument Loops 3-164, 164A, 172, 156, 156A, 173, 148, 148A, 174, 171, 171A, 175)~~	~~3/steam generator~~	1 ~~3~~/steam generator (a)	5	A, B, E, and H

LA04

A03

LA05

Add proposed Table 3.3.3-1 Footnote (a)

A03

ITS | A01 | ITS 3.3.3

Table 3.3.3-1

TABLE 3.3-10 (Continued)

ITS ACTION

ACCIDENT MONITORING INSTRUMENTATION

LA03

ITS	INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION
12	12. Reactor Coolant System Subcooling Margin Monitor ~~(Instrument Loops 94-101, 102)~~	~~2~~	2	1 A, B, C, and H
13	13. Containment Water Level (Wide Range) ~~(Instrument Loops 63-178, 179)~~	~~2~~	2	1 A, B, C, and H
14	14. Incore Thermocouples	~~65~~		
	a. Core Quadrant (1)		2~~(1/Train)~~	1 A, B, C, and H
	b. Core Quadrant (2)		2~~(1/Train)~~	1 A, B, C, and H
	c. Core Quadrant (3)		2~~(1/Train)~~	1 A, B, C, and H
	d. Core Quadrant (4)		2~~(1/Train)~~	1 A, B, C, and H
15	15. Reactor Vessel Level Instrumentation System	~~6~~		
	a. Dynamic Range ~~(Instrument Loops 68- 367, 370)~~		2	1 A, B, C, and H
	b. Lower Range ~~(Instrument Loops 68-368, 371)~~		2	1 A, B, C, and H
	c. Upper Range ~~(Instrument Loops 68-369, 372)~~		2	1 A, B, C, and H
16	16. Containment Area Radiation Monitors			
	a. Upper Compartment ~~(Instrument Loops 90-271, 272)~~	~~2~~	1	4 F and I
	b. Lower Compartment ~~(Instrument Loops 90-273, 274)~~	~~2~~	1	4 F and I

LA04

(b) ~~(c)~~ A04

LA05

Add proposed Table 3.3.3-1 Footnote ~~(c)~~ (b) A04

ITS | A01 | ITS 3.3.3

Table 3.3.3-1 | ITS ACTION

TABLE 3.3-10 (Continued)

ACCIDENT MONITORING INSTRUMENTATION

LA03

	INSTRUMENT	~~TOTAL NO. OF CHANNELS~~	MINIMUM CHANNELS REQUIRED	ACTION	ITS ACTION
17	17. Neutron Flux				
	a. Source Range ~~(Instrument Loops 92-5001, -5002)~~	~~2~~	2#	1	A, B, C, and H
	b. Intermediate Range ~~(Instrument Loops 92-5003, -5004)~~	~~2~~	2	1	A, B, C, and H
18	18. ERCW to AFW Valve Position		A05 (d)		
	a) Motor Driven Pumps ~~(Instrument Loops 3-116A, -116B, -126A, -126B)~~	~~1/Train/Pump (2 Valves/Train)~~	2 ~~1/Train/Pump (2 Valves/Train)~~	1	A, B, C, and H
			LA04		
	b) Turbine Driven Pumps ~~(Instrument Loops 3-136A, -136B, -179A, -179B)~~	~~2 Trains (2 Valves/Train)~~	2 ~~2 Trains~~ (d) ~~(2 Valves/Train)~~	1	A, B, C, and H
			~~(b)~~ (f) A06		
19	19. Containment Isolation Valve Position ~~(Panels TR-A XX-55-6K & TR-B XX-55-6L)~~	~~1/Valve~~	~~1/Valve~~## 2 per penetration flow path A06	3	A, C, and H

LA05

Table 3.3.3-1 Footnote ~~(d)~~ (c) # Source Range outputs may be disabled above the P-6 (Block of Source Range Reactor Trip) setpoint.

Table 3.3.3-1 Footnote ~~(a)~~ (e) ## Not required for isolation valves ~~that are~~ whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. L03

Add Note (d)

~~(b)~~ (f) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel. A06

(d) A channel consists of two valve position indicators associated with the in-series valves in a single suction line. A05

TABLE 3.3-10 (Continued)

ACTION STATEMENTS

ACTION 1 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from Tables 3.3-1 and 3.3-3, and LCO 3.3.3.5 since they may contain more restrictive actions.~~ A07

ACTION A a. With the number of channels one less than the minimum channels required, restore the inoperable channel to OPERABLE status within 30 days or ~~be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours~~. Initiate action in accordance with Specification 5.6.5 L01

ACTION B

ACTION C b. With the number of channels two less than the minimum channels required, restore at least one inoperable channel to OPERABLE status within 7 days or be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION H

ACTION 2 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from Tables 3.3-1 since it may contain more restrictive actions.~~ A07

ACTION A a. With the number of channels one less than the minimum channels required, restore the inoperable channel to OPERABLE status within 30 days or ~~be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours~~. Initiate action in accordance with Specification 5.6.5 L01

ACTION B

ACTION C b. With the number of channels two less than the minimum channels required, restore at least one inoperable channel to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION H

ACTION D c. With the number of channels three less than the minimum channels required, restore one channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.

ACTION H

ACTION 3 - ~~NOTE:~~ ~~Also refer to the applicable action requirements from LCO 3.6.3 since it may contain more restrictive actions.~~ A07

A06

ACTION A ### a. With the accident monitoring indication for one of the penetration ~~inboard or outboard~~ valve~~(s)~~ inoperable, restore the inoperable valve(s) accident indication to OPERABLE status within 30 days, or isolate each affected penetration within 30 days by use of at least one deactivated automatic valve secured in the isolated position, or isolate each

Table 3.3-1 (e) Footnote ~~(a)~~

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ITS A01 ITS 3.3.3

TABLE 3.3-10 (Continued)

ACTION STATEMENTS

(Continued)

Initiate action in accordance with Specification 5.6.5 L01

Table 3.3.3-1 Footnote ~~(a)~~ (e)
ACTION B

affected penetration within 30 days by use of at least one closed manual valve or blind flange, or ~~be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the next 6 hours~~.

ACTION C ### b. With the accident monitoring indication for ~~both an inboard and outboard~~ two valve~~(s)~~s on the same penetration inoperable, restore at least the inboard or outboard inoperable valve(s) indication to OPERABLE status within 7 days, or isolate each affected penetration within 7 days by use of at least one deactivated automatic valve secured in the isolated position, or isolate each affected penetration within 7 days by use of at least one closed manual valve or blind flange, or be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the next 6 hours. A06

Table 3.3.3-1 Footnote ~~(a)~~ (e)
ACTION H

Table 3.3.3-1 Footnote ~~(b)~~ (f) ### ~~On a penetration where accident indication is declared INOPERABLE on a valve but on the opposite side of the penetration an accident indication valve does not exist (such as with a closed system or a check valve), only ACTION 3(a) must be entered.~~ A06 ~~However, valves FCV-63-158 & -172 are both inboard penetration valves, but if both valves have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's accident indication is restored to OPERABLE status. Valves FCV-30-46 & VLV-30-571, FCV-30-47 & VLV-30-572, and FCV-30-48 & VLV-30-573 are all outboard penetration valves, but if both valves have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's accident indication is restored to OPERABLE status.~~ LA06

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DISCUSSION OF CHANGES
ITS 3.3.3, POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1431, Rev. 4.0, "Standard Technical Specifications-Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

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

A02 CTS 3.3.3.7 ACTIONS, as shown in CTS Table 3.3-10, provide the compensatory actions to take when PAM instrumentation is inoperable. ITS 3.3.3 ACTIONS provide the compensatory actions for inoperable PAM Instrumentation. The ITS 3.3.3 ACTIONS include a Note that allows separate Condition entry for each Function. In addition, separate Condition entry is allowed within a Function on a "per" bases as listed for Functions 8 (Steam Line Pressure (per steam line)), 10 (Steam Generator Level (Narrow Range) (per steam generator)) 11 (Auxiliary Feedwater (per steam generator)), and 19 (Containment Isolation Valve Position (per penetration flowpath)). This modifies the CTS by providing a specific allowance to enter the Action for each inoperable PAM instrumentation Function and for certain Functions on a "per" steam line, steam generator, or penetration flowpath basis.

This change is acceptable because it clearly states the current requirement. The CTS considers each PAM instrumentation Function to be separate and independent from the others. In addition, the channels associated with Functions 8, 10, 11, and 19 are allowed separate Condition entry on a steam line, steam generator, or penetration flowpath basis, which is consistent with the intent of the CTS. This change is designated as administrative because it does not result in technical changes to the CTS.

and is modified by Footnote (a). Footnote (a) states, "A channel consists of three valve position indicators (two level control valves for the motor driven AFW flow path and one level control valve for the turbine driven AFW flow path)."

A03 CTS Table 3.3-10 Instrument 11.b (Auxiliary Feedwater (Valve Position Indication)) "Minimum Channels Required" column states that the minimum channels required is 3/steam generator. ITS Table 3.3.3-1 Function 11.b (Auxiliary Feedwater (Valve Position Indication)) "Required Channels" column requires one channel per steam generator ~~(consisting of 3 valve position indications)~~. This changes the CTS by simplifying the presentation of the requirements for Auxiliary Feedwater (Valve Position Indication) instrumentation by requiring one channel per steam generator.

and explicitly stating the number of valve position indicators included in a channel

The purpose of CTS Table 3.3-10 "Minimum Channels Required" column is to list the number of channels required to be OPERABLE for the associated instrument per steam generator. CTS Table 3.3-10 "Minimum Required Channels" column lists "3/steam generator" as the minimum required channels for Instrument 11.b (Auxiliary Feedwater (Valve Position Indication)). At SQN a channel consists of three valves per steam generator, two from the motor driven auxiliary feedwater pump and one from the turbine driven auxiliary feedwater pump. Therefore, to fulfill the "Minimum Required Channels" requirement for Instrument 11.b

DISCUSSION OF CHANGES
ITS 3.3.3, POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

requiring one channel per steam generator, all three valves position indication must be OPERABLE. This change is acceptable because the requirements contained in ITS are the same as in CTS when a required auxiliary feedwater valve position indicator is inoperable. This change is designated as administrative because it does not result in technical changes to the CTS.

A04 CTS Table 3.3-10 Instrument 14 (Incore Thermocouples) "Minimum Channels Required" column states, in part, that the minimum channels required is 2 (1 per train) in each of the four core quadrants. ITS Table 3.3.3-1 Function 14 (Incore Thermocouples) "Required Channel" column also requires two channels in each of the four core quadrants and is modified by Footnote (~~c~~). ITS Table 3.3.3-1 Footnote (~~c~~) states, "A channel consists of one ~~incore~~ thermocouple. The required channels in each quadrant ~~shall~~ be in different trains." This changes the CTS by explicitly stating the number of incore thermocouples included in a channel.

b

The purpose of CTS Table 3.3-10 "Minimum Channels Required" column is to list the number of channels required to be OPERABLE for the associated instrument. CTS Table 3.3-10 "Minimum Required Channels" column lists "2(1/train)" as the minimum required channels for Instrument 14 (Incore Thermocouples) in each core quadrant. At SQN a channel consists of one incore thermocouple, therefore to fulfill the "Minimum Required Channels" requirement for Instrument 14 requires two incore thermocouples in each core quadrant, one from each train, to be OPERABLE. ITS Table 3.3.3-1 "Required Channel" column for Function 14 (Incore Thermocouples) requires two channels to be OPERABLE in each of the four core quadrants and is modified by Footnote (~~c~~). ITS Table 3.3.3-1 Footnote (~~c~~) states that a channel consists of one incore thermocouple from different trains. The addition of Footnote (~~c~~) explicitly states the channel requirement of CTS. This change is designated as administrative because it does not result in technical changes to the CTS.

b

and is modified by Footnote (d). Footnote (d) states, "A channel consists of two valve position indicators associated with the in-series valves in a single suction line."

A05 CTS Table 3.3-10 Instrument 18.a (ERCW to AFW Valve Position (Motor Driven Pumps)), "Minimum Channels Required" column states, in part, that the minimum channels required are 1/Train/Pump (2 Valves/Train). ITS Table 3.3.3-1 Function 18.a (ERCW to AFW Valve Position (Motor Driven Pumps)), "Required Channel" column requires 2 channels. CTS Table 3.3-10 Instrument 18.b (ERCW to AFW Valve Position (Turbine Driven Pump)), "Minimum Channels Required" column states that the minimum channels required are 2 Trains (2 Valves/Train). ITS Table 3.3.3-1 Function 18.b (ERCW to AFW Valve Position (Turbine Driven Pump)), "Required Channel" column requires 2 channels. This changes the CTS by simplifying the presentation of the channel requirements for ERCW to AFW Valve Position for the Motor Driven Pumps and the Turbine Driven Pump.

The purpose of CTS Table 3.3-10 "Minimum Channels Required" column is to designate the number of channels required to be OPERABLE for the associated instrument. CTS Table 3.3-10 "Minimum Required Channels" column lists "1/Train/Pump (2 Valves/Train)" as the minimum required channels for Instrument 18.a (ERCW to AFW Valve Position (Motor Driven Pumps,)). At SQN there are two motor driven auxiliary feedwater pumps. Each motor driven pump has two valves in series between the AFW pump and the ERCW supply. CTS Table 3.3-10 lists them as 3-116A and 3-116B, which are in the ERCW supply

and is modified by Footnote (d). Footnote (d) states, "A channel consists of two valve position indicators associated with the in-series valves in a single suction line."

and explicitly stating the number of valve position indicators included in a channel

DISCUSSION OF CHANGES
ITS 3.3.3, POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

line to the 1A-A AFW Pump, and 3-126A and 3-126B, which are in the ERCW supply line to the 1B-B AFW pump. The ITS Bases defines a channel as consisting of these two valves in series in the ERCW to AFW flow path for each motor driven pump, therefore 2 channels are required. CTS Table 3.3-10 "Minimum Required Channels" column lists "2 Trains (2 Valves/Train)" as the minimum required channels for Instrument 18.b (ERCW to AFW Valve Position (Turbine Driven Pump,)). At SQN there is one turbine driven auxiliary feedwater pump. The turbine driven pump has two supply lines from ERCW, one from each train with two valves in series between the AFW pump and the ERCW supply. CTS Table 3.3-10 lists them as 3-136A and 3-136B, which are in the ERCW supply line from the 1A ERCW header to the turbine driven AFW Pump, and 3-179A and 3-179B, which are in the ERCW supply line from the 1B ERCW header to the turbine driven AFW pump. The ITS Bases defines a channel as two valves in series for each ERCW supply line to the turbine driven AFW pump, therefore 2 channels are required. This change is acceptable because the requirements contained in ITS are the same as in CTS when an ERCW to AFW Valve Position channel is inoperable. This change is designated as administrative because it does not result in technical changes to the CTS.

A06 CTS Table 3.3-10 Instrument 19 (Containment Isolation Valve Position) "Minimum Channels Required" column requires one valve position indication channel OPERABLE per valve and lists ACTION 3 as the ACTION to follow if one channel per valve is inoperable. CTS Table 3.3-10 ACTION 3.a provides the required ACTIONS for one of the penetration inboard or outboard valve(s) inoperable (i.e., one channel inoperable per penetration) one part of which is restoring the inoperable valve(s) accident indication to OPERABLE status within 30 days. CTS Table 3.3-10 ACTION 3.b provides the required ACTIONS for both an inboard and outboard valve(s) on the same penetration inoperable (i.e., two channels inoperable per penetration) one part of which is restoring at least the inboard or outboard inoperable valve(s) indication to OPERABLE status within 7 days. ITS LCO 3.3.3 ACTION A, applicable to Function 19 (Containment Isolation Valve Position), states that with one or more Functions with one required channel inoperable restore required channel to OPERABLE status within 30 days. ITS LCO 3.3.3 ACTION C, applicable to Function 19 (Containment Isolation Valve Position), states that with one or more Functions with two required channels inoperable to restore one channel to OPERABLE status within 7 days. CTS Table 3.3-10 Note ### states, in part, that on a penetration where accident indication is declared inoperable on a valve but on the opposite side of the penetration an accident indication valve does not exist (such as with a closed system or a check valve), only ACTION 3(a) must be entered. ITS Table 3.3.3-1 Function 19 (Containment Isolation Valve Position) "Required Channels" column requires two channels to be OPERABLE per penetration and is modified by Footnote (~~b~~ f) which states that only one position indication channel is required for penetration flow paths with only one installed control room indication channel. CTS Table 3.3-10 ACTION 3.a references an inboard or outboard valve. CTS Table 3.3-10 ACTION 3.b references both an inboard and outboard valve(s). CTS Table 3.3-10 Note ###, in part, references penetrations whose valves are either both inboard (FCV 63-158 and FCV 63-172) or both outboard (FCV 30-46 and VLV 30-571, FCV 30-47 and VLV 30-572, FCV 30-48 and VLV 30-573) and states that if both valves (two) have inoperable accident indication, ACTION 3(b) must be entered until at least one of the valve's

DISCUSSION OF CHANGES
ITS 3.3.3, POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

accident indication is restored to OPERABLE status. ITS LCO 3.3.3 ACTION C, applicable to Function 19 (Containment Isolation Valve Position), states that with one or more Functions with two required channels inoperable to restore one channel to OPERABLE status within 7 days, similar to CTS Table 3.3-10 ACTION 3.b. This changes the CTS by simplifying the presentation of the requirements for Containment Isolation Valve Position instrumentation by requiring two channels per penetration, except where ITS Table 3.3.3-1 Footnote ~~(b)~~ (f) is applicable for those penetration flow paths with only one installed control room indication channel, and eliminating reference to inboard and outboard valve combinations.

The purpose of CTS Table 3.3-10 is to provide requirements for Post-Accident Monitoring instruments. One of these instruments is Containment Isolation Valve Position. CTS requires one position indication channel per valve to be OPERABLE where normally there are two valves per penetration. Similarly, ITS requires two channels per penetration. CTS Note ###, in part, states that on a penetration where accident indication is declared INOPERABLE on a valve but on the opposite side of the penetration an accident indication valve does not exist (such as with a closed system or a check valve), only ACTION 3(a) must be entered. ITS Table 3.3.3-1 Footnote ~~(b)~~ (f) similarly states that only one position indication channel is required for penetration flow paths with only one installed control room indication channel. CTS Table 3.3-10 Note ###, in part, requires entry into ACTION 3.b when two required valve position indicators per penetration are inoperable because ACTION 3.b entry condition is when both an inboard and outboard valve(s) on the same penetration inoperable (i.e., two position indicator per penetration). ITS LCO 3.3.3 ACTION C condition entry is when one or more Functions have two required channels inoperable, similar to CTS. This change is acceptable because the requirements contained in ITS are the same as in CTS when Containment Isolation Valve Position channel are inoperable for penetrations with two isolation valves per penetration and penetrations with one isolation valve per penetration. This change is designated as administrative because it does not result in technical changes to the CTS.

A07 CTS Table 3.3-10 ACTION 1, ACTION 2, ACTION 3, and ACTION 5 contain a Note referring to applicable action requirements from reference LCOs that may contain more restrictive actions. ITS Table 3.3.3-1 does not retain this information. This changes the CTS by not including the information referring to other potentially applicable action requirements to the Bases.

The purpose of CTS Table 3.3-10 ACTION 1, ACTION 2, ACTION 3, and ACTION 5 Note is to reference potentially associated Technical Specifications. It is an ITS convention to not include these types of notes or cross-references. This change is designated as administrative change because it does not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

None

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Table 3.3-10

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

FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION ~~D~~.1 G
~~1. Power Range Neutron Flux~~	~~2~~	~~E~~
INSERT 4		
~~2. Source Range Neutron Flux~~	~~2~~	~~E~~
~~3. Reactor Coolant System (RCS) Hot Leg Temperature~~	~~2 per loop~~	~~E~~
~~4. RCS Cold Leg Temperature~~	~~2 per loop~~	~~E~~
~~5. RCS Pressure (Wide Range)~~	~~2~~	~~E~~
~~6. Reactor Vessel Water Level~~	~~2~~	~~F~~
~~7. Containment Sump Water Level (Wide Range)~~	~~2~~	~~E~~
~~8. Containment Pressure (Wide Range)~~	~~2~~	~~E~~
~~9. Penetration Flow Path Containment Isolation Valve Position~~	~~2 per penetration flow path(a)(b)~~	~~E~~
~~10. Containment Area Radiation (High Range)~~	~~2~~	~~F~~
~~11. Pressurizer Level~~	~~2~~	~~E~~
~~12. Steam Generator Water Level (Wide Range)~~	~~2 per steam generator~~	~~E~~
~~13. Condensate Storage Tank Level~~	~~2~~	~~E~~
~~14. Core Exit Temperature - Quadrant [1]~~	~~2(c)~~	~~E~~
~~15. Core Exit Temperature - Quadrant [2]~~	~~2(c)~~	~~E~~
~~16. Core Exit Temperature - Quadrant [3]~~	~~2(c)~~	~~E~~
~~17. Core Exit Temperature - Quadrant [4]~~	~~2(c)~~	~~E~~
~~18. Auxiliary Feedwater Flow~~	~~2~~	~~E~~

1

Note ##
ACTION 3.a
ACTION 3.b

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

Note ###

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

DOC A03

~~(c)~~ b A channel consists of ~~two core exit~~ one incore thermocouple~~s (CETs)~~. The required channels in each quadrant shall be in different trains. 1

~~REVIEWER'S NOTE~~
~~Table 3.3.3-1 shall be amended for each unit as necessary to list:~~
~~1. All Regulatory Guide 1.97, Type A instruments and~~
~~2. All Regulatory Guide 1.97, Category I, non-Type A instruments in accordance with the unit's Regulatory Guide 1.97, Safety Evaluation Report.~~

3

Note #

~~(d)~~ c Source Range outputs may be disabled above the P-6 (Block of Source Range Reactor Trip) setpoint. 1

(a) A channel consists of three valve position indicators (two level control valves for the motor driven AFW flow path and one level control valve for the turbine driven AFW flow path). X 1

CTS ITS 3.3.3

Table 3.3-10

1

INSERT 4

		FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION G.1
1	1.	Reactor Coolant T_{HOT} (Wide Range)	4	H
2	2.	Reactor Coolant T_{COLD} (Wide Range)	4	H
3	3.	Containment Pressure (Wide Range)	2	H
4	4.	Containment Pressure (Narrow Range)	2	H
5	5.	Refueling Water Storage Tank Level	2	H
6	6.	Reactor Coolant Pressure (Wide Range)	3	H
7	7.	Pressurizer Level (Wide Range)	3	H
8	8.	Steam Line Pressure	2 per steam line	H
9	9.	Steam Generator Level - (Wide Range)	4	H
10	10.	Steam Generator Level - (Narrow Range)	2 per steam generator	H
11	11.	Auxiliary Feedwater		
		a. Flow Rate	1 per steam generator	H
		b. Valve Position Indication	1 per steam generator (a)	H

CTS ITS 3.3.3

Table 3.3-10

1

INSERT 4 continued

		FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION G.1
12	12.	Reactor Coolant System Subcooling Margin Monitor	2	H
13	13.	Containment Water Level (Wide Range)	2	H
14	14.	Incore Thermocouples		
		a. Core Quadrant (1)	2~~(c)~~ (b)	H
		b. Core Quadrant (2)	2~~(c)~~ (b)	H
		c. Core Quadrant (3)	2~~(c)~~ (b)	H
		d. Core Quadrant (4)	2~~(c)~~ (b)	H
15	15.	Reactor Vessel Level Instrumentation		
		a. Dynamic Range	2	H
		b. Lower Range	2	H
		c. Upper Range	2	H
16	16.	Containment Area Radiation Monitors		
		a. Upper Compartment	1	I
		b. Lower Compartment	1	I
17	17.	Neutron Flux		
		a. Source Range	2~~(d)~~ (c)	H
		b. Intermediate Range	2	H
18	18.	ERCW to AFW Valve Position		
		a. Motor Driven Pumps	2 (d)	H
		b. Turbine Driven Pump	2 (d)	H
19	19.	Containment Isolation Valve Position	2 per penetration flowpath~~(a)(b)~~ (e)(f)	H

(d) A channel consists of two valve position indicators associated with the in-series valves in a single suction line.

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CTS

PAM Instrumentation
3.3.3

Table 3.3-10

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

FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION ~~D~~.1 G
INSERT 4		
~~1. Power Range Neutron Flux~~	~~2~~	~~E~~
~~2. Source Range Neutron Flux~~	~~2~~	~~E~~
~~3. Reactor Coolant System (RCS) Hot Leg Temperature~~	~~2 per loop~~	~~E~~
~~4. RCS Cold Leg Temperature~~	~~2 per loop~~	~~E~~
~~5. RCS Pressure (Wide Range)~~	~~2~~	~~E~~
~~6. Reactor Vessel Water Level~~	~~2~~	~~F~~
~~7. Containment Sump Water Level (Wide Range)~~	~~2~~	~~E~~
~~8. Containment Pressure (Wide Range)~~	~~2~~	~~E~~
~~9. Penetration Flow Path Containment Isolation Valve Position~~	~~2 per penetration flow path(a)(b)~~	~~E~~
~~10. Containment Area Radiation (High Range)~~	~~2~~	~~F~~
~~11. Pressurizer Level~~	~~2~~	~~E~~
~~12. Steam Generator Water Level (Wide Range)~~	~~2 per steam generator~~	~~E~~
~~13. Condensate Storage Tank Level~~	~~2~~	~~E~~
~~14. Core Exit Temperature - Quadrant [1]~~	~~2(c)~~	~~E~~
~~15. Core Exit Temperature - Quadrant [2]~~	~~2(c)~~	~~E~~
~~16. Core Exit Temperature - Quadrant [3]~~	~~2(c)~~	~~E~~
~~17. Core Exit Temperature - Quadrant [4]~~	~~2(c)~~	~~E~~
~~18. Auxiliary Feedwater Flow~~	~~2~~	~~E~~

1

Note ## ACTION 3.a ACTION 3.b ~~(a)~~ e Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

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

DOC A03 ~~(c)~~ b A channel consists of ~~two core exit~~ one incore thermocouple~~s (CETs)~~. The required channels in each quadrant shall be in different trains. 1

~~REVIEWER'S NOTE~~
~~Table 3.3.3-1 shall be amended for each unit as necessary to list:~~
~~1. All Regulatory Guide 1.97, Type A instruments and~~
~~2. All Regulatory Guide 1.97, Category I, non-Type A instruments in accordance with the unit's Regulatory Guide 1.97, Safety Evaluation Report.~~

3

Note # ~~(d)~~ c Source Range outputs may be disabled above the P-6 (Block of Source Range Reactor Trip) setpoint. 1

(a) A channel consists of three valve position indicators (two level control valves for the motor driven AFW flow path and one level control valve for the turbine driven AFW flow path). XXX 1

CTS

ITS 3.3.3

Table 3.3-10

1

INSERT 4

CTS		FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION G.1
1	1.	Reactor Coolant T_{HOT} (Wide Range)	4	H
2	2.	Reactor Coolant T_{COLD} (Wide Range)	4	H
3	3.	Containment Pressure (Wide Range)	2	H
4	4.	Containment Pressure (Narrow Range)	2	H
5	5.	Refueling Water Storage Tank Level	2	H
6	6.	Reactor Coolant Pressure (Wide Range)	3	H
7	7.	Pressurizer Level (Wide Range)	3	H
8	8.	Steam Line Pressure	2 per steam line	H
9	9.	Steam Generator Level - (Wide Range)	4	H
10	10.	Steam Generator Level - (Narrow Range)	2 per steam generator	H
11	11.	Auxiliary Feedwater		
		a. Flow Rate	1 per steam generator	H
		b. Valve Position Indication	1 per steam generator (a)	H

CTS | ITS 3.3.3

Table 3.3-10

INSERT 4 continued

1

CTS	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION G.1
12	12. Reactor Coolant System Subcooling Margin Monitor	2	H
13	13. Containment Water Level (Wide Range)	2	H
14	14. Incore Thermocouples		
	a. Core Quadrant (1)	2~~(c)~~ (b)	H
	b. Core Quadrant (2)	2~~(c)~~ (b)	H
	c. Core Quadrant (3)	2~~(c)~~ (b)	H
	d. Core Quadrant (4)	2~~(c)~~ (b)	H
15	15. Reactor Vessel Level Instrumentation		
	a. Dynamic Range	2	H
	b. Lower Range	2	H
	c. Upper Range	2	H
16	16. Containment Area Radiation Monitors		
	a. Upper Compartment	1	I
	b. Lower Compartment	1	I
17	17. Neutron Flux		
	a. Source Range	2~~(d)~~ (c)	H
	b. Intermediate Range	2	H
18	18. ERCW to AFW Valve Position		
	a. Motor Driven Pumps	2 (d)	H
	b. Turbine Driven Pump	2 (d)	H
19	19. Containment Isolation Valve Position	2 per penetration flowpath~~(a)(b)~~ (e)(f)	H

(d) A channel consists of two valve position indicators associated with the in-series valves in a single suction line.

ITS Insert Page 3.3.3-4b

Licensee Response/NRC Response/NRC Question Closure

Id	**169**
NRC Question Number	**KAB037**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**7/2/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**7/2/2014 3:16 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**64**
NRC Question Number	**KAB038**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.5**
DOC Number	**L-1**
JFD Number	
JFD Bases Number	
Page Number(s)	**837**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 837 of Enclosure 2, Volume 8, L01 provides the discussion of engineered safety features response time verification in CTS 4.3.3.11.2. L01 proposes to delete the engineered safety features response time verification. L01 states, "This change is acceptable because 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."** **Sequoyah's current licensing basis for CTS 3.3.3.11 does not require a channel check, but it does require a channel calibration, channel functional test, and engineered safety features response time verification. TVA is proposing to delete the ISTS channel check, and modify the ISTS TADOT to be equivalent to a CTS channel functional test. These changes are consistent with the current licensing basis for Sequoyah. However, TVA is not proposing to add the engineered safety features response time verification to the surveillance requirements in ITS. This is not consistent with Sequoyah's current licensing basis.** **Please correct ITS 3.3.5 to be consistent with Sequoyah's current licensing basis, by adding the engineered safety features response time verification or provide a technical evaluation that includes historical data and explains why this instrumentation no longer needs the performance of a response time verification. Note that removing the engineered safety features response time test is a beyond scope change and will be reviewed by the associated technical branch.**

Attach File 1	
Attach File 2	
Issue Date	**5/14/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/14/2014 10:23 AM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**98**
NRC Question Number	**KAB038**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**Sequoyah License Amendment 190 and 182, for Unit 1 and Unit 2 respectively, relocated the Engineered Safety Feature Actuation System (ESFAS) response time limits to the Updated Final Safety Analysis Report (UFSAR) (ADAMS Accession No. ML013300393). UFSAR Table 7.3.1-4 contains these limits. Item 12.a, Loss of Power, 6.9 kV Shutdown Board – Degraded Voltage or Loss of Voltage, response time is listed as ≤ 10 seconds, and is modified by Note 10. Note 10 states that the response time for loss of voltage is measured from the time the diesel start signal is initiated until the time full voltage is restored by the diesel. The response time for degraded voltage is measured from the time the load shedding signal is generated, either from the degraded voltage or the safety injection (SI) enable timer, to the time full voltage is restored by the diesel. The response time of the timers is covered by the requirements on their setpoints.** **UFSAR Table 7.3.1-4, item 2.a, Containment Pressure – High, Safety Injection (ECCS); item 3.a, Pressurizer Pressure – Low, Safety Injection (ECCS); and item 6.a, Steam Line Pressure – Low, Safety Injection (ECCS), each indicate the assumed response time for the respective actuation signal and are each modified by Note 1. Note 1 states that the response time limit includes opening of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps, SI, and RHR pumps. Furthermore, Note 1 states that DG starting and sequence loading delays are included. Therefore, each SI actuation signal response time contains the response time of the LOP DG Start Instrumentation.** **In WCAP-12159, MERITS Program Phase II, NUREG-0452, Tables 3.3-4 and 4.3-2, Functions 8.a Loss of Power, 4 kV Bus Undervoltage (Loss of Voltage), and 8.b, Loss of Power, 4 kV Bus Undervoltage (Grid Degraded Voltage), were relocated from NUREG-0452 with the justification that, "The safeguards 4 kV bus undervoltage and degraded voltage functions only start the emergency diesel generators. These functions have been relocated to LCO 3.7.1, AC Sources – Operating." Therefore, the surveillance requirements within ITS 3.8.1 will continue to verify that each required DG will upon receipt of an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal, auto-start from a standby condition and energize permanently connected loads in ≤ 10 seconds.** **In conclusion, ITS will continue to verify that the ESF response times, including the DG start and load shedding times, assumed in the accident analysis are satisfied.**
Response Date/Time	**6/5/2014 4:30 PM**

Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/5/2014 3:28 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**147**
NRC Question Number	**KAB038**
Select Application	**NRC Response**
Attachment 1	
Attachment 2	
Response Statement	**Please provide a copy (or excerpt) of the procedure currently used for conducting the CTS SR 4.3.3.11.2.**
Response Date/Time	**6/24/2014 6:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/24/2014 6:34 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**278**
NRC Question Number	**KAB038**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**Surveillance Instruction, 1-SI-IRT-099-699.A, Response Time Test of ESFAS Safety Injection Signal with Station Blackout Train A, is performed to measure and verify 6.9 kV Shutdown Board bus regeneration after Blackout for the SQN Unit 1, A Train. This procedure in conjunction with 1-SI-IRT-099-400.0 (Attachment 2) satisfies CTS 4.3.3.11.2 for SQN UFSAR Table 7.3.1-4, Function 12.a, 6.9 kV Shutdown Board - Degraded Voltage or Loss of Voltage.** **Surveillance Instruction, 1-SI-IRT-099-400.0, Response Time Scheduling and Verification of Reactor Trip and Engineered Safety Feature Systems, establishes the Acceptance Criteria required in each individual Response Time Instruction for SQN Unit 1.** **Surveillance Instruction, 1-SI-EDC-082-307.A, Undervoltage/Degraded Voltage, DG Start, and Load Shedding Time Response Relay Test. 1-SI-EDC-082-307.A is a calibration performed to determine the operability of Diesel Generator start and load shedding and SI/degraded voltage logic enable timers for SQN Unit 1.**
Response Date/Time	**8/21/2014 9:25 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**8/21/2014 8:24 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**301**
NRC Question Number	**KAB038**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/27/2014**
Notification	**Scott Bowman Michelle Conner Vijay Goel Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**8/27/2014 1:54 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**66**
NRC Question Number	**KAB039**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.4**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**786, 791, 814, 823**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On pages 786 and 791 of Enclosure 2, Volume 8, shows the CTS Table 3.3-9. On these pages instrument 1 has a measurement range of 1 to 1 x 10^6 cps and the CTS page states that it is Amendment No. 113 May 4, 1989 for unit 1 and Amendment No. 67, 103 May 4, 1989 for unit 2. However, the record copy of Sequoyah's CTS states that instrument 1 has a measurement range of 0.1 to 1 x 10^5 cps and the CTS page states that it is Amendment No. 113, 278 September 30, 2002 for unit 1 and Amendment No. 67, 103, 269 September 30, 2002 for unit 2. In addition, pages 814 and 823, the ITS Bases, states that instrument 1 has a measurement range of 1 to 1 x 10^6 cps. Please explain why there is a difference in the measurement range for instrument 1. In addition, explain if this instrument has been replaced from the original instrument to a new instrument, if so was the replacement the same make and model, and what is the measured range of the currently installed instrument (0.1 to 1 x 10^5 cps) or (1 to 1 x 10^6 cps)?**
Attach File 1	
Attach File 2	
Issue Date	**5/19/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/19/2014 8:05 AM**

Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**133**
NRC Question Number	**KAB039**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**As stated in the ITS license amendment request (LAR) cover letter, "the CTS marked-up pages do not include NRC-approved Amendments 278 and 289 for Unit 1 and Amendments 269 and 279 for Unit 2. These amendments are not to be implemented until start up from the outage where SQN inserts tritium-producing burnable rods in the core. At this time, the production of tritium in the SQN reactors has been delayed indefinitely." The ADAMS record copy of the CTS reflects all NRC-approved amendments and therefore, the record copy differs from SQN's operating copy of technical specifications because the listed amendments (278, 289, 269 and 279) have not been implemented at SQN.** **On September 21, 2001, SQN submitted an LAR (ML012890063) to change the TSs for Units 1 and 2 to allow SQN to provide irradiation services for the U.S. Department of Energy. One of the proposed changes involved revising the measurement range for the source range monitors (identified in the RAI as Instrument 1) in TS Table 3.3-9. The LAR was approved by issuance of Amendments 278 and 269. Although approved, SQN has not implemented the TS change. Therefore, the instrument has not been replaced by a new instrument and there has been no revision to the source range instrumentation measurement range.** **The correct measurement range for the source range monitors is 1 to $1x10^6$ cps.**
Response Date/Time	**6/20/2014 5:10 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**

Date Added	**6/20/2014 4:07 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**140**
NRC Question Number	**KAB039**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/20/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/20/2014 1:16 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**67**
NRC Question Number	**KAB040**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.6**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	**903**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 903 of Enclosure 2, Volume 8, A05 provides the discussion for CTS 4.3.2.1.3 ESFAS Response Time of each ESFAS function. However, in the discussion it refers to reactor trip function instead of the ESFAS function. Please explain this discrepancy.**
Attach File 1	
Attach File 2	
Issue Date	**5/19/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/19/2014 8:07 AM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**68**
NRC Question Number	**KAB040**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 revised 3.3.6 DOC A05.pdf** (17KB)
Attachment 2	
Response Statement	**In response to KAB040, discussion of change (DOC) A05 on page 903 of Enclosure 2, Volume 8, will be revised. Specifically, the sentence, "The requirement specifies that each test shall include at least one logic train such that both logic trains are tested at least once per 36 months, and one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the 'Total No. of Channels' column of Table 3.3-3[.]" will be revised to, "The requirement specifies that each test shall include at least one logic train such that both logic trains are tested at least once per 36 months, and one channel per function such that all channels are tested at least once every 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."** **See Attachment 1 for the draft revised DOC A05.**
Response Date/Time	**5/29/2014 3:40 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**5/29/2014 2:37 PM**
Date Modified	
Modified By	

as is delineated in UFSAR Table 7.3.1-4. This change is designated as administrative because it does not result in technical changes to the CTS.

A05 CTS 4.3.2.1.3 states, in part, that the ESF RESPONSE TIME of each ESFAS function shall be demonstrated to be within its limit at least once per 18 months. The requirement specifies that each test shall include at least one logic train such that both logic trains are tested at least once per 36 months, and one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific ~~reactor trip~~ ESFAS function as shown in the "Total No. of Channels" column of Table 3.3-3. ITS SR 3.3.6.8 requires the verification of ESF RESPONSE TIMES every 18 months "on a STAGGERED TEST BASIS." The ITS definition of STAGGERED TEST BASIS is consistent with the CTS testing Frequency. This changes the CTS by utilizing the ITS definition of STAGGERED TEST BASIS for the Frequency of the ESF RESPONSE TIME testing.

This change is acceptable because the requirements for ESF RESPONSE TIME testing for the ESFAS channels remain unchanged. The ITS definition of STAGGERED TEST BASIS and its application in this requirement do not change the current testing Frequency requirements. This change is designated as administrative because it does not result in technical changes to the CTS.

A06 ITS 3.3.6 ACTIONS contains a Note which states that separate Condition entry is allowed for each Function. The ACTIONS for CTS 3.3.2.1 (Unit 1), CTS 3.3.2 (Unit 2), and CTS 3.3.3.1 do not contain this Note. This changes the CTS by specifically allowing separate Condition entry for each Function in ITS Table 3.3.6-1.

This change is acceptable because it clearly states the current requirement. The CTS considers each ESFAS and radiation monitoring instrument Function to be separate and independent. This change is designated as administrative because it does not result in a technical change to the CTS.

A07 CTS Table 4.3-2 requires a CHANNEL FUNCTIONAL TEST for Functional Unit c.1 (Manual). ITS Table 3.3.6-1 requires a similar test; ITS SR 3.3.6.6 (TADOT) to be performed for Function 1 (Manual Initiation) with the addition of a Note that states, "Verification of setpoint is not required." This changes the CTS by requiring a TADOT without setpoint verification instead of a CHANNEL FUNCTIONAL TEST.

CTS 1.6 states that for an analog channel a CHANNEL FUNCTIONAL TEST shall be the injection of a simulated signal into the channel as close to the sensor as practicable to verify OPERABILITY including alarm and/or trip functions. ITS 1.1 defines a TADOT as consisting of operating the trip actuating device and verifying the OPERABILITY of all devices in the channel required for trip actuating device OPERABILITY. ITS further states that the TADOT shall include adjustment, as necessary, of the trip actuating device so that it actuates at the required setpoint within the necessary accuracy. Because the TADOT includes adjustment, as necessary, of the trip actuating device so that it actuates at the required setpoint within the necessary accuracy, which is not included in the CTS CHANNEL FUNCTIONAL TEST, ITS SR 3.3.3.6 includes the Note, "Verification

Enclosure 2, Volume 8, Rev. 0, Page 903 of 1148

Licensee Response/NRC Response/NRC Question Closure

Id	**86**
NRC Question Number	**KAB040**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**5/30/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**5/30/2014 8:42 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**68**
NRC Question Number	**KAB041**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.6**
DOC Number	**LA-1**
JFD Number	
JFD Bases Number	
Page Number(s)	**905, 907**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On pages 905 and 907 of Enclosure 2, Volume 8, LA01 in part, and M04 provides the discussion of adding a surveillance requirement for master and slave relay testing. This discussion states that the slave relay testing ITS SR 3.3.6.5 has a frequency of 18 months. However, ISTS and ITS slave relay testing has a frequency of 92 days. Please explain which frequency is proposed. If Sequoyah is proposing to adopt the ISTS frequency, then please correct the frequency in LA01 and M04. If Sequoyah is proposing to adopt a frequency of 18 months, which is a beyond scope change then please provide the technical evaluation for NRC review.**
Attach File 1	
Attach File 2	
Issue Date	**5/19/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/19/2014 8:09 AM**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**242**
NRC Question Number	**KAB041**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**SQN proposes to add ITS 3.3.6, Surveillance Requirement (SR) 3.3.6.5, slave relay testing requirements, forFunctional Unit 2 at a frequency of every 18 months. This change is annotated on CTS pages 882 and 894 of Enclosure 2, Volume 8 and justified by ITS 3.3.6 discussion of change (DOC) M04 on pages 905-906. The proposed surveillance Frequency for slave relay testing, 18 months, is consistent with SQN's current testing practices. SQN's current testing practice, although not required by CTS, ensures the slave relays are tested each refueling outage (18 months).** **Additionally, Westinghouse performed a reliability assessment of Westinghouse Type AR relays used as SSPS slave relays. The objective of WCAP-13877, "Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays WOG Program MUHP-7040," was to establish the basis for determining the reliability of the Westinghouse type AR relay. The evaluation was intended to aid in the determination of maintenance and surveillance intervals consistent with reliability goals. A particular objective was to demonstrate that a refueling-based surveillance interval (18 months to 24 months) would not adversely affect the reliability of Solid State Protection System (SSPS) slave relays used in Engineered Safety Feature Actuation System (ESFAS) functions. The WCAP used SQN slave relay failure history, in addition to failure history from other utilities, to conclude that the assumed initial quarterly test interval (92 days) supported by WCAP-10271-P-A, Supplement 2, Revision 1 was overly conservative. WCAP-13877 concluded that slave relay testing could be extended to a refueling basis without impact or consequence to relay reliability.** **Therefore, based on the conclusion of WCAP-13877, that slave relay testing could be extended to a refueling basis without impact to relay reliability, and SQN's current slave relay testing frequency of 18 months, SQN proposes to adopt ITS SR 3.3.6.5 with an 18 month Frequency.**
Response Date/Time	**8/5/2014 9:25 AM**
Closure Statement	
Question Closure	

Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**8/5/2014 8:24 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**310**
NRC Question Number	**KAB041**
Select Application	**NRC Response**
Attachment 1	
Attachment 2	
Response Statement	**Did TVA get approval for the existing 18 month surveillance interval by submitting a LAR that was approved by NRC staff. If so, please provide the information of submittal of the LAR and NRC staff safety evaluation for our confirmation.** **If not then provide the following information as requested in the safety evaluation issued by NRC staff when approving Westinghouse WCAP-13877:** **a. Confirm the applicability of WCAP-13877 (Rev. 1 and Rev. 2) analysis for Sequoyah plants.** **b. Ensure that contact loading analysis for Type AR relays has been performed to determine the acceptability of this analysis.** **c. Determine that the qualified life for the Type AR relays based on plant specific environmental conditions.** **d. Establish a program to evaluate the adequacy of the proposed test interval if two or more AR relays fail in a 12-month period.**
Response Date/Time	**9/3/2014 6:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**9/3/2014 7:03 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**355**
NRC Question Number	**KAB041**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**SQN's current technical specifications (CTS) do not contain a Surveillance Requirement to specifically test slave relays. SQN is proposing to add ISTS 3.3.6.7 (ITS SR 3.3.6.5), SLAVE RELAY TEST, as part of the ITS conversion, for ITS Table 3.3.6-1, Function 2 (Automatic Actuation Logic and Actuation Relays). This is a more restrictive change to CTS and is justified in Discussion of Change M04. The proposed Frequency for ITS SR 3.3.2.5 is every 18 months.** **Currently, SQN performs slave relay testing every refueling outage (18 months) which corresponds to the proposed 18-month Surveillance Frequency for ITS SR 3.3.6.5.** **SQN is not proposing to adopt WCAP-13877 as a basis for extending slave relay testing from 92 days to an 18 month frequency, because SQN does not have a Surveillance Requirement to perform slave relay testing in CTS, and slave relays are already tested at an 18-month frequency. However, it should be recognized that SQN was used as one of the reference plants for the development of WCAP-13877. SQN slave relay failure history, in addition to failure history from other plants, was used in WCAP-13877 to conclude that testing on an 18-month Surveillance Frequency was acceptable.**
Response Date/Time	**9/26/2014 9:25 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**9/26/2014 8:19 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**359**
NRC Question Number	**KAB041**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**9/26/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**9/26/2014 9:19 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**69**
NRC Question Number	**KAB042**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.6**
DOC Number	**L-1**
JFD Number	
JFD Bases Number	
Page Number(s)	**909**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 909 of Enclosure 2, Volume 8, L01 provides the discussion of adding a note to the engineered safety features (ESF) response time of the engineered safety features actuation system functions in CTS and ITS. L01 states, "This changes the CTS by excluding the radiation monitor from the ESF RESPONSE TIME testing for the Containment Ventilation Isolation High Radiation Function." However, note (6) in the updated final safety analysis report Table 7.3.1-4 states, "Radiation detectors for Containment Ventilation Isolation may be excluded from Response Time Testing." Please correct the sentence in L01 to reference the radiation detector instead of the radiation monitor.**
Attach File 1	
Attach File 2	
Issue Date	**5/19/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/19/2014 8:10 AM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**70**
NRC Question Number	**KAB042**
Select Application	**Licensee Response**
Attachment 1	**SQN ITS Attachment 1 revised 3.3.6 DOC L01.pdf** (21KB)
Attachment 2	
Response Statement	**In response to KAB042, discussion of change (DOC) L01 will be revised. Specifically, the sentence, "This changes the CTS by excluding the radiation <u>monitor</u> from the ESF RESPONSE TIME testing for the Containment Ventilation Isolation High Radiation Function." will be revised to, "This changes the CTS by excluding the radiation <u>detector</u> from the ESF RESPONSE TIME testing for the Containment Ventilation Isolation High Radiation Function."** **See Attachment 1 for the draft revised DOC L01.**
Response Date/Time	**5/29/2014 4:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**5/29/2014 2:58 PM**
Date Modified	
Modified By	

DISCUSSION OF CHANGES
ITS 3.3.6, CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION

necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the requirement for the number of required channels and the appropriate Condition to enter if a required channel becomes inoperable. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 6 – Relaxation of Surveillance Requirement Acceptance Criteria)* CTS 4.3.2.1.3 states, in part, that the ESF RESPONSE TIME of each ESFAS function shall be demonstrated to be within its limit at least once per 18 months. ITS SR 3.3.6.8 Note states that the radiation detectors are excluded from response time testing. This changes the CTS by excluding the radiation ~~monitor~~ detector from the ESF RESPONSE TIME testing for the Containment Ventilation Isolation High Radiation Function.

The purpose of CTS 4.3.2.1.3 is to ensure that the actuation response times are less than or equal to the maximum values assumed in the accident analysis. UFSAR Table 7.3.1-4 specifies response times and exceptions allowed for the Containment Ventilation Isolation Function initiated by the Containment Purge Air Exhaust Radioactivity –High signal. Sequoyah License Amendment 190 and 182, for Unit 1 and Unit 2 respectively, relocated the ESFAS response time limits to the UFSAR (ADAMS Accession No. ML013300393). UFSAR Table 7.3.1-4 contains these limits listing the information in two columns, "Initiating Signal and Function," and "Response Time in Seconds." The Initiating Signals listed in UFSAR Table 7.3.1-4 includes Containment Purge Air Exhaust Radioactivity – High for Function Containment Ventilation Isolation. The Response Time column in UFSAR Table 7.3.1-4 for Containment Ventilation Isolation is modified by Note (6). UFSAR Table 7.3.1-4 Note (6) states that the radiation detectors for Containment Ventilation Isolation Function may be excluded from Response Time Testing. This Note modifies the CTS definition of an ESF RESPONSE TIME test and was removed from CTS by License Amendment 190 and 182. ITS SR 3.3.6.8 is modified by a similar Note that excludes the radiation detector from ESF RESPONSE TIME testing. This change is acceptable because ITS 3.3.6, Table 3.3.6-1 retains the CTS intent of requiring ESF RESPONSE TIME testing (ITS SR 3.3.6.8) for those ESFAS Functions listed in UFSAR Table 7.3.1-4 as modified by the associated Table 7.3.1-4 Note. This change is designated as less restrictive because less stringent Surveillance Requirements are being applied in the ITS than were applied in the CTS.

L02 *(Category 4 – Relaxation of Required Action)* CTS Table 3.3-3 ACTION 15 requires that when one channel of Containment Ventilation Isolation – Automatic Isolation Logic (Functional Unit 3.c.2) is inoperable to be in at least HOT STANDBY within 12 hours and in COLD SHUTDOWN within the following 30 hours. Additionally, CTS Table 3.3-3 ACTION 15 allows one channel of the

Enclosure 2, Volume 8, Rev. 0, Page 909 of 1148

Licensee Response/NRC Response/NRC Question Closure

Id	**87**
NRC Question Number	**KAB042**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**5/30/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**5/30/2014 8:42 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**70**
NRC Question Number	**KAB043**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.6**
DOC Number	**A-7**
JFD Number	
JFD Bases Number	
Page Number (s)	**903**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 903 of Enclosure 2, Volume 8, A07 provides the discussion of the channel functional test in CTS Table 4.3-2 as compared to the ITS trip actuating device operational test in ITS 3.3.6. A07 states, "CTS Table 4.3-2 requires a CHANNEL FUNCTIONAL TEST for Functional Unit c.1 (Manual)." The functional unit is missing part of its designation. Please correct the designator for the functional unit being referenced in A07.**
Attach File 1	
Attach File 2	
Issue Date	**5/19/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/19/2014 8:12 AM**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**108**
NRC Question Number	**KAB043**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.6 revised DOC A07.pdf** (11KB)
Attachment 2	**Attachment 2 revised CTS pages.pdf** (39KB)
Response Statement	**In response to KAB043, discussion of change (DOC) A07, on page 903 of Enclosure 2, Volume 8, will be revised. Specifically, the sentence, "CTS Table 4.3-2 requires a CHANNEL FUNCTIONAL TEST for Functional Unit c.1 (Manual)." will be revised to read, "CTS Table 4.3-2 requires a CHANNEL FUNCTIONAL TEST for Functional Unit 3.c.1 (Containment Isolation, Containment Ventilation Isolation, Manual)."** **During review for the RAI response, the following issue was identified. The Unit 1 CTS page is missing the first level of numerical designation. Specifically, CTS Table 4.3-2, Functional Unit Containment Isolation, should be preceded by a 3 to read, "3. Containment Isolation." The missing numerical designator is a typographical error that was introduced when the word files were converted from Word95 to the present version. The current plant operating technical specifications, as well as, the retrievable version of technical specifications from the NRC website, contain the correct designator. The same issue exists on page 367 of Enclosure 2, Volume 8. The CTS pages will be revised to reflect the numerical designator.** **See Attachment 1 for the draft revised DOC A07.** **See Attachment 2 for the revised CTS pages.**
Response Date/Time	**6/6/2014 11:20 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/6/2014 10:18 AM**
Date Modified	
Modified By	

DISCUSSION OF CHANGES
ITS 3.3.6, CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION

as is delineated in UFSAR Table 7.3.1-4. This change is designated as administrative because it does not result in technical changes to the CTS.

A05 CTS 4.3.2.1.3 states, in part, that the ESF RESPONSE TIME of each ESFAS function shall be demonstrated to be within its limit at least once per 18 months. The requirement specifies that each test shall include at least one logic train such that both logic trains are tested at least once per 36 months, and one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-3 ITS SR 3.3.6.8 requires the verification of ESF RESPONSE TIMES every 18 months "on a STAGGERED TEST BASIS." The ITS definition of STAGGERED TEST BASIS is consistent with the CTS testing Frequency. This changes the CTS by utilizing the ITS definition of STAGGERED TEST BASIS for the Frequency of the ESF RESPONSE TIME testing.

This change is acceptable because the requirements for ESF RESPONSE TIME testing for the ESFAS channels remain unchanged. The ITS definition of STAGGERED TEST BASIS and its application in this requirement do not change the current testing Frequency requirements. This change is designated as administrative because it does not result in technical changes to the CTS.

A06 ITS 3.3.6 ACTIONS contains a Note which states that separate Condition entry is allowed for each Function. The ACTIONS for CTS 3.3.2.1 (Unit 1), CTS 3.3.2 (Unit 2), and CTS 3.3.3.1 do not contain this Note. This changes the CTS by specifically allowing separate Condition entry for each Function in ITS Table 3.3.6-1.

This change is acceptable because it clearly states the current requirement. The CTS considers each ESFAS and radiation monitoring instrument Function to be separate and independent. This change is designated as administrative because it does not result in a technical change to the CTS.

A07 CTS Table 4.3-2 requires a CHANNEL FUNCTIONAL TEST for Functional Unit ~~c.1 (Manual)~~. ITS Table 3.3.6-1 requires a similar test; ITS SR 3.3.6.6 (TADOT) to be performed for Function 1 (Manual Initiation) with the addition of a Note that states, "Verification of setpoint is not required." This changes the CTS by requiring a TADOT without setpoint verification instead of a CHANNEL FUNCTIONAL TEST.

3.c.1 (Containment Isolation, Containment Ventilation Isolation, Manual)

CTS 1.6 states that for an analog channel a CHANNEL FUNCTIONAL TEST shall be the injection of a simulated signal into the channel as close to the sensor as practicable to verify OPERABILITY including alarm and/or trip functions. ITS 1.1 defines a TADOT as consisting of operating the trip actuating device and verifying the OPERABILITY of all devices in the channel required for trip actuating device OPERABILITY. ITS further states that the TADOT shall include adjustment, as necessary, of the trip actuating device so that it actuates at the required setpoint within the necessary accuracy. Because the TADOT includes adjustment, as necessary, of the trip actuating device so that it actuates at the required setpoint within the necessary accuracy, which is not included in the CTS CHANNEL FUNCTIONAL TEST, ITS SR 3.3.3.6 includes the Note, "Verification

ITS

A01

ITS 3.3.2

Table 3.3.2-1

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

M02

L15

	FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	~~MODES FOR WHICH SURVEILLANCE IS REQUIRED~~
	3. CONTAINMENT ISOLATION				
3.a	a. Phase "A" Isolation				
3.a.(1)	1) Manual	N.A.	N.A.	~~R~~ SR 3.3.2.7	~~1, 2, 3, 4~~
3.a.(3)	2) From Safety Injection Automatic Actuation Logic	N.A.	N.A.	M(1)	~~1, 2, 3, 4~~
3.b.	b. Phase "B" Isolation				
3.b.(1)	1) Manual	N.A.	N.A.	~~R~~ SR 3.3.2.7	~~1, 2, 3, 4~~
3.b.(2)	2) Automatic Actuation Logic	N.A.	N.A.	~~M(1)~~ SR 3.3.2.2	~~1, 2, 3, 4~~
3.b.(3)	3) Containment Pressure-- High-High	~~S~~ SR 3.3.2.1	~~R~~ SR 3.3.2.8	~~Q~~ SR 3.3.2.4	~~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

~~92 days on a STAGGERED TEST BASES~~

A09

A09

A04

~~184 days~~

L14

In accordance with the Surveillance Frequency Control Program

LA02

See ITS 3.3.6

SEQUOYAH - UNIT 1 3/4 3-35 March 4, 1996
Amendment No. 47, 168, 220

ITS (A01) ITS 3.3.6

Table 3.3.6-1

TABLE 4.3-2 (Continued)

Containment Ventilation Isolation (A02)

~~ENGINEERED SAFETY FEATURE ACTUATION SYSTEM~~ INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

ACTUATION LOGIC TEST / COT / TADOT (M01)

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				
Function 1 1) Manual	N.A.	N.A.	~~R~~ SR 3.3.6.6	1, 2, 3, 4
Function 2 2) Automatic Isolation Logic	N.A.	N.A.	~~M(1)~~ SR 3.3.6.2	1, 2, 3, 4
Function 3 3) Containment Purge Air Exhaust Monitor Radio-activity-High	~~S~~ SR 3.3.6.1	~~R~~ SR 3.3.6.7	~~Q~~ SR 3.3.6.4	1, 2, 3, 4

See ITS 3.3.2

(L03) ~~92 days on a STAGGERED TEST BASIS~~

In accordance with the Surveillance Frequency Control Program (LA01)

Add proposed SR 3.3.6.3 with a Frequency of ~~92 days on a STAGGERED TEST BASIS~~ for ITS Table 3.3.6-1 Function 2 (M04)

Add proposed SR 3.3.6.5 with a of Frequency of ~~every 18 months~~ for ITS Table 3.3.6-1 Function 2 (M04)

In accordance with the Surveillance Frequency Control Program (LA01)

Add proposed SR 3.3.6.6 Note (A07)

Licensee Response/NRC Response/NRC Question Closure

Id	**119**
NRC Question Number	**KAB043**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/17/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/17/2014 9:27 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**71**
NRC Question Number	**KAB044**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.6**
DOC Number	**L-4**
JFD Number	
JFD Bases Number	
Page Number(s)	**911**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

On page 911 of Enclosure 2, Volume 8, L04 provides the discussion of converting applicable mode 6 for the Containment purge air process monitors in CTS Table 3.3-6 to ITS Table 3.3.6-1. CTS defines mode 6 as refueling, which is fuel in the reactor vessel with the vessel head closure bolts less than fully tensioned or with the head removed, reactivity condition less than or equal to 0.95, 0% rated thermal power excluding decay heat, and average coolant temperature less than or equal to 140 °F. TVA is requesting to replace the mode 6 applicability for the containment purge air process monitors with the ITS applicability during movement of recently irradiated fuel assemblies within containment. L04 states:

> **TVA has performed a Fuel Handling Accident Radiological Accident Analysis for SQN using the alternate source term analysis methodology described in Regulatory Guide 1.183 obtaining acceptable results. The SQN fuel handling analysis assumes, in part, that the accident occurs within 100 hours after a plant shut down, radioactive decay during the interval between shut down and movement of the first spent fuel assembly is taken into account, and a single fuel**

assembly is damaged. As a result of the analysis, it has been determined that the handling of spent fuel assemblies can take place with the containment open and the Auxiliary Building Gas Treatment System out of service (i.e., no credit for filtration of releases) when handling fuel that has not occupied part of a critical reactor core within the previous 100 hours. The NRC approved use of this analysis for SQN under License Amendment 288/278 (Unit 1/Unit 2) (ADAMS Accession No. ML033070057).

The cover letter for License Amendment 288/278 (ADAMS Accession No. ML033030206) states, "The selective use of the AST and the total effective dose equivalent criteria may not be extended to other aspects of the plant design or operation without prior NRC review and approval under 10 CFR 50.67." Please confirm that you are requesting the NRC staff to extend the review performed in license amendment 288/278 to this requested change in Sequoyah's conversion. Note that request is a beyond scope change and will be reviewed by the associated technical branch.

Attach File 1	
Attach File 2	
Issue Date	**5/19/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/19/2014 8:14 AM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**99**
NRC Question Number	**KAB044**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1.pdf** (8KB)
Attachment 2	**Attachment 2 Radiological Consequences of FHA.pdf** (228KB)
Response Statement	**In response to KAB044, SQN requests that the NRC staff extend their review performed in support of license amendments 288 and 278 for SQN, Units 1 and 2, to proposed changes in the SQN ITS conversion. Specifically, SQN requests NRC review and approval for ITS Specifications that have revised the Mode of Applicability to include the term, "recently," with the current AST analysis as the basis for using the term, "recently."** **See Attachment 1 for additional information concerning SQN's current AST analysis for a fuel handling accident (FHA).** **See Attachment 2 for SQN's current AST analysis for an FHA.**
Response Date/Time	**6/5/2014 4:35 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/5/2014 3:32 PM**
Date Modified	
Modified By	

Background

NRC approval for the use of an alternative source term (AST) for the SQN Design Basis Fuel Handling Accident (FHA) is contained in the Safety Evaluation (SE) dated October 28, 2003 (ML033030206). The FHA SE states: *With this approval, the selected characteristics of the AST and TEDE criteria become the design basis for the DBA FHA within the containment and outside containment.* The FHA SE also states: *Additionally, the NRC staff finds that the EAB, LPZ and control room doses will continue to comply with the applicable regulatory criteria without credit being taken for containment isolation if the irradiated fuel has been allowed to decay for 100 hours prior to being moved.* Therefore, at the time of the NRC review and approval of the AST submittal, NRC acknowledged that the AST FHA analysis did not credit containment isolation, with the above proviso on irradiated fuel. This analysis was revised in 2012 to support removal of the purge isolation function.

Current AST FHA Analysis

Table 1 of the FHA SE summarizes the parameters that were deemed acceptable in the NRC-approved FHA analysis. From that table, only the containment purge isolation time is different in the current FHA analysis. Specifically, the containment purge isolation time used in the current FHA analysis was increased from 30 seconds to 5 minutes. However, as discussed below the control room and offsite doses are higher for shorter purge isolation times, i.e., the current FHA analysis is conservative with respect to the previously reviewed, NRC-approved FHA analysis. In addition, if the purge is isolated at the initiation of an FHA inside containment, the control room and offsite doses would be no higher than for an FHA outside containment.

Removing the purge isolation function

If containment purge isolates at the initiation of an FHA inside containment, then the entire release is modeled as originating from the Auxiliary Building (AB). Therefore, the results of the FHA inside containment analysis are the same as the results of the FHA outside containment analysis. Because neither scenario credits filtration before being released, the only parameters of interest are the release rate and the meteorology (X/Q). The AB release has a higher control room X/Q than the containment release so it produces higher control room doses when the release rates are the same. However, the difference in release rates has the potential for the containment purge release to be more limiting because the amount of iodine released before control room isolation could be more. As outlined in RG 1.183, all of the activity is required to be released within 2 hrs. Consequently, after the control room isolates, the pathway with the higher X/Q becomes the more conservative pathway. Thus, it is more conservative to assume purge ventilation isolates and the activity exhausts through the AB vent. Because isolation was assumed to make the FHA inside containment more limiting and not to reduce offsite and control room doses, the purge ventilation isolation function is not required.

Westinghouse

Radiological Consequences of Fuel Handling Accidents for the Sequoyah Nuclear Plant Units 1 and 2

Addressing:
1) Implementation of Alternate Source Term
2) Permitting Open Equipment Hatch During Fuel Movement
3) No credit for Operation of the Auxiliary Building Gas Treatment System

Document ID: LTR-CRA-02-219, Revision 1

Prepared for Tennessee Valley Authority
by Westinghouse Electric Company
January 30, 2012

1.0 USE OF ALTERNATE SOURCE TERM METHODOLOGY

1.1 Introduction

Alternate source term (AST) methodology is described in Regulatory Guide 1.183 (Reference 1) and it is being implemented at Sequoyah Units 1 and 2 in a limited-scope application that will only affect the determination of design basis accident doses for the Fuel Handling Accident (occurring either outside containment or inside containment). With the use of the AST methodology, it can be demonstrated that handling of spent fuel assemblies and performing core alterations can take place with the containment equipment hatch open and with the Auxiliary Building Gas Treatment System out of service (no credit for filtration of releases).

1.2 Dose Models and Timing

Doses are determined at the exclusion area boundary (EAB) and at the low population zone boundary (LPZ) for the two-hour interval over which releases are assumed to take place and in the control room for an extended period of time after termination of releases in order to address the continued presence of activity in the control room atmosphere.

The accident doses were calculated using the dose model consistent with the use of the alternate source term methodology (Regulatory Guide 1.183) and are reported as Total Effective Dose Equivalent (TEDE).

The TEDE dose is the sum of the Committed Effective Dose Equivalent (CEDE) and the Effective Dose Equivalent (EDE) which are calculated using the following equations:

$$D_{CEDE} = (A)(X/Q)(BR)(DCF_{CEDE})$$

$$D_{EDE} = (A)(X/Q)(DCF_{EDE})$$

where: A = Activity of the nuclide released (Ci)

X/Q = atmospheric dispersion factor (sec/m^3)

BR = breathing rate (m^3/sec)

DCF_{CEDE} = CEDE dose conversion factor (rem/Ci inhaled)

DCF_{EDE} = EDE dose conversion factor (rem-m^3/Ci-s)

Nuclide data is provided in Table 1. The decay constants for the iodines and noble gases were provided by TVA. The dose conversion factors for the CEDE doses are taken from Table 2.1 of EPA Federal Guidance Report No. 11 (Reference 2). The dose conversion factors for the EDE doses are from Table III.1 of EPA Federal Guidance Report No. 12 (Reference 3). The tritium decay constant is derived from the half-life reported in ICRP Publication 38 (Reference 4).

2.0 FUEL HANDLING ACCIDENT ANALYSIS

A fuel assembly is assumed to be dropped and damaged during refueling. Activity released from the damaged assembly is released to the outside atmosphere through either the containment purge system or the fuel-handling building ventilation system to the plant vent.

2.1 Input Parameters and Assumptions

The analysis of the radiological consequences following a fuel handling accident (FHA) uses the methodology outlined in Regulatory Guide 1.183 (Reference 1). The major assumptions and parameters used in the analysis are itemized in Table 2.

It is assumed that all of the fuel rods in the equivalent of one fuel assembly are damaged to the extent that all the gap activity in the rods is released. Also, the assembly inventory is based on the assumption that the subject fuel assembly has been operated at 1.7 times core average power. The core fission product source term bounds operation with or without the presence of TPBARs (Tritium Producing Burnable Absorber Rods) in the reactor core.

The damaged fuel assembly is assumed to be one with 24 TPBARs which are also assumed to be damaged. Although the release of tritium to the water pool is expected to take place relatively slowly, it is conservatively assumed that all of the tritium is released from the TPBARs immediately. Since tritium in the gaseous form is not a significant dose contributor (minor beta radiation emitter with no retention in the body), it is assumed that all tritium is in the form of water – either as T_2O or HTO. In the water vapor form the tritium is readily absorbed into the body tissues where there can be a significant dose contribution.

The decay time prior to the accident is 100 hours.

The analysis assumes that the iodine released from the fuel is 99.85% elemental and 0.15% organic. This is consistent with Regulatory Guide 1.183. The water pool provides retention of a large portion of the elemental iodine but there is no retention of the organic iodine credited. From Regulatory Guide 1.183, a decontamination factor (DF) of 200 specified is applied to the overall iodine inventory released to the pool. No retention in the water pool is assumed for noble gases (DF = 1.0).

While the tritium is assumed to be chemically combined with oxygen to form tritiated water and would thus be readily retained in the water pool, no credit is taken for retention in the pool.

For the FHA occurring outside of containment, all of the activity released from the damaged fuel and not retained in the water pool is assumed to be released within two hours. No credit is taken for filtration of iodine in the release path. This allows the Auxiliary Building Gas Treatment System to be out of service during spent fuel handling operations.

For the FHA occurring inside containment it is assumed that only a fraction of the containment volume is included in the mixing volume and that the purge line is isolated within 300 seconds. No credit is taken for filtration of the purge flow. After isolation of the containment purge line, it

is assumed that all of the activity remaining in the containment is released within two hours of the fuel damage occurrence.

2.2 Acceptance Criteria

The offsite dose limit is defined in Regulatory Guide 1.183 to be 6.3 rem TEDE and, from 10CFR50.67, the dose limit for the control room is 5.0 rem TEDE.

2.3 Results

	FHA Occurring in the Auxiliary Building	FHA Occurring inside Primary Containment
EAB	4.5 rem TEDE	4.5 rem TEDE
LPZ	0.8 rem TEDE	0.8 rem TEDE
Control room	4.1 rem TEDE	3.9 rem TEDE

The doses are all within the acceptance criteria.

3.0 REFERENCES

1. Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," July 2000
2. EPA Federal Guidance Report No. 11, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," EPA-520/1-88-020, September 1988
3. EPA Federal Guidance Report No. 12, "External Exposure to Radionuclides in Air, Water, and Soil," EPA 402-R-93-081, September 1993
4. ICRP Publication 38, "Radionuclide Transformations, Energy and Intensity of Emissions," 1983

Table 1: Nuclide Data

Nuclide	Decay Constant (hr^{-1})	Committed Effective Dose Equivalent DCF from EPA Federal Guidance Report No. 11 (rem/Ci inhaled)	Effective Dose Equivalent DCF from EPA Federal Guidance Report No.12 (rem-m^3/Ci-s)
I-131	3.5833E-3	3.29E4	6.734E-2
I-132	3.0401E-1	3.81E2	4.144E-1
I-133	3.3320E-2	5.85E3	1.088E-1
I-135	1.0486E-1	1.23E3	2.953E-1
Kr-85	7.3692E-6	N/A	4.403E-4
Xe-131m	2.4269E-3	N/A	1.439E-3
Xe-133m	1.2836E-2	N/A	5.069E-3
Xe-133	5.4594E-3	N/A	5.772E-3
Xe-135	7.5755E-2	N/A	4.403E-2
H-3 (tritium)	6.407E-6	64.01	1.225E-6

Table 2: Fuel Handling Accident Assumptions

Delay after shutdown before fuel movement		100 hours
Average fuel assembly activity at shutdown (no decay)[1]		
	I-131	4.90E5
	I-132	7.18E5
	I-133	1.01E6
	I-135	9.65E5
	Kr-85	5.35E3
	Xe-131m	5.43E3
	Xe-133m	3.19E4
	Xe-133	9.92E5
	Xe-135	3.33E5
	Te-131m	9.62E4
	Te-132	7.05E5
Radial peaking factor		1.7
Fuel rod gap fraction[2]		
	I-131	0.08
	Kr-85	0.10
	Other iodines and noble gases	0.05
Fuel damaged		One assembly with 24 TPBARs
Iodine species split		
	Elemental	99.85%
	Organic	0.15%
Tritium release from 24 damaged TPBARs		84,000 Ci
Pool scrubbing factor		
	Iodine	200
	Noble gases	1
	Tritium	1
Breathing rate		3.5E-4 m^3/sec

[1] Only the iodines and noble gases having a significant presence after 100 hours are included in the list. The Te-131m and Te-132 are included since they produce I-131 and I-132 respectively as decay products.

[2] These gap fractions are dependent on limiting the high burnup fuel rods (>54,000 MWD/Mtu) to a maximum linear heat generation rate of ≤6.3 kw/ft, peak rod average power.

Table 2 (continued)

Atmospheric dispersion factor	
EAB	8.59E-4 sec/m^3
LPZ outer boundary	1.39E-4 sec/m^3
<u>FHA Outside Containment</u>	
Release path filter efficiency for iodines	No credit assumed
Isolation of release path	None
Duration of releases	2 hours
<u>FHA Inside Containment</u>	
Mixing volume	325,500 ft^3
Purge flow rate	16,000 cfm
Release path filter efficiency for iodines	None
Isolation of purge release path	300 seconds
Duration of releases via the equipment hatch	300 sec – 2 hr
<u>Control Room Dose Analysis Parameters</u>	
Volume	2.6E5 cubic feet
Normal operation inflow (unfiltered)	3200 cfm
Air intake high radiation setpoint to actuate HVAC emergency mode	400 cpm
Time to switch to emergency mode after signal	5 min
Emergency mode filtered intake flow	1000 cfm
Emergency mode filtered recirculation flow	2600 cfm
Filter efficiency for iodine	95%
Unfiltered inleakage	51 cfm
Atmospheric dispersion factor (X/Q)	
FHA outside containment (0 – 2 hr)	1.80E-3 sec/m^3
FHA inside containment	
0 – 300 sec	5.63E-4 sec/m^3
300 sec – 2 hr	1.80E-3 sec/m^3
Occupancy factor	
0 – 24 hours	1.0
24 – 96 hours	0.6
96 – 720 hours	0.4
Breathing rate	3.5E-4 m^3/sec

Licensee Response/NRC Response/NRC Question Closure

Id	**273**
NRC Question Number	**KAB044**
Select Application	**NRC Response**
Attachment 1	
Attachment 2	
Response Statement	**Regarding TVA's proposed changes related to the adoption of TSTFs-51, -286 and -471, in a 8/12/14 meeting between the NRC and TVA at the NRC HQ followed by 8/19/14 phone call between the NRC and TVA, the NRC was informed of the TVA's decision for rescinding all changes associated with the subject TSTFs as currently specified in its TS conversion amendment.** **Please submit the revised pages for the NRC's review.**
Response Date/Time	**8/20/2014 6:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**8/20/2014 2:20 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**373**
NRC Question Number	**KAB044**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**Per discussion, on October 7, 2014, between SQN and NRC staff, SQN proposes that changes incorporated in NUREG-1431, Revision 4, associated with TSTFs-51, -286, and -471 be reviewed as submitted in the SQN ITS conversion submittal. SQN understands, that during staff review, there may be additional requests for information related to the changes made to NUREG-1431, Revision 4.**
Response Date/Time	**10/16/2014 2:15 PM**
Closure Statement	
Question Closure Date	
Notification	**Mark Blumberg** **Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**10/16/2014 1:12 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**376**
NRC Question Number	**KAB044**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**The NRC staff will perform the review as requested. This RAI is being closed at this time and other RAIs, as necessary, will be entered into the database as the review progresses. AST RAIs have been entered as KAB-066 through KAB-071.**
Question Closure Date	**10/17/2014**
Notification	**Mark Blumberg** **Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**10/17/2014 7:11 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**72**
NRC Question Number	**KAB045**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.6**
DOC Number	**L-6**
JFD Number	
JFD Bases Number	
Page Number(s)	**912**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

On page 912 of Enclosure 2, Volume 8, L06 provides the discussion of the CTS requirement to demonstrate operability within 100 hours prior to the start of movement of irradiated fuel within containment by verifying that containment ventilation isolation occurs on manual initiation and on a high radiation test signal from each of the containment radiation monitoring instrumentation channels. This CTS requirement requires *performance* of the surveillance requirements (SRs) that demonstrate the operability within 100 hours prior to the start of moving irradiated fuel. The ITS requires the SRs to be *met* prior to movement of recently irradiated fuel.

In ITS there is a difference between “met” and “performed.” A Surveillance is "met" only when the acceptance criteria are satisfied. "Performance" refers only to the requirement to specifically determine the ability to meet the acceptance criteria. ITS SR 3.3.6.2 ALT has a frequency of 92 days on a staggered test basis, ITS SR 3.3.6.4 COT has a frequency of 92 days, and ITS SR 3.3.6.6 TADOT has a frequency of 18 months. ITS SR

3.3.6.2 and 3.3.6.6 have a longer frequency and may be still "met" within a 100 hours of moving fuel therefore, ITS will not require them to be "performed."

Please provide a technical evaluation that explains the safety basis for deleting the requirement to "perform" the CTS SRs that demonstrate the operability of the containment ventilation isolation system within 100 hours prior to the start of moving irradiated fuel. In addition, add the manual initiation ITS SR 3.3.6.6 to the discussion in L06 since it is applicable.

Attach File 1	
Attach File 2	
Issue Date	**5/19/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/19/2014 8:17 AM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**220**
NRC Question Number	**KAB045**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 KAB-045.pdf** (109KB)
Attachment 2	

Response Statement

In response to KAB045, discussion of change (DOC) L06, on page 912 of Enclosure 2, Volume 8, will be deleted. In addition, changes to CTS 4.9.9 associated with DOC L06 will be deleted and the corresponding Surveillance Requirement Frequencies for ITS SRs 3.3.6.4 and 3.3.6.6, on pages 918, 919, 927, and 928, will be revised to include the conditional performance of CTS 4.9.9, "within 100 hours prior to the start of."

During review for the RAI response, the following issues were identified.

1. **The CTS 4.9.9 reference to, "during movement of irradiated fuel within containment," should state, "during movement of recently irradiated fuel within containment." The addition of the term "recently" is justified in DOC L04 which discusses the change for the CTS 3.9.9 Applicability from, "During movement of irradiated fuel within containment," to, "During movement of recently irradiated fuel within containment." The CTS markups for CTS 4.9.9, on pages 888 and 900, will be revised to add "recently" and include a DOC L04 indicator.**

2. **ITS Table 3.3.6-1, Function 2 (Automatic Actuation Logic and Actuation Relays) requires Surveillance Requirements to be performed in Modes 1, 2, 3, 4, (a), where Footnote (a) states, "During movement of recently irradiated fuel assemblies within containment." CTS Table 4.3-2, Function 3.c.2 (Containment Ventilation Isolation, Automatic Isolation Logic) requires Surveillance Requirements to be performed in Modes 1, 2, 3, 4. ITS Function 2 corresponds to CTS Function 3.c.2. ITS Table 3.3.6-1, Function 2 should require Surveillance Requirements to be performed in Modes 1, 2, 3, 4. The ISTS markups, on pages 921 and 930, will be revised to delete Mode (a) associated with ITS Table 3.3.6-1, Function 2, and an associated JFD 2 indicator will be added.**

3. **The CTS markups (left hand margin) should indicate that CTS 4.9.9 corresponds to ITS SRs 3.3.6.4 and 3.3.6.6. The CTS markups, on pages 888 and 900, will be revised to replace ITS SR 3.3.6.2 with 3.3.6.6.**

See Attachment 1 for the draft revised CTS and ISTS markups and deletion of DOC L06.

Response Date/Time	**8/4/2014 6:55 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**8/4/2014 5:51 AM**
Date Modified	
Modified By	

ITS A01 ITS 3.3.6

REFUELING OPERATIONS

INSTRUMENTATION A02

3/4.9.9 CONTAINMENT VENTILATION ISOLATION ~~SYSTEM~~

LIMITING CONDITION FOR OPERATION

instrumentation A02

LCO 3.3.6 3.9.9 The Containment Ventilation isolation ~~system~~ shall be OPERABLE.

Applicability APPLICABILITY: During movement of irradiated fuel within the containment.

recently L04

ACTION:

instrumentation A02

ACTION B With the Containment Ventilation isolation ~~system~~ inoperable, close each of the Ventilation penetrations providing direct access from the containment atmosphere to the outside atmosphere. ~~The provisions of Specification 3.0.3 are not applicable.~~ M06

A02

~~92 days~~ for containment radiation monitors L05

In accordance with the Surveillance Frequency Control Program LA01

~~18 months~~ for manual initiation L05

SURVEILLANCE REQUIREMENTS

instrumentation

~~L06~~

~~SR 3.3.6.2~~, SR 3.3.6.4

SR 3.3.6.6

4.9.9 The Containment Ventilation isolation ~~system~~ shall be demonstrated OPERABLE ~~within 100 hours prior to the start of~~ and at least once per ~~7 days~~ during movement of irradiated fuel within containment by verifying that Containment Ventilation isolation occurs on manual initiation and on a high radiation test signal from each of the containment radiation monitoring instrumentation channels.

See ITS 3.9.4

STET

recently

L04

Enclosure 2, Volume 8, Rev. 0, Page 888 of 1148

ITS A01 ITS 3.3.6

REFUELING OPERATIONS

3/4.9.9 CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION ~~SYSTEM~~ A02

LIMITING CONDITION FOR OPERATION

LCO 3.3.6 3.9.9 The Containment Ventilation Isolation instrumentation ~~System~~ shall be OPERABLE. A02

Applicability APPLICABILITY: During movement of recently irradiated fuel within the containment. L04

ACTION:

ACTION B With the Containment Ventilation Isolation instrumentation ~~System~~ inoperable, close each of the Ventilation penetrations providing direct access from the containment atmosphere to the outside atmosphere. ~~The provisions of Specification 3.0.3 are not applicable.~~ A02 M06

SURVEILLANCE REQUIREMENTS

~~SR 3.3.6.2,~~ SR 3.3.6.4 SR 3.3.6.6 4.9.9 The Containment Ventilation Isolation instrumentation ~~System~~ shall be demonstrated OPERABLE ~~within 100 hours prior to the start of~~ and at least once per ~~7 days~~ ~~92 days~~ for containment radiation monitors ~~18 months~~ for manual initiation In accordance with the Surveillance Frequency Control Program during movement of recently irradiated fuel within containment by verifying that Containment Ventilation isolation occurs on manual initiation and on a high radiation test signal from each of the containment radiation monitoring instrumentation channels.

A02 L05 LA01 L05 ~~L06~~ STET L04 See ITS 3.9.4

DISCUSSION OF CHANGES
ITS 3.3.6, CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION

L05 *(Category 7 – Relaxation of Surveillance Frequency)* CTS 4.9.9 includes a Surveillance Frequency of "once per 7 days" during conditions specified in the Applicability for performing Surveillances of the Containment Ventilation Isolation System on the manual initiation channels and the high radiation monitoring instrumentation channels. The ITS SR 3.3.6.4 requires the performance of a COT on the Containment Purge Air Radiation Monitoring Instrumentation, every 92 days. ITS SR 3.3.6.6 requires the performance of a TADOT on the manual initiation channels every 18 months. This changes the CTS by changing the Surveillance Frequency from 7 days to 92 days for the Containment Purge Air Radiation monitoring channels and 18 months for the manual initiation channels. (See DOC LA01 for a discussion on moving the Surveillance Frequencies to the Surveillance Frequency Control Program.)

The purpose of CTS 4.9.9 is to verify the equipment required to meet the LCO is OPERABLE. This change is acceptable because the new Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. Containment ventilation isolation instrumentation testing is still required, but at a Frequency consistent with the testing Frequency for containment isolation instrumentation required in CTS Table 4.3-2 and CTS Table 4.3-3. This Frequency provides an appropriate degree of assurance that the instruments are OPERABLE. This change is designated as less restrictive because Surveillances will be performed less frequently under the ITS than under the CTS.

~~L06~~ ~~*(Category 7 – Relaxation of Surveillance Frequency)* CTS 4.9.9 states, in part, that the Containment Ventilation isolation system shall be demonstrated OPERABLE within 100 hours prior to the start of movement of irradiated fuel within containment. ITS SR 3.3.6.2 and ITS SR 3.3.6.4 do not include the Frequency of within 100 hours prior to the start of movement of irradiated fuel within containment. ITS SR 3.0.1 states "SRs shall be met during the MODES or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR." Therefore, the ITS requires the Surveillance be met prior to initiation of movement of recently irradiated fuel. (See DOC L04 for discussion on changing the Applicability from during movement of irradiated fuel to during movement of recently irradiated fuel.) This changes the CTS by eliminating the stipulation that the Surveillances be met within 100 hours prior to entering the conditions specified in the Applicability.~~

Not Used

~~The purpose of CTS 4.9.9 is to verify that the Containment Ventilation Isolation System is OPERABLE. This change is acceptable because the new Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. The periodic Surveillance Frequency for verifying that Containment Ventilation isolation occurs is acceptable during the conditions specified in the Applicability, and is also acceptable during the period prior to entering the conditions specified in the Applicability. This change is designated as less restrictive because Surveillance will be performed less frequently under the ITS than under the CTS.~~

CTS

Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.6~~A~~

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
~~-----REVIEWER'S NOTE-----~~ ~~The Frequency of 92 days on a STAGGERED TEST BASIS is applicable to the master relays processed through the Solid State Protection System.~~ ~~-----~~		6
DOC M04 [SR 3.3.6.~~5~~ 3	-----NOTE----- This Surveillance is only applicable to the master relays of the ESFAS Instrumentation. ----- Perform MASTER RELAY TEST.	3 5 ~~[92 days on a STAGGERED TEST BASIS~~ ~~OR~~ 4 In accordance with the Surveillance Frequency Control Program ~~]~~] 4 3
Table 4.3-2 Function 3.c.3, Table 4.3-3 Instrument 2.a, 4.9.9 SR 3.3.6.~~6~~ 4	Perform COT.	2 Within 100 hours prior to start of movement of recently irradiated fuel AND ~~[92 days~~ 5 ~~OR~~ 4 In accordance with the Surveillance Frequency Control Program] 4

CTS

Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.6~~A~~

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
DOC M04	SR 3.3.6.~~7~~ 5	Perform SLAVE RELAY TEST.	~~[[92] days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	5 4 4
DOC A07 Table 4.3-2 Function 3.c.1, 4.9.9	SR 3.3.6.~~8~~ 6	-----------------------------NOTE----------------------------- Verification of setpoint is not required. --- Perform TADOT.	Within 100 hours prior to start of movement of recently irradiated fuel AND ~~[[18] months~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	5 2 4 4
Table 4.3-2 Function 3.c.3, Table 4.3-3 Instrument 2.a	SR 3.3.6.~~9~~ 7	Perform CHANNEL CALIBRATION.	~~[[18] months~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	5 4 4

INSERT 1 2

Enclosure 2, Volume 8, Rev. 0, Page 919 of 1148

CTS

Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.6~~A~~

Table 3.3.6-1 (page 1 of 1)
Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation 1

CTS	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT	
Tables 3.3-3, 4.3-2, and 3.3-4, Function 3.c.1	1. Manual Initiation	1,2,3,4, (a)	2	SR 3.3.6.~~8~~ 6	NA	5
Tables 3.3-3, 4.3-2, and 3.3-4, Function 3.c.2	2. Automatic Actuation Logic and Actuation Relays	1,2,3,4, ~~(a)~~	2 trains	~~SR 3.3.6.2~~ ~~SR 3.3.6.3~~ ~~[~~SR 3.3.6.~~4]~~ 2 ~~[~~SR 3.3.6.~~5]~~ 3 SR 3.3.6.~~7~~ 5	NA 2	5
Tables 3.3-3, 4.3-2, and 3.3-4, Function 3.c.3, and Table 3.3-6 Instrument 2.a	3. ~~[~~ Containment Purge Air Radiation Monitor					3
	~~a. Gaseous~~	1,2,3,4~~, (a)~~	~~[~~1~~]~~	SR 3.3.6.1 SR 3.3.6.~~6~~ 4 SR 3.3.6.~~9~~ 7 SR 3.3.6.8	≤ ~~[2 x background]~~ 8.5 x 10^{-3} μCi/cc	5
	INSERT 2					
	~~b. Particulate~~	~~1,2,3,4, (a)~~	~~[1]~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.6~~ ~~SR 3.3.6.9~~	~~≤ [2 x background]~~	
	~~c. Iodine~~	~~1,2,3,4, (a)~~	~~[1]~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.6~~ ~~SR 3.3.6.9~~	~~≤ [2 x background]~~	
	~~d. Area Radiation~~	~~1,2,3,4, (a)~~	~~[1]~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.6~~ ~~SR 3.3.6.9~~	~~≤ [2 x background]]~~	
DOC M02	4. ~~Containment Isolation - Phase A~~ Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function ~~3.a.~~ 1., for all initiation functions and requirements.				2

(a) During movement of ~~[~~recently~~]~~ irradiated fuel assemblies within containment. 3

CTS

Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation ~~(Without Setpoint Control Program)~~
3.3.6~~A~~ 1

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
~~-----REVIEWER'S NOTE----- The Frequency of 92 days on a STAGGERED TEST BASIS is applicable to the master relays processed through the Solid State Protection System.~~		6
DOC M04 ~~[~~SR 3.3.6.~~5~~ 3	-----NOTE----- This Surveillance is only applicable to the master relays of the ESFAS Instrumentation. ----- Perform MASTER RELAY TEST.	3 5 ~~[92 days on a STAGGERED TEST BASIS~~ ~~OR~~ 4 In accordance with the Surveillance Frequency Control Program ~~]]~~ 4 3
Table 4.3-2 Function 3.c.3, Table 4.3-3 Instrument 2.a, 4.9.9 SR 3.3.6.~~6~~ 4	Perform COT.	2 ~~[92 days~~ ~~OR~~ 5 4 Within 100 hours prior to start of movement of recently irradiated fuel AND In accordance with the Surveillance Frequency Control Program ~~]~~ 4

CTS

Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation ~~(Without Setpoint Control Program)~~
3.3.6~~A~~ 1

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
DOC M04	SR 3.3.6.~~7~~ 5	Perform SLAVE RELAY TEST.	~~[[92] days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	5 4 4
DOC A07 Table 4.3-2 Function 3.c.1, 4.9.9	SR 3.3.6.~~8~~ 6	-----------------------------NOTE----------------------------- Verification of setpoint is not required. --- Perform TADOT.	Within 100 hours prior to start of movement of recently irradiated fuel AND ~~[[18] months~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	5 2 4 4
Table 4.3-2 Function 3.c.3, Table 4.3-3 Instrument 2.a	SR 3.3.6.~~9~~ 7	Perform CHANNEL CALIBRATION.	~~[[18] months~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	5 4 4

INSERT 1 2

CTS

Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.6~~A~~

Table 3.3.6-1 (page 1 of 1)
Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation 1

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT	
Tables 3.3-3, 4.3-2, and 3.3-4, Function 3.c.1	1. Manual Initiation	1,2,3,4, (a)	2	SR 3.3.6.~~8~~ 6	NA	5
Tables 3.3-3, 4.3-2, and 3.3-4, Function 3.c.2	2. Automatic Actuation Logic and Actuation Relays	1,2,3,4, ~~(a)~~	2 trains	~~SR 3.3.6.2~~ ~~SR 3.3.6.3~~ ~~[~~SR 3.3.6.~~4~~ 2~~]~~ ~~[~~SR 3.3.6.~~5~~ 3~~]~~ SR 3.3.6.~~7~~ 5	NA 2	5
Tables 3.3-3, 4.3-2, and 3.3-4, Function 3.c.3, and Table 3.3-6 Instrument 2.a	3. ~~[~~ Containment Purge Air Radiation Monitor					3
	~~a. Gaseous~~	1,2,3,4~~, (a)~~	~~[~~1~~]~~	SR 3.3.6.1 SR 3.3.6.~~6~~ 4 SR 3.3.6.~~9~~ 7 SR 3.3.6.8	≤ ~~[2 x background]~~ 8.5 x 10^{-3} μCi/cc	5
	INSERT 2					
	~~b. Particulate~~	~~1,2,3,4, (a)~~	~~[~~1~~]~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.6~~ ~~SR 3.3.6.9~~	~~≤ [2 x background]~~	
	~~c. Iodine~~	~~1,2,3,4, (a)~~	~~[~~1~~]~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.6~~ ~~SR 3.3.6.9~~	~~≤ [2 x background]~~	
	~~d. Area Radiation~~	~~1,2,3,4, (a)~~	~~[~~1~~]~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.6~~ ~~SR 3.3.6.9~~	~~≤ [2 x background]]~~	
DOC M02	4. ~~Containment Isolation - Phase A~~ Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function ~~3.a.~~ 1., for all initiation functions and requirements.				2

(a) During movement of ~~[~~recently~~]~~ irradiated fuel assemblies within containment. 3

Licensee Response/NRC Response/NRC Question Closure

Id	**243**
NRC Question Number	**KAB045**
Select Application	**NRC Response**
Attachment 1	
Attachment 2	
Response Statement	**Sequoyah CTS requires the containment ventilation isolation system shall be operable during movement of irradiated fuel within the containment. CTS requires verification that the containment ventilation isolation occurs on manual initiation and on a high radiation test signal from each of the containment radiation monitoring instrumentation channels within 100 hours prior to the start of and at least once per 7 days during the movement of irradiated fuel within containment.** **Please explain if the high radiation test signal from each containment purge air radiation monitor can isolate the containment ventilation system without the automatic actuation logic and actuation relays being operable (during movement of irradiated fuel within containment). If the isolation of the containment ventilation system cannot occur without operability of the automatic actuation logic and actuation relays then please return footnote (a) to function 2 in TS Table 3.3.6-1.**
Response Date/Time	**8/6/2014 6:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**8/6/2014 8:41 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**394**
NRC Question Number	**KAB045**
Select Application	**Licensee Response**
Attachment 1	**RAI KAB045 revised Attachment 1.pdf** (2MB)
Attachment 2	
Response Statement	**This response supplements the response to RAI KAB045 based on NRC response dated August 6, 2014.**

The containment purge air radiation monitors will isolate the containment ventilation isolation system without the automatic actuation logic being OPERABLE; however, the master and slave relays are required to be OPERABLE for the isolation to occur. The high radiation signal from the containment purge air radiation monitors goes directly to a safeguards driver card bypassing the automatic actuation logic. The safeguards driver card will actuate the master relay which will, in turn, pick up the slave relays, initiating the containment ventilation isolation. Because the automatic actuation logic is bypassed, there is no need for the logic to be OPERABLE during the movement of recently irradiated fuel within containment. Therefore, ITS Table 3.3.6-1, on pages 921 and 930 of Enclosure 2, Volume 8, will be revised to include a new Insert 3 that addresses the separation of ITS 3.3.6, Function 2 into two sub-functions. Specifically, ITS Table 3.3.6-1, Function 2 (Automatic Actuation Logic and Actuation Relays) will be divided into two sub-functions (a. Logic and b. Relays) to align with the required applicable MODES. ITS 3.3.6, Function 2.a (Automatic Actuation Logic) will be required OPERABLE in MODES 1, 2, 3, and 4. For ITS Function 2.a, SR 3.3.6.2 (ACTUATION LOGIC TEST) will be required in MODES 1, 2, 3, and 4. ITS 3.3.6, Function 2.b (Automatic Actuation Relays) will be required OPERABLE in MODES 1, 2, 3, 4, and (a), where

Footnote (a) is during the movement of recently irradiated fuel assemblies within containment. For ITS 3.3.6, Function 2.b, SRs 3.3.6.3 (MASTER RELAY TEST) and 3.3.6.5 (SLAVE RELAY TEST) will be required in MODES 1, 2, 3, 4, and (a). This revision will ensure the master and slave relays are verified to be OPERABLE during the movement of recently irradiated fuel assemblies within containment. Additionally, Justification for Deviation (JFD) 7 will be added to the Justification for Deviations Section on page 932 to justify the change to ISTS.

Additional changes associated with the discussion above include:

1. **CTS 4.9.9 will be added as a cross reference for Insert 3. (Pages 921 and 930)**

2. **JFD 7 indicators will be added to the associated changes. (Pages 921, 922, 930, and 931)**

3. **The ITS 3.3.6 Bases Applicability Section will be revised to indicate that ITS Table 3.3.6-1 specifies the required Mode of Applicability for Manual Initiation, Automatic Actuation Logic and Actuation Relays, Safety Injection, and Containment Radiation Functions. (Pages 937 and 952)**

Additionally, during review for KAB045, it was identified that CTS 4.9.9 requires verifying that each of the containment radiation monitoring instrumentation channels is OPERABLE during movement of irradiated fuel within containment. As originally proposed, ITS Table 3.3.6-1 requires only one Containment Purge Air Radiation Monitor to be OPERABLE during the movement of recently irradiated fuel assemblies within containment. Therefore, ITS Table 3.3.6-1, Insert 2 on pages 922 and 931, will be revised to require two Containment Purge Air Radiation Monitors to be OPERABLE during the movement of recently irradiated fuel assemblies within containment. The ITS 3.3.6 Bases, LCO Section for Function 3 (Containment

Radiation) on pages 937 and 952, will also be revised to reflect that ITS Table 3.3.6-1 specifies the number of required channels.

Additional changes associated with the number of required Radiation Monitors include:

1. **The ITS 3.3.6 Bases APPLICABILITY discussion on pages 937 and 952 will be revised to reflect that the number of required channels is annotated on Table 3.3.6-1.**

2. **The pointer to ITS 3.3.6 Bases Insert 2 on pages 937 and 952 will be removed and ITS Bases 3.3.6 Insert 2 on pages 938 and 953 will be deleted.**

3. **The ITS 3.3.6 Bases Actions Section discussions associated with Conditions A.1 and B.1, on pages 940 and 955, will be revised to address the required radiation monitoring channel.**

See Attachment 1 for the final version of changes to be made to ITS 3.3.6 in response to KAB045.

Response Date/Time	**12/12/2014 9:50 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**12/12/2014 8:49 AM**
Date Modified	
Modified By	

ITS A01 ITS 3.3.6

REFUELING OPERATIONS

3/4.9.9 CONTAINMENT VENTILATION ISOLATION ~~SYSTEM~~ INSTRUMENTATION A02

LIMITING CONDITION FOR OPERATION

LCO 3.3.6 3.9.9 The Containment Ventilation isolation ~~system~~ instrumentation shall be OPERABLE. A02

Applicability APPLICABILITY: During movement of recently irradiated fuel within the containment. L04

ACTION:

ACTION B With the Containment Ventilation isolation ~~system~~ instrumentation inoperable, close each of the Ventilation penetrations providing direct access from the containment atmosphere to the outside atmosphere. ~~The provisions of Specification 3.0.3 are not applicable.~~ A02 M06

SURVEILLANCE REQUIREMENTS

A02

~~92 days~~ for containment radiation monitors L05

In accordance with the Surveillance Frequency Control Program LA01

~~18 months~~ for manual initiation L05

~~SR 3.3.6.2~~, SR 3.3.6.4 SR 3.3.6.3 SR 3.3.6.5 SR 3.3.6.6

4.9.9 The Containment Ventilation isolation ~~system~~ instrumentation shall be demonstrated OPERABLE ~~within 100 hours prior to the start of~~ and at least once per ~~7 days~~ during movement of recently irradiated fuel within containment by verifying that Containment Ventilation isolation occurs on manual initiation and on a high radiation test signal from each of the containment radiation monitoring instrumentation channels.

~~L06~~ See ITS 3.9.4

STET

recently L04

ITS A01 ITS 3.3.6

REFUELING OPERATIONS

3/4.9.9 CONTAINMENT VENTILATION ISOLATION ~~SYSTEM~~ INSTRUMENTATION A02

LIMITING CONDITION FOR OPERATION

LCO 3.3.6 3.9.9 The Containment Ventilation Isolation ~~System~~ instrumentation shall be OPERABLE. A02

Applicability APPLICABILITY: During movement of recently irradiated fuel within the containment. L04

ACTION:

ACTION B With the Containment Ventilation Isolation ~~System~~ instrumentation inoperable, close each of the Ventilation penetrations providing direct access from the containment atmosphere to the outside atmosphere. ~~The provisions of Specification 3.0.3 are not applicable.~~ A02 M06

SURVEILLANCE REQUIREMENTS

~~SR 3.3.6.2,~~ SR 3.3.6.4 SR 3.3.6.3 SR 3.3.6.5 SR 3.3.6.6 4.9.9 The Containment Ventilation Isolation ~~System~~ instrumentation shall be demonstrated OPERABLE ~~within 100 hours prior to the start of~~ and at least once per ~~7 days~~ (~~92 days~~ for containment radiation monitors; In accordance with the Surveillance Frequency Control Program; ~~18 months~~ for manual initiation) during movement of recently irradiated fuel within containment by verifying that Containment Ventilation isolation occurs on manual initiation and on a high radiation test signal from each of the containment radiation monitoring instrumentation channels.

A02 L05 LA01 L05 ~~L06~~ STET L04

See ITS 3.9.4

DISCUSSION OF CHANGES
ITS 3.3.6, CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION

L05 *(Category 7 – Relaxation of Surveillance Frequency)* CTS 4.9.9 includes a Surveillance Frequency of "once per 7 days" during conditions specified in the Applicability for performing Surveillances of the Containment Ventilation Isolation System on the manual initiation channels and the high radiation monitoring instrumentation channels. The ITS SR 3.3.6.4 requires the performance of a COT on the Containment Purge Air Radiation Monitoring Instrumentation, every 92 days. ITS SR 3.3.6.6 requires the performance of a TADOT on the manual initiation channels every 18 months. This changes the CTS by changing the Surveillance Frequency from 7 days to 92 days for the Containment Purge Air Radiation monitoring channels and 18 months for the manual initiation channels. (See DOC LA01 for a discussion on moving the Surveillance Frequencies to the Surveillance Frequency Control Program.)

The purpose of CTS 4.9.9 is to verify the equipment required to meet the LCO is OPERABLE. This change is acceptable because the new Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. Containment ventilation isolation instrumentation testing is still required, but at a Frequency consistent with the testing Frequency for containment isolation instrumentation required in CTS Table 4.3-2 and CTS Table 4.3-3. This Frequency provides an appropriate degree of assurance that the instruments are OPERABLE. This change is designated as less restrictive because Surveillances will be performed less frequently under the ITS than under the CTS.

~~L06~~ ~~*(Category 7 – Relaxation of Surveillance Frequency)* CTS 4.9.9 states, in part, that the Containment Ventilation isolation system shall be demonstrated OPERABLE within 100 hours prior to the start of movement of irradiated fuel within containment. ITS SR 3.3.6.2 and ITS SR 3.3.6.4 do not include the Frequency of within 100 hours prior to the start of movement of irradiated fuel within containment. ITS SR 3.0.1 states "SRs shall be met during the MODES or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR." Therefore, the ITS requires the Surveillance be met prior to initiation of movement of recently irradiated fuel. (See DOC L04 for discussion on changing the Applicability from during movement of irradiated fuel to during movement of recently irradiated fuel.) This changes the CTS by eliminating the stipulation that the Surveillances be met within 100 hours prior to entering the conditions specified in the Applicability.~~

Not Used

~~The purpose of CTS 4.9.9 is to verify that the Containment Ventilation Isolation System is OPERABLE. This change is acceptable because the new Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. The periodic Surveillance Frequency for verifying that Containment Ventilation isolation occurs is acceptable during the conditions specified in the Applicability, and is also acceptable during the period prior to entering the conditions specified in the Applicability. This change is designated as less restrictive because Surveillance will be performed less frequently under the ITS than under the CTS.~~

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CTS

Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation ~~(Without Setpoint Control Program)~~
3.3.6~~A~~ 1

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
~~-----REVIEWER'S NOTE----- The Frequency of 92 days on a STAGGERED TEST BASIS is applicable to the master relays processed through the Solid State Protection System.~~		
DOC M04 [SR 3.3.6.~~5~~ 3	-----NOTE----- This Surveillance is only applicable to the master relays of the ESFAS Instrumentation. ----- Perform MASTER RELAY TEST.	~~[92 days on a STAGGERED TEST BASIS~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~]
Table 4.3-2 Function 3.c.3, Table 4.3-3 Instrument 2.a, 4.9.9 SR 3.3.6.~~6~~ 4	Perform COT.	Within 100 hours prior to start of movement of recently irradiated fuel AND ~~[92 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~

6 3 5 4 4 3 5 2 4 4

CTS

Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.6~~A~~

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY	
DOC M04	SR 3.3.6.~~7~~ 5 Perform SLAVE RELAY TEST.	~~[[92] days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	5 4 4
DOC A07 Table 4.3-2 Function 3.c.1, 4.9.9	SR 3.3.6.~~8~~ 6 --------NOTE-------- Verification of setpoint is not required. ---------------- Perform TADOT.	Within 100 hours prior to start of movement of recently irradiated fuel AND ~~[[18] months~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	5 2 4 4
Table 4.3-2 Function 3.c.3, Table 4.3-3 Instrument 2.a	SR 3.3.6.~~9~~ 7 Perform CHANNEL CALIBRATION.	~~[[18] months~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	5 4 4

INSERT 1 2

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CTS

Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.6~~A~~

Table 3.3.6-1 (page 1 of 1)
Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation 1

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT	
Tables 3.3-3, 4.3-2, and 3.3-4, Function 3.c.1	1. Manual Initiation	1,2,3,4, (a)	2	SR 3.3.6.~~8~~ 6	NA	5
Tables 3.3-3, 4.3-2, and 3.3-4, Function 3.c.2; 4.9.9	2. Automatic Actuation ~~Logic and Actuation Relays~~ Insert 3	~~1,2,3,4, (a)~~	~~2 trains~~	~~SR 3.3.6.2~~ ~~SR 3.3.6.3~~ ~~[SR 3.3.6.4]~~ ~~2~~ ~~[SR 3.3.6.5]~~ 3 ~~SR 3.3.6.7~~ ~~5~~	NA	5 7
Tables 3.3-3, 4.3-2, and 3.3-4, Function 3.c.3, and Table 3.3-6 Instrument 2.a	3. ~~[~~ Containment Purge Air Radiation Monitor					3
	~~a. Gaseous~~ INSERT 2	1,2,3,4~~, (a)~~	~~[~~1~~]~~	SR 3.3.6.1 4 SR 3.3.6.~~6~~ 7 SR 3.3.6.~~9~~ SR 3.3.6.8	≤ ~~[2 x background]~~ 8.5 x 10^{-3} μCi/cc	5
	~~b. Particulate~~	~~1,2,3,4, (a)~~	~~[1]~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.6~~ ~~SR 3.3.6.9~~	~~≤ [2 x background]~~	
	~~c. Iodine~~	~~1,2,3,4, (a)~~	~~[1]~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.6~~ ~~SR 3.3.6.9~~	~~≤ [2 x background]~~	
	~~d. Area Radiation~~	~~1,2,3,4, (a)~~	~~[1]~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.6~~ ~~SR 3.3.6.9~~	~~≤ [2 x background]]~~	
DOC M02	4. ~~Containment Isolation - Phase A~~ Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function ~~3.a.~~ 1., for all initiation functions and requirements.				2

(a) During movement of ~~[~~recently~~]~~ irradiated fuel assemblies within containment. 3

3 **INSERT 2**

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
	(a)	~~1~~ 2	SR 3.3.6.1 SR 3.3.6.4 SR 3.3.6.7	≤ 8.5 x 10^{-3} μCi/cc

7 **INSERT 3**

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
a. Logic	1,2,3,4	2 trains	SR 3.3.6.2	NA
b. Relays	1,2,3,4, (a)	2 trains	SR 3.3.6.3 SR 3.3.6.5	NA

CTS

Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation ~~(Without Setpoint Control Program)~~ 1

3.3.6~~A~~

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
~~-----REVIEWER'S NOTE----- The Frequency of 92 days on a STAGGERED TEST BASIS is applicable to the master relays processed through the Solid State Protection System. -----~~		
~~[~~SR 3.3.6.~~5~~ 3	-----NOTE----- This Surveillance is only applicable to the master relays of the ESFAS Instrumentation. ----- Perform MASTER RELAY TEST.	~~[92 days on a STAGGERED TEST BASIS~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]]~~
SR 3.3.6.~~6~~ 4	Perform COT.	Within 100 hours prior to start of movement of recently irradiated fuel AND ~~[92 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~

DOC M04

Table 4.3-2 Function 3.c.3, Table 4.3-3 Instrument 2.a, 4.9.9

6

3 5

4

4 3

5 4 2

4

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CTS

Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.6~~A~~

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY	
DOC M04	SR 3.3.6.~~7~~ 5 Perform SLAVE RELAY TEST.	~~[[92] days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	5 4 4
DOC A07 Table 4.3-2 Function 3.c.1, 4.9.9	SR 3.3.6.~~8~~ 6 -----NOTE----- Verification of setpoint is not required. ---------- Perform TADOT.	Within 100 hours prior to start of movement of recently irradiated fuel AND ~~[[18] months~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	5 2 4 4
Table 4.3-2 Function 3.c.3, Table 4.3-3 Instrument 2.a	SR 3.3.6.~~9~~ 7 Perform CHANNEL CALIBRATION.	~~[[18] months~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	5 4 4

INSERT 1 2

CTS

Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation ~~(Without Setpoint Control Program)~~
3.3.6~~A~~

1

Table 3.3.6-1 (page 1 of 1)
Containment ~~Purge and Exhaust~~ Ventilation Isolation Instrumentation

1

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT	
Tables 3.3-3, 4.3-2, and 3.3-4, Function 3.c.1	1. Manual Initiation	1,2,3,4, (a)	2	SR 3.3.6.~~8~~ 6	NA	5
Tables 3.3-3, 4.3-2, and 3.3-4, Function 3.c.2	2. Automatic Actuation ~~Logic and Actuation Relays~~	~~1,2,3,4, (a)~~	~~2 trains~~	~~SR 3.3.6.2~~ ~~SR 3.3.6.3~~ ~~[SR 3.3.6.4]~~ ~~2~~ ~~[SR 3.3.6.5]~~ ~~3~~ ~~SR 3.3.6.7~~ ~~5~~	NA	5, 7
4.9.9	Insert 3					
Tables 3.3-3, 4.3-2, and 3.3-4, Function 3.c.3, and Table 3.3-6 Instrument 2.a	3. ~~[~~ Containment Purge Air Radiation Monitor					3
	~~a. Gaseous~~	1,2,3,4~~, (a)~~	~~[~~1~~]~~	SR 3.3.6.1 ~~4~~ SR 3.3.6.~~6~~ 7 SR 3.3.6.~~9~~ SR 3.3.6.8	≤ ~~[2 x background]~~ 8.5 x 10^{-3} μCi/cc	5
	INSERT 2					
	~~b. Particulate~~	~~1,2,3,4, (a)~~	~~[1]~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.6~~ ~~SR 3.3.6.9~~	~~≤ [2 x background]~~	
	~~c. Iodine~~	~~1,2,3,4, (a)~~	~~[1]~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.6~~ ~~SR 3.3.6.9~~	~~≤ [2 x background]~~	
	~~d. Area Radiation~~	~~1,2,3,4, (a)~~	~~[1]~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.6~~ ~~SR 3.3.6.9~~	~~≤ [2 x background]]~~	
DOC M02	4. ~~Containment Isolation - Phase A~~ Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function ~~3.a~~ 1., for all initiation functions and requirements.				2

(a) During movement of ~~[~~recently~~]~~ irradiated fuel assemblies within containment. 3

3 INSERT 2

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
	(a)	~~1~~ 2	SR 3.3.6.1 SR 3.3.6.4 SR 3.3.6.7	≤ 8.5 x 10^{-3} μCi/cc

7 INSERT 3

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
a. Logic	1, 2, 3, 4	2 trains	SR 3.3.6.2	NA
b. Relays	1, 2, 3, 4, (a)	2 trains	SR 3.3.6.3 SR 3.3.6.5	NA

JUSTIFICATION FOR DEVIATIONS
ITS 3.3.6, CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION

1. The type of Setpoint Control Program (Without Setpoint Control Program) and the Specification designator "A" are deleted since they are unnecessary. This information is provided in NUREG 1431, Rev. 4.0 to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion, but serves no purpose in the plant specific implementation. In addition, ISTS 3.3.6B (with Setpoint Control Program Specification) is not used and is not shown. Furthermore, the title of the Specification has been changed from "Containment Purge and Exhaust Isolation Instrumentation" to " Containment Ventilation Isolation Instrumentation" since Sequoyah Nuclear Plant (SQN) does not have a Containment Purge and Exhaust Isolation Instrumentation.

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

3. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

4. ISTS SR 3.3.6.1, SR 3.3.6.4, SR 3.3.6.5, SR 3.3.6.6, SR 3.3.6.7, SR 3.3.6.8 and SR 3.3.6.9 (ITS SR 3.3.6.1, SR 3.3.6.2, SR 3.3.6.3, SR 3.3.6.4, SR 3.3.6.5, SR 3.3.6.6, and SR 3.3.6.7, respectively) provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program.

5. The ACTUATION LOGIC TEST and MASTER RELAY TEST for SQN are processed through the Solid State Protection System. Since ISTS SR 3.3.6.4 and ISTS SR 3.3.6.5 are the appropriate Surveillances for the ACTUATION LOGIC TEST and MASTER RELAY TEST when they are processed through the Solid State Protection System, ISTS SR 3.3.6.2 and SR 3.3.6.3 have been deleted and the subsequent Surveillance Requirements have been renumbered.

6. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

7. The Automatic Actuation Logic is required OPERABLE in MODES 1, 2, 3, and 4. The Automatic Actuation Relays are required OPERABLE in MODES 1, 2, 3, 4, and during movement of recently irradiated fuel within containment to ensure that the containment ventilation isolates when a high radiation signal is received from the containment purge air radiation monitors. Therefore, ISTS Table 3.3.6-1, Function 2 (Automatic Actuation Logic and Actuation Relays) has been divided into two sub-functions (a. Logic and b. Relays) to align with the required Applicable MODES. The Surveillance Requirements applicable to both sub-functions have been divided to align with the change.

   The ACTUATION LOGIC TEST (ITS SR 3.3.6.2) is applicable to ITS Table 3.3.6-1 Function 2.a (Logic) in MODES 1, 2, 3, and 4. The MASTER RELAY TEST (ITS SR 3.3.6.3) and SLAVE RELAY TEST (ITS SR 3.3.6.5) are applicable to ITS Table 3.3.6-1 Function 2.b (Relays) in MODES 1, 2, 3, 4, and during movement of recently irradiated fuel within containment.

BASES

LCO (continued)

Automatic Actuation Logic and Actuation Relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b, SI~~, and ESFAS Function 3.a, Containment Phase A Isolation~~. The applicable MODES and specified conditions for the containment ~~purge~~ ventilation isolation portion of ~~these Functions are~~ the SI Function is different and less restrictive than those for the~~ir Phase A isolation and~~ SI role~~s~~. If one or more of the SI ~~or Phase A isolation~~ Functions becomes inoperable in such a manner that only the Containment ~~Purge~~ Ventilation Isolation Function is affected, the Conditions applicable to the~~ir~~ SI ~~and Phase A isolation~~ Functions need not be entered. The less restrictive Actions specified for inoperability of the Containment ~~Purge~~ Ventilation Isolation Functions specify sufficient compensatory measures for this case. 2

3. Containment Radiation

Table 3.3.6-1 specifies the number of required channels

~~The LCO specifies four required channels~~ ~~one~~ of radiation monitors to ensure that the radiation monitoring instrumentation necessary to initiate Containment ~~Purge~~ Ventilation Isolation remains OPERABLE. 2 2

For sampling systems, channel OPERABILITY involves more than OPERABILITY of the channel electronics. OPERABILITY ~~may~~ also require~~s~~ correct valve lineups~~,~~ and 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. 2

4. ~~Containment Isolation - Phase A~~ Safety Injection (SI) 4

Refer to LCO 3.3.2, Function ~~3.a.~~ 1., for all initiating Functions and requirements.

APPLICABILITY

The Manual Initiation, Automatic Actuation Logic and Actuation Relays, ~~Containment Isolation - Phase A~~ Safety Injection, and Containment Radiation Functions are required OPERABLE ~~in MODES 1, 2, 3, and 4, and during movement of [recently] irradiated fuel assemblies [(i.e., fuel that has occupied part of a critical reactor core within the previous [X] days)] within containment.~~ as annotated on Table 3.3.6-1. ~~100 hours~~ Under these conditions, the potential exists for an accident that could release significant fission product radioactivity into containment. Therefore, the containment ~~purge and exhaust~~ ventilation isolation instrumentation must be OPERABLE in these MODES. 4 3 1

~~INSERT 2~~ 4

2 **~~INSERT 2~~**

~~Since the movement of recently irradiated fuel assemblies in containment can only occur in MODE 6 or with the unit defueled, only one Containment Purge Air Radiation Monitor is required to be OPERABLE during the movement of recently irradiated fuel assemblies in containment.~~

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BASES

ACTIONS (continued)

~~B~~ A.1 4

Condition ~~B~~ A applies to all Containment ~~Purge and Exhaust~~ Ventilation Isolation Functions and addresses the train orientation of the Solid State Protection System (SSPS) and the master and slave relays for these Functions. ~~It also addresses the failure of multiple radiation monitoring channels, or the inability to restore a single failed channel to OPERABLE status in the time allowed for Required Action A.1~~. It also addresses the failure of the required radiation monitoring channel. 4 1 4

If a train is inoperable~~,~~ or ~~multiple channels are~~ the required channel is inoperable, ~~or the Required Action and associated Completion Time of Condition A are not met,~~ 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. 4

A Note is added stating that Condition ~~B~~ A is only applicable in MODE 1, 2, 3, or 4. 4

~~C~~ B.1 and ~~C~~ B.2 4

Condition ~~C~~ B applies to all Containment ~~Purge and Exhaust~~ Ventilation Isolation Functions and addresses the train orientation of the SSPS and the master and slave relays for these Functions. It also addresses the failure of the ~~single~~ required ~~multiple~~ radiation monitoring channel~~s, or the inability to restore a single failed channel to OPERABLE status in the time allowed for Required Action A.1~~. If a train ~~is inoperable, multiple channels are~~ or the required radiation monitoring channel is inoperable~~, or the Required Action and associated Completion Time of Condition A are not met~~, operation may continue as long as the Required Action to place and maintain containment ~~purge and exhaust~~ ventilation isolation valves in their closed position is met or the applicable Conditions of LCO 3.9.4, "Containment Penetrations," are met for each valve made inoperable by failure of isolation instrumentation. The Completion Time for these Required Actions is Immediately. 4 1 4 1

A Note states that Condition ~~C~~ B is applicable during movement of ~~[~~recently~~]~~ irradiated fuel assemblies within containment. 4 3

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that Table 3.3.6-1 determines which SRs apply to which Containment ~~Purge and Exhaust~~ Ventilation Isolation Functions. 1

BASES

LCO (continued)

Automatic Actuation Logic and Actuation Relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b, SI~~, and ESFAS Function 3.a, Containment Phase A Isolation~~. The applicable MODES and specified conditions for the containment ventilation ~~purge~~ isolation portion of the SI Function is ~~these Functions are~~ different and less restrictive than those for the~~ir Phase A isolation and~~ SI role~~s~~. If one or more of the SI ~~or Phase A isolation~~ Functions becomes inoperable in such a manner that only the Containment Ventilation ~~Purge~~ Isolation Function is affected, the Conditions applicable to the~~ir~~ SI ~~and Phase A isolation~~ Functions need not be entered. The less restrictive Actions specified for inoperability of the Containment Ventilation ~~Purge~~ Isolation Functions specify sufficient compensatory measures for this case. 2

3. Containment Radiation

Table 3.3.6-1 specifies the number of required channels ~~one~~ ~~The LCO specifies four required channels~~ of radiation monitors to ensure that the radiation monitoring instrumentation necessary to initiate Containment Ventilation ~~Purge~~ Isolation remains OPERABLE. 2 2

For sampling systems, channel OPERABILITY involves more than OPERABILITY of the channel electronics. OPERABILITY ~~may~~ also require and correct valve lineups ~~s,~~ 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. 2

4. Safety Injection (SI) ~~Containment Isolation - Phase A~~ 4

Refer to LCO 3.3.2, Function 1 ~~3.a~~., for all initiating Functions and requirements.

APPLICABILITY The Manual Initiation, Automatic Actuation Logic and Actuation Relays, Safety Injection ~~Containment Isolation - Phase A~~, and Containment Radiation Functions are required OPERABLE as annotated on Table 3.3.6-1. ~~in MODES 1, 2, 3, and 4, and during movement of [recently] irradiated fuel assemblies [(i.e., fuel that has occupied part of a critical reactor core within the previous~~ ~~100 hours~~ ~~[X] days)] within containment.~~ Under these conditions, the potential exists for an accident that could release significant fission product radioactivity into containment. Therefore, the containment Ventilation ~~purge and exhaust~~ isolation instrumentation must be OPERABLE in these MODES. 4 3 1

~~INSERT 2~~ 4

~~2~~

~~INSERT 2~~

~~Since the movement of recently irradiated fuel assemblies in containment can only occur in MODE 6 or with the unit defueled, only one Containment Purge Air Radiation Monitor is required to be OPERABLE during the movement of recently irradiated fuel assemblies in containment.~~

Enclosure 2, Volume 8, Rev. 0, Page 953 of 1148

BASES

ACTIONS (continued)

~~B~~A.1 4

Condition ~~B~~ A applies to all Containment ~~Purge and Exhaust~~ Ventilation Isolation Functions and addresses the train orientation of the Solid State Protection System (SSPS) and the master and slave relays for these Functions. It also addresses the failure of the required radiation monitoring channel. ~~It also addresses the failure of multiple radiation monitoring channels, or the inability to restore a single failed channel to OPERABLE status in the time allowed for Required Action A.1~~. 4 1 4

If a train is inoperable~~,~~ or ~~multiple channels are~~ the required channel is inoperable, ~~or the Required Action and associated Completion Time of Condition A are not met,~~ 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. 4

A Note is added stating that Condition ~~B~~ A is only applicable in MODE 1, 2, 3, or 4. 4

~~C~~B.1 and ~~C~~B.2 4

Condition ~~C~~ B applies to all Containment ~~Purge and Exhaust~~ Ventilation Isolation Functions and addresses the train orientation of the SSPS and the master and slave relays for these Functions. It also addresses the failure of the ~~single~~ required ~~multiple~~ radiation monitoring channel~~s, or the inability to restore a single failed channel to OPERABLE status in the time allowed for Required Action A.1~~. If a train ~~is inoperable, multiple channels are~~ or the required radiation monitoring channel is inoperable~~, or the Required Action and associated Completion Time of Condition A are not met~~, operation may continue as long as the Required Action to place and maintain containment ~~purge and exhaust~~ ventilation isolation valves in their closed position is met or the applicable Conditions of LCO 3.9.4, "Containment Penetrations," are met for each valve made inoperable by failure of isolation instrumentation. The Completion Time for these Required Actions is Immediately. 4 1 4 1

A Note states that Condition ~~C~~ B is applicable during movement of ~~[~~recently~~]~~ irradiated fuel assemblies within containment. 4 3

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that Table 3.3.6-1 determines which SRs apply to which Containment ~~Purge and Exhaust~~ Ventilation Isolation Functions. 1

Licensee Response/NRC Response/NRC Question Closure

Id	**396**
NRC Question Number	**KAB045**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation. The change to recently irradiated fuel will be addressed under the AST review, and further questions on this will be included in the AST RAIs.**
Question Closure Date	**12/12/2014**
Notification	**Mark Blumberg** **Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**12/12/2014 10:00 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**85**
NRC Question Number	**KAB046**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.8**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**1050, 1055**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

On pages 1050 and 1055 of Enclosure 2, Volume 8, has ITS 3.3.8 Table 3.3.8-1.

CTS 3.7.8 requires two independent auxiliary building gas treatment filter trains be operable in Modes 1, 2, 3, and 4 for the loss of coolant accident design basis accident. CTS 3.9.12 requires one auxiliary building gas treatment filter trains be operable whenever irradiated fuel in in the storage pool for the fuel handling accident (FHA). CTS 3.3.3.1 requires the radiation monitoring instrumentation channels in Table 3.3-6 to be operable. CTS Table 3.3-6 requires a minimum of 1 channel of the fuel storage pool area monitor to be operable with fuel in the storage pool or building.

ITS LCO 3.7.12, "Auxiliary Building Gas Treatment System (ABGTS)," requires that two ABGTS trains are operable in Modes 1, 2, 3, 4, and during movement of recently irradiated fuel assemblies in the auxiliary building. ITS 3.3.8 requires one channel of Spent Fuel Pool Area Radiation Monitor during movements of recently irradiated fuel assemblies in the auxiliary building to be operable and footnote (b) clarifies that the Required Channel shall be associated with ABGTS train required to be OPERABLE per LCO 3.7.12.

The ITS definition of Operable-Operability states:

> **A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable**

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

ITS 3.7.12 reflects the combination of CTS 3.7.8 and CTS 3.9.12. However, all the instrumentation needed for ABGTS does not seem to be reflected in ITS 3.3.8.

ABGTS is started by high radiation signal from the Area Monitor Fuel Storage pool area and is based on FHA. In addition, the ABGTS is started by a high radiation signal from the Auxiliary Building Exhaust Ventilation monitor and a high temperature signal from Auxiliary Building air intakes.

Please explain if the high radiation signal from the Auxiliary Building Exhaust Ventilation monitor and a high temperature signal from Auxiliary Building air intakes are credited for starting the ABGTS following a loss of coolant accident. If these instruments are not credited for starting the ABGTS following a loss of coolant accident than explain which instruments are credited to start ABGTS following a loss of coolant accident.

In addition, if there is other credited instrumentation that starts the ABGTS, other than the Spent Fuel Pool Area Radiation Monitor, please explain why it was not added to ITS 3.3.8 or add it to ITS 3.3.8.

Attach File 1	
Attach File 2	
Issue Date	**5/23/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/23/2014 6:45 AM**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**134**
NRC Question Number	**KAB046**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**The auxiliary building exhaust ventilation monitor is not credited for starting the auxiliary building gas treatment system (ABGTS) following a loss of coolant accident (LOCA). The automatic initiation of the ABGTS associated with the auxiliary building ventilation monitor is not a primary safety function; rather, it is provided for ALARA offsite dose purposes.** **A high temperature signal from the auxiliary building air intake is not credited for starting ABGTS following a LOCA. The high temperature initiation of the ABGTS is associated with protecting the environmental qualification of certain equipment in the auxiliary building during a high energy line break located near the auxiliary building air intake canopy.** **For a LOCA, the Phase A containment isolation signal is the only credited signal for starting the ABGTS. Automatic Phase A containment isolation is initiated by a safety injection signal.** **All credited ABGTS start signals are listed in ITS Table 3.3.8.**
Response Date/Time	**6/20/2014 5:15 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/20/2014 4:11 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**139**
NRC Question Number	**KAB046**
Select Application	**NRC Response**
Attachment 1	
Attachment 2	
Response Statement	**is the high radiation signal from the auxiliary building exhaust ventilation monitor or high temperature signal from the auxiliary building air intake credited for any of the accidents and/or transient analyses in Sequoyah UFSAR?** **In order for ABGTS to be considered operable, ITS LCO 3.7.12 will require all the ABGTS necessary attendant instrumentation to be capable of performing their related support functions in modes 1, 2, 3, 4, and during movement of recently irradiated fuel assemblies in the Auxiliary building. Please explain which instrumentation Sequoyah considered to be necessary for ABGTS operabliity and state what the function it supports?**
Response Date/Time	**6/20/2014 6:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/20/2014 8:36 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**253**
NRC Question Number	**KAB046**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**The auxiliary building exhaust ventilation monitor is not credited for starting the auxiliary building gas treatment system (ABGTS) in the accidents and/or transient analyses in the SQN UFSAR. The automatic initiation of the ABGTS associated with the auxiliary building ventilation monitor is not a primary safety function; rather, it is provided for ALARA offsite dose purposes.** **A high temperature signal from the auxiliary building air intake is not credited for starting ABGTS in the accidents and/or transient analyses in the SQN UFSAR. The high temperature initiation of the ABGTS is associated with protecting the environmental qualification (EQ) of certain equipment in the auxiliary building during a high energy line break (HELB) located near the auxiliary building air intake canopy. ABGTS is not credited in any steam or feedwater line break.** **The instrumentation and functions necessary for ABGTS operability are:** **1. ITS Table 3.3.8-1, Function 1, Manual Initiation.** **2. ITS Table 3.3.8-1, Function 2, Spent Fuel Pool Radiation Monitor, for a Fuel Handling Accident.** **3. ITS Table 3.3.8-1, Function 3, Containment Isolation - Phase A, for a Loss of Coolant Accident.** **All credited ABGTS start signals are listed in ITS Table 3.3.8.**
Response Date/Time	**8/8/2014 11:20 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**

Date Added	**8/8/2014 10:19 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**265**
NRC Question Number	**KAB046**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/14/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**8/14/2014 9:55 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**86**
NRC Question Number	**KAB047**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.8**
DOC Number	**M-6**
JFD Number	
JFD Bases Number	
Page Number(s)	**1041**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 1041 of Enclosure 2, Volume 8, M06 provides the discussion of CTS Table 3.3-6 action 26 compared to ITS 3.3.8 Condition b. M06 states, "ITS Table 3.3.8-1 Function 2 requires one Spent Fuel Pool Area Radiation Monitor to be OPERABLE during movement of irradiated fuel assemblies in the auxiliary building. However, ITS Table 3.3.8-1 Function 2 requires one Spent Fuel Pool Area Radiation Monitor to be operable during movement of *recently* irradiated fuel assemblies in the auxiliary building.** **Please provide a correction to M06 so that it is accurate, or explain the discrepancy.**
Attach File 1	
Attach File 2	
Issue Date	**5/23/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/23/2014 6:47 AM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**103**
NRC Question Number	**KAB047**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.8 revised DOC M08.pdf** (15KB)
Attachment 2	
Response Statement	**In response to KAB047, discussion of change (DOC) M06, on page 1041 of Enclosure 2, Volume 8, will be revised. Specifically, the sentence, "ITS Table 3.3.8-1 Function 2 requires one Spent Fuel Pool Area Radiation Monitor to be OPERABLE during movement of irradiated fuel assemblies in the auxiliary building." will be revised to read, "ITS Table 3.3.8-1 Function 2 requires one Spent Fuel Pool Area Radiation Monitor to be OPERABLE during movement of <u>recently</u> irradiated fuel assemblies in the auxiliary building."** **See Attachment 1 for a draft revised DOC M06.**
Response Date/Time	**6/6/2014 6:40 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/6/2014 5:39 AM**
Date Modified	
Modified By	

DISCUSSION OF CHANGES
ITS 3.3.8, AUXILIARY BUILDING GAS TREATMENT SYSTEM (ABGTS) ACTUATION INSTRUMENTATION

M05 CTS 3.3.3.1 states that the Radiation Monitoring Instrumentation channels shown in Table 3.3-6 shall be OPERABLE. CTS Table 3.3-6 lists the radiation monitor required for the fuel storage pool area. ITS LCO 3.3.8 states that the ABGTS actuation instrumentation for each Function in Table 3.3.8-1 shall be OPERABLE. ITS Table 3.3.8-1 lists the required ABGTS instrument Functions which includes Containment Isolation – Phase A (Function 3). ITS Table 3.3.8-1 Function 3 provides a statement referring to LCO 3.3.2, "ESFAS Instrumentation," Function 3.a for all initiation functions and requirements. This changes the CTS by specifying an additional instrumentation actuation Function for the ABGTS.

The purpose of CTS 3.3.3.1 and Table 3.3-6 is to specify the required Functions and instrumentation to ensure the ABGTS actuates as assumed in the accident analysis. The Containment Isolation – Phase A signal from the ESFAS provides an actuation of ABGTS that is credited in the loss of coolant accident. This change is acceptable because it will result in a more complete listing of the Functions that actuate ABGTS. The inclusion of the Containment Isolation – Phase A signal with the other credited ABGTS instrumentation provides a complete list of the required ABGTS instrumentation with a common set of Actions to assure the unit is placed in a safe condition when the required instrumentation is inoperable. Therefore, the proposed change ensures the radioactive materials in the Auxiliary Building Secondary Containment Enclosure atmosphere following an accident are filtered and adsorbed prior to being exhausted to the environment. This change is designated as more restrictive because more ABGTS actuation instrumentation will be required in ITS than was required in CTS.

M06 CTS Table 3.3-6 "MINIMUM CHANNELS OPERABLE" column, for Instrument 1.a, only requires one Area Monitor – Fuel Storage Pool Area channel to be OPERABLE with fuel in the storage pool or building. CTS Table 3.3-6 ACTION 26 applies when the number of OPERABLE channels is less than required by the Minimum Channels OPERABLE requirement. ACTION 26 requires the performance of an area survey of the monitored area with portable monitoring instrumentation at least once per 24 hours. ITS Table 3.3.8-1 Function 2 requires one Spent Fuel Pool Area Radiation Monitor to be OPERABLE during movement of recently irradiated fuel assemblies in the auxiliary building. ITS 3.3.8 ACTION B requires that when one required channel is inoperable, to place one ABGTS train in operation and to enter the applicable Conditions and Required Action for LCO 3.7.12 for one train made inoperable by inoperable actuation instrumentation. This changes the CTS by requiring more stringent ACTIONS for the inoperable channels. (See DOC L01 for a discussion on the change to the Applicability.)

The purpose of the Spent Fuel Pool Area Radiation Monitor is to provide indication of high radiation in the Fuel Storage Pool area. This change is acceptable because when one required Spent Fuel Pool Area Radiation Monitor channel is inoperable, placing the ABGTS in operation accomplishes the Spent Fuel Pool Area Radiation Monitor instrument function. Additionally, entering the Conditions and Required Actions for the ABGTS Specification (ITS 3.7.12) will allow 7 days to restore one inoperable ABGTS train to OPERABLE status. This

DISCUSSION OF CHANGES
ITS 3.3.8, AUXILIARY BUILDING GAS TREATMENT SYSTEM (ABGTS) ACTUATION INSTRUMENTATION

change is designated as more restrictive because more stringent Required Actions and Completion Times are required in the ITS than were required in the CTS.

M07 CTS 3.3.3.1, Table 3.3-6, ACTION 26, is associated with Functional Unit 1.a (Area Monitor, Fuel Storage Pool Area) and requires that with the number of OPERABLE channels less than required by the Minimum Channels OPERABLE requirement, to perform area surveys of the monitored area with portable monitoring instrumentation at least once per 24 hours. ITS 3.3.8 ACTION C requires if the Required Action and associated Completion Time for Condition B, one required radiation monitor inoperable, is not met during movement of recently irradiated fuel assemblies in the auxiliary building, to immediately suspend movement of recently irradiated fuel assemblies in the auxiliary building. This changes the CTS by adding explicit Required Actions to exit the MODE of Applicability if remedial action cannot be completed within the allotted time.

The purpose of Required Actions is to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. This change is acceptable because it provides Required Actions to exit the MODE of Applicability that must be taken if the time allotted to establish the required remedial measures or complete the repair of inoperable features is exceeded. This change is designated as more restrictive because more stringent Required Actions and Completion Times are required in the ITS than were required in the CTS.

<u>RELOCATED SPECIFICATIONS</u>

None

<u>REMOVED DETAIL CHANGES</u>

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS Table 3.3-6 for Radiation Monitoring Instrumentation has five columns stating various requirements for the Radiation Monitoring Instrumentation. These columns are labeled "MINIMUM CHANNELS OPERABLE," "APPLICABLE MODES," ALARM/TRIP SETPOINT," "MEASUREMENT RANGE," AND "ACTION." ITS Table 3.3.8-1 does not contain the "MEASUREMENT RANGE" column. This changes the CTS by moving the information of the "MEASUREMENT RANGE" column to the Bases.

The removal of these details, which are related to system design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the requirement for the number of required channels, the Applicable MODES, the alarm/trip setpoint, and the appropriate Condition to enter if a required channel becomes inoperable. Also, this change is acceptable because the removed information will be

Licensee Response/NRC Response/NRC Question Closure

Id	**116**
NRC Question Number	**KAB047**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/17/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/17/2014 9:02 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**87**
NRC Question Number	**KAB048**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.9**
DOC Number	**LA-2**
JFD Number	
JFD Bases Number	
Page Number (s)	**1097**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 1097 of Enclosure 2, Volume 8, LA02 provides the discussion of surveillance requirements in CTS 4.3.1.1.1 and Table 4.3-1 as compared to ITS 3.3.9. LA02 states, "Also, see DOC L01 for discussion on changing the COT Surveillance Frequency from monthly to 184 days." However, L01 does not discuss the surveillance frequency change from monthly to 184 days.** **Please provide a correction to LA02 so that it is accurate, or explain the discrepancy**
Attach File 1	
Attach File 2	
Issue Date	**5/23/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/23/2014 2:48 PM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**104**
NRC Question Number	**KAB048**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.9 revised DOC LA02.pdf** (15KB)
Attachment 2	
Response Statement	**In response to KAB048, discussion of change (DOC) LA02, beginning on page 1097 of Enclosure 2, Volume 8, will be revised. Specifically, the reference to DOC L01 concerning the COT Surveillance Frequency changing from monthly to 184 days, will be revised to reference DOC L03.** **See Attachment 1 for a draft revised DOC LA02.**
Response Date/Time	**6/6/2014 6:45 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/6/2014 5:42 AM**
Date Modified	
Modified By	

DISCUSSION OF CHANGES
ITS 3.3.9, BORON DILUTION MONITORING INSTRUMENTATION

that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. Furthermore, the Required Actions are consistent with safe operation under the specified Conditions. This change is considered more restrictive because additional Required Actions are required in the ITS that were not required in the CTS.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS Table 3.3-1, "Reactor Trip System Instrumentation," includes three columns stating various requirements for the Source Range Neutron Flux Shutdown Function. These columns are labeled "TOTAL NO. OF CHANNELS," "CHANNELS TO TRIP," and "MINIMUM CHANNELS OPERABLE." For CTS Table 3.3.1 Functional Unit 6.B, the "CHANNELS TO TRIP COLUMN" is "0" (i.e., the Function is required to provide an indication only function and is not required to have a trip function). ITS 3.3.9 does not include the "TOTAL NO. OF CHANNELS" and "CHANNELS TO TRIP" columns. This changes the CTS by moving the information of the "TOTAL NO. OF CHANNELS" and "CHANNELS TO TRIP" columns to the Bases.

The removal of these details, which are related to system design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the requirement for the number of required channels and the appropriate Condition to enter if a required channel becomes inoperable. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LA02 *(Type 5 – Removal of SR Frequency to the Surveillance Frequency Control Program)* CTS 4.3.1.1.1 requires that each reactor trip system instrumentation channel be demonstrated OPERABLE by performance of a CHANNEL CHECK, CHANNEL CALIBRATION, and CHANNEL FUNCTIONAL TEST for the MODES and Frequencies shown in Table 4.3-1. CTS Table 4.3-1 Functional Unit 6 requires performance of a CHANNEL CHECK every 12 hours, a CHANNEL CALIBRATION every refueling outage, and a CHANNEL FUNCTIONAL TEST every month for the source range neutron flux monitors during MODES 3, 4, and 5. ITS SR 3.3.9.1, SR 3.3.9.2, and SR 3.3.9.3 require similar Surveillances and specify the periodic Frequency as, "In accordance with the Surveillance Frequency Control Program." (See DOC M01 for the discussion on changing the

DISCUSSION OF CHANGES
ITS 3.3.9, BORON DILUTION MONITORING INSTRUMENTATION

3

CHANNEL FUNCTIONAL TEST to a COT. Also, see DOC L0~~1~~ for discussion on changing the COT Surveillance Frequency from monthly to 184 days.) This changes the CTS by moving the specified Frequencies for the SRs and associated Bases to the Surveillance Frequency Control Program.

The removal of these details related to Surveillance Requirement Frequencies from the Technical Specifications is acceptable, because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The existing Surveillance Frequencies are removed from Technical Specifications and placed under licensee control pursuant to the methodology described in NEI 04-10. A new program (Surveillance Frequency Control Program) is being added to the Administrative Controls section of the Technical Specifications describing the control of Surveillance Frequencies. The surveillance test requirements remain in the Technical Specifications. The control of changes to the Surveillance Frequencies will be in accordance with the Surveillance Frequency Control Program. The Program shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met. This change is designated as a less restrictive removal of detail change, because the Surveillance Frequencies are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 2 – Relaxation of Applicability)* CTS 3.3.1.1 [3.3.1 Unit 2] Applicability states that the Applicability of each Functional Unit is as shown in Table 3.3-1. For CTS Table 3.3-1 Functional Unit 6.B (Source Range, Neutron Flux, Shutdown) the "Applicable MODES" column lists MODES 3, 4, and 5. ITS 3.3.9, Boron Dilution Monitoring Instrumentation, provides requirements for the Source Range Neutron Flux instruments. ITS 3.3.9 Applicability similarly lists MODES 3, 4, and 5 but is modified by a Note that states, "The high flux at shutdown alarm may be blocked in MODE 3 during reactor startup." This changes the CTS Mode of Applicability for the high flux at shutdown alarm by allowing blocking of the alarm in MODE 3 during reactor startup.

The purpose of CTS Table 3.3-1 Functional Unit 6.B (Source Range, Neutron Flux, Shutdown) is to provide indication of a dilution accident in sufficient time for the operators to respond and mitigate the accident. This change is acceptable because the requirements continue to ensure that the operators would be made aware of a dilution accident in sufficient time to respond and mitigate the accident. A reactor startup is a controlled activity where operator's attention is focused on the reactivity condition of the reactor core. Boron concentration is also monitored as one of the inputs to the estimated critical position calculation. In addition, the source range and intermediate range nuclear instruments are monitored closely specifically looking for indications of an unplanned reactivity rate of change. This change is designated as less restrictive because the LCO requirements are applicable in fewer operating conditions than in the CTS.

Licensee Response/NRC Response/NRC Question Closure

Id	**117**
NRC Question Number	**KAB048**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/17/2014**
Notification	**Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/17/2014 9:02 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**88**
NRC Question Number	**KAB049**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.9**
DOC Number	**L-4**
JFD Number	
JFD Bases Number	
Page Number (s)	**1099**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 1099 of Enclosure 2, Volume 8, L04 provides the discussion of the addition of a surveillance note to ITS SR 3.3.9.2. The added note states, "Not required to be performed prior to entering MODE 3 from MODE 2 until 24 hours after entry into MODE 3," and it is applied to the channel operational test.** **Please explain which instruments are tested, including the instrument designations/nomenclature, for ITS SR 3.3.9.2, ITS SR 3.3.1.7, and ITS 3.3.1.8. In addition, please explain if the test procedure performed for ITS SR 3.3.9.2 is the same test procedure that is used to perform ITS SR 3.3.1.7 and/or ITS SR 3.3.1.8.** **If the same instruments are tested using the same test procedure then please explain why there is a time difference (24 hours) in the note for ITS SR 3.3.9.2 versus (4 hours) that allowed in ITS/ISTS SR 3.3.1.7 and 3.3.1.8.**
Attach File 1	
Attach File 2	
Issue Date	**5/23/2014**
Added By	**Kristy Bucholtz**
Date Modified	

Modified By	
Date Added	**5/23/2014 2:50 PM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**330**
NRC Question Number	**KAB049**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 RAI KAB049.pdf** (1MB)
Attachment 2	
Response Statement	**In response to RAI KAB049, the Note for ITS SR 3.3.9.2, on pages 1103 and 1106 of Enclosure 2, Volume 8, will be deleted. Additionally, ITS Required Actions A.1, A.2.1, A.2.2.1, and A.2.2.2 will be replaced with Required Action A.1 (Perform SR 3.1.1.1). The proposed change will replace ITS Required Actions with Actions equivalent to CTS Table 3.3-1 ACTION 5.**

The proposed Note to ITS SR 3.3.9.2 allowed a delay of 24 hours after entry into MODE 3 to perform a CHANNEL OPERABILITY TEST (COT) for the source range neutron flux monitoring channel. The intention of the proposed Note was to prevent entering ITS 3.3.9 Condition A when ITS LCO 3.3.9 was not met because the unit transitioned from MODE 1 to MODE 3 and ITS SR 3.3.9.2 was not within the specified Frequency (portions of the COT cannot be performed above the P-6 interlock). Required Actions associated with ITS 3.3.9 Condition A required suspending operations involving positive reactivity additions and restoring one required channel to OPERABLE status or closing one combination of unborated water source isolation valves and performing ITS SR 3.1.1.1 (Verify SHUTDOWN MARGIN).

In CTS, if LCO 3.3.1.1 (Unit 1 and LCO 3.3.1 for Unit 2) is not met for the source range neutron flux instrumentation, then CTS Table 3.3-1 ACTION 5 requires verifying compliance with the SHUTDOWN MARGIN requirements of CTS 3.1.1.1 or 3.1.1.2, as applicable, within 1 hour and at least once per 12 hours thereafter.

Based on the revision to ITS SR 3.3.9.2 and Required Actions for ITS 3.3.9 Condition A, the following changes will be necessary:

1. **Discussion of change (DOC) M02 will be deleted, as well as, DOC M02 inserts and indicators. (Pages 1087, 1092, 1096, and 1097)**

2. **DOC L04 will be deleted, as well as, DOC L04 inserts and indicators. (Pages 1089, 1094, 1099, and 1100)**

3. **DOC A03 will be revised to replace ITS 3.3.9 Required Action "A.2.2.2" with "A.1". (Page 1095)**

4. **The ISTS markups will be revised to correct the CTS cross-references in the left hand margin. (Pages 1102, 1103, 1105, and 1106)**

5. **Justification for deviation (JFD) 9 will be added to justify changes made to ISTS Required Actions B.1, B.2.1, B.2.2.1, and B.2.2.2. JFD indicators in the right hand margin will be deleted where the associated changes are deleted and replaced with JFD 9 indicators. (Pages 1102, 1103, 1105, 1106, and 1109)**

6. **JFD 7 will be deleted, as well as, JFD 7 indicators. (Pages 1103, 1106,1108 and 1109)**

7. **JFD 8 will be deleted. In response to KAB051, ISTS markups were provided showing JFD 4 should be JFD 8 for changes made to ISTS Required Action B.2.2.1. ISTS Required Action B.2.2.1 will be deleted and justified by the new JFD 9. (Pages 1103, 1106, and 1109)**

8. **The ISTS Bases markups will be revised to reflect the changes made to ISTS Required Actions B.1, B.2.1, B.2.2.1, and B.2.2.2. JFD indicators in the right hand margin will be deleted where the associated changes are deleted. (Pages 1116 and 1125)**

9. **ISTS Bases JFD 5 will be deleted, as well as, JFD 5 indicators. (Pages 1116, 1125, and 1129)**

See Attachment 1 for the revised CTS and ISTS markups; deletion of DOCs M02, L04, JFD 7, Bases JFD 5; revision of DOC A03; and addition of JFD 9.

The following information is provided for RAI KAB049 concerning which instruments are tested and the procedures used to perform the tests for ITS SRs 3.3.1.7, 3.3.1.8, and 3.3.9.2.

ITS SR 3.3.1.7 is a CHANNEL OPERATIONAL TEST (COT) applicable to source range instrumentation (ITS Table 3.3.1-1, Function 5) in MODES 3, 4, and 5 with the Rod Control System capable of withdrawal or one or more rods not fully inserted. The applicable instruments for SQN Unit 1 are 1-XX-92-5001 and 1-XX-92-5002. The applicable procedures for SQN Unit 1 are 1-SI-IFT-092-N31.1 for Channel I and 1-SI-IFT-092-N32.2 for Channel II.

ITS SR 3.3.1.8 is a COT applicable to source range instrumentation (ITS Table 3.3.1-1, Function 5) in MODE 2 below the P-6 interlock. The applicable instruments for SQN Unit 1 are 1-XX-92-5001 and 1-XX-92-5002. The applicable procedures for SQN Unit 1 are 1-SI-IFT-092-N31.1 for Channel I and 1-SI-IFT-092-N32.2 for Channel II.

ITS SR 3.3.9.2 is a COT applicable to source range instrumentation in MODES 3, 4, and 5. The applicable instruments for SQN Unit 1 are 1-XX-92-5001 and 1-XX-92-5002. The applicable procedures for SQN Unit 1 are 1-SI-IFT-092-N31.1 for Channel I and 1-SI-IFT-092-N32.2 for Channel II.

Response

Date/Time	**9/10/2014 3:15 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Robert Elliott** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Lynn Mynatt**
Date Added	**9/10/2014 2:11 PM**
Date Modified	
Modified By	

ITS

A01

ITS 3.3.9

TABLE 3.3-1 (Continued)

ACTION 3 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:

a. Below the P-6 (Block of Source Range Reactor Trip) setpoint, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above the P-6 Setpoint.

b. Above the P-6 (Block of Source Range Reactor Trip) setpoint, but below 5% of RATED THERMAL POWER, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above 5% of RATED THERMAL POWER.

c. Above 5% of RATED THERMAL POWER, POWER OPERATION may continue.

d. Above 10% of RATED THERMAL POWER, the provisions of Specification 3.0.3 are not applicable.

ACTION 4 - With the number of OPERABLE channels one less than required by the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:

a. Below the P-6 (Block of Source Range Reactor Trip) setpoint, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above the P-6 Setpoint.

b. Above the P-6 (Block of Source Range Reactor Trip) setpoint, operation may continue.

See ITS 3.3.1

ACTION A

ACTION 5 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, verify compliance with ~~the SHUTDOWN MARGIN requirements of Specification 3.1.1.1 or 3.1.1.2, as applicable~~, within 1 hour and at least once per 12 hours thereafter.

~~Add proposed Required Actions A.1, A.2.1, and A.2.2.1~~

SR 3.1.1.1

A03

~~M02~~

ACTION 6 - 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 requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.1.

See ITS 3.3.1

ACTION 7 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the inoperable channel is placed in the tripped condition within 6 hours or THERMAL POWER is reduced to less than P-9 within 10 hours.

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ITS A01 ITS 3.3.9

TABLE 4.3-1 (Continued)

NOTATION

*	-	With the reactor trip system breakers closed and the control rod drive system capable of rod withdrawal.
**	-	Above the P-9 (Power Range Neutron Flux) interlock.

See ITS 3.3.1

~~(1) - If not performed in previous 31 days.~~ L02

(2)	-	Heat balance only, above 15% of RATED THERMAL POWER. Adjust channel if absolute difference greater than 2 percent.
(3)	-	Compare incore to excore AXIAL FLUX DIFFERENCE above 15% of RATED THERMAL POWER. Recalibrate if the absolute difference greater than or equal to 3 percent. The frequency of this surveillance is every 31 EFPD. This surveillance is not required to be performed until 96 hours after thermal power is ≥ 15% RTP.
(4)	-	Deleted.
(5)	-	Each train or logic channel shall be tested at least every 62 days on a STAGGERED TEST BASIS. The test shall independently verify the OPERABILITY of the undervoltage and automatic shunt trip circuits.

See ITS 3.3.1

SR 3.3.9.3 Note (6) - Neutron detectors may be excluded from CHANNEL CALIBRATION.

(7)	-	Below P-6 (Block of Source Range Reactor Trip) setpoint.
(8)	-	Deleted.
(9)	-	The CHANNEL FUNCTIONAL TEST shall independently verify the operability of the undervoltage and shunt trip circuits for the manual reactor trip function.
(10)	-	Local manual shunt trip prior to placing breaker in service. Each train shall be tested at least every 62 days on a STAGGERED TEST BASIS.
(11)	-	Automatic and manual undervoltage trip.
(12)	-	Prior to exceeding the P-9 interlock whenever the unit has been in HOT STANDBY.

See ITS 3.3.1

~~Add proposed SR 3.3.9.2 Note~~ ~~L04~~

ITS

A01

ITS 3.3.9

TABLE 3.3-1 (Continued)

ACTION 3 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:

a. Below the P-6 (Block of Source Range Reactor Trip) setpoint, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above the P-6 Setpoint.

b. Above the P-6 (Block of Source Range Reactor Trip) setpoint, but below 5% of RATED THERMAL POWER, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above 5% of RATED THERMAL POWER.

c. Above 5% of RATED THERMAL POWER, POWER OPERATION may continue.

d. Above 10% of RATED THERMAL POWER, the provisions of Specification 3.0.3 are not applicable.

See ITS 3.3.1

ACTION 4 - With the number of OPERABLE channels one less than required by the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:

a. Below the P-6 (Block of Source Range Reactor Trip) setpoint, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above the P-6 Setpoint.

b. Above the P-6 (Block of Source Range Reactor Trip) setpoint, operation may continue.

ACTION A

ACTION 5 - With the number of OPERABLE channels one less than required by the Minimum Channels OPERABLE requirement, verify compliance with ~~the SHUTDOWN MARGIN requirements of Specification 3.1.1.1 or 3.1.1.2, as applicable~~, within 1 hour and at least once per 12 hours thereafter.

~~Add proposed Required Actions A.1, A.2.1, and A.2.2.1~~

~~M02~~

SR 3.1.1.1

A03

ACTION 6 - 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 requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.1.

See ITS 3.3.1

ACTION 7 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the inoperable channel is placed in the tripped condition within 6 hours or THERMAL POWER is reduced to less than P-9 within 10 hours.

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ITS A01 ITS 3.3.9

Table 4.3-1 (Continued)

NOTATION

* - With the reactor trip system breakers closed and the control rod drive system capable of rod withdrawal.

** - Above the P-9 (Power Range Neutron Flux) interlock.

See ITS 3.3.1

~~(1) - If not performed in previous 31 days.~~ L02

(2) - Heat balance only, above 15% of RATED THERMAL POWER. Adjust channel if absolute difference greater than 2 percent.

(3) - Compare incore to excore AXIAL FLUX DIFFERENCE above 15% of RATED THERMAL POWER. Recalibrate if the absolute difference greater than or equal to 3 percent. The frequency of this surveillance is every 31 EFPD. This surveillance is not required to be performed until 96 hours after thermal power is $\geq$ 15% RTP.

(4) - Deleted.

(5) - Each train or logic channel shall be tested at least every 62 days on a STAGGERED TEST BASIS. The test shall independently verify the OPERABILITY of the undervoltage and automatic shunt trip circuits.

See ITS 3.3.1

SR 3.3.9.3 Note (6) - Neutron detectors may be excluded from CHANNEL CALIBRATION.

(7) - Below P-6 (Block of Source Range Reactor Trip) setpoint.

(8) - Deleted.

(9) - The CHANNEL FUNCTIONAL TEST shall independently verify the operability of the undervoltage and shunt trip circuits for the manual reactor trip function.

(10) - Local manual shunt trip prior to placing breaker in service. Each train shall be tested at least every 62 days on a STAGGERED TEST BASIS.

(11) - Automatic and manual undervoltage trip.

(12) - Prior to exceeding the P-9 interlock whenever the unit has been in HOT STANDBY.

See ITS 3.3.1

~~Add proposed SR 3.3.9.2 Note~~ ~~L04~~

DISCUSSION OF CHANGES
ITS 3.3.9, BORON DILUTION MONITORING INSTRUMENTATION

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1431, Rev. 4.0, "Standard Technical Specifications-Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

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

A02 CTS LCOs 3.3.1.1 (Unit 1) and 3.3.1 (Unit 2), requires the Reactor Trip System Instrumentation channels and interlocks shown in Table 3.3-1 to be OPERABLE and requires that each channel be demonstrated OPERABLE by performance of the tests specified in CTS Table 4.3-1, including Functional Unit 6.B (Source Range, Neutron Flux, Shutdown). ITS 3.3.9, "Boron Dilution Monitoring Instrumentation (BDMI)," provides similar OPERABILITY and testing requirements for the source range neutron flux monitoring channels. This changes the CTS by providing a separate Specification for the Source Range, Neutron Flux, Shutdown Function (Boron Dilution Monitoring Instrumentation), in lieu of including it with the Reactor Trip System Instrumentation Specification.

This change is acceptable because the technical requirements for the Source Range, Neutron Flux, Shutdown Instrumentation are maintained with the change in format. The Boron Dilution Monitoring Instrumentation Specification continues to require the OPERABILITY and testing of the source range neutron flux monitoring instrumentation. This change is designated as administrative because it does not result in a technical change to the CTS.

A03 CTS Table 3.3-1 ACTION 5, which is the ACTION referenced in Table 3.3-1 for Functional Unit 6.B (Source Range, Neutron Flux – Shutdown), requires within one hour and every twelve hours thereafter, that when both channels are inoperable in MODES 3, 4, and 5 to verify compliance with the SHUTDOWN MARGIN requirements of Specification 3.1.1.1 or 3.1.1.2, as applicable. ITS 3.3.9 Required Action A.1 ~~A.2.2.2~~ requires, in part, that when the required source range neutron flux monitoring channel is inoperable, to perform SR 3.1.1.1. This changes the CTS by changing the presentation of how to perform the verification of compliance with the SHUTDOWN MARGIN requirements of Specification 3.1.1.1 or 3.1.1.2.

This change is acceptable because the requirement have not changed. In CTS, the SHUTDOWN MARGIN specification was in two separate Specifications. CTS 3.1.1.1 contained the requirements for the SHUTDOWN MARGIN when T_{avg} was greater than or equal to 200 degrees Fahrenheit. CTS 3.1.1.2 contained the requirements for the SHUTDOWN MARGIN when T_{avg} was less than or equal to 200 degrees Fahrenheit. The ITS combined these two CTS Specifications into ITS 3.1.1, "SHUTDOWN MARGIN." Therefore, stating in ITS 3.3.9 Required Action A.1 ~~A.2.2.2~~, to perform SR 3.1.1.1 is the same as the CTS Table 3.3-1 ACTION 5 statement to verify compliance with the SHUTDOWN MARGIN

requirements of Specification 3.1.1.1 or 3.1.1.2, as applicable. This change is considered a change in presentation and, therefore, is considered as an administrative change since it does not result in a technical change to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 4.3.1.1.1 requires, in part, the reactor trip system instrumentation shall be demonstrated OPERABLE by performance of a CHANNEL FUNCTIONAL TEST for the MODES and Frequencies shown in Table 4.3-1. Table 4.3-1 Functional Unit 6 requires a CHANNEL FUNCTIONAL TEST of the Source Range Neutron Flux. ITS SR 3.3.9.1 requires performance of a CHANNEL OPERABILITY TEST (COT) for each source range neutron flux monitoring channel. This changes the CTS by requiring a COT instead of a CHANNEL FUNCTIONAL TEST.

This change is acceptable because the COT continues to perform a test similar to the current CHANNEL FUNCTIONAL TEST. CTS defines a CHANNEL FUNCTIONAL TEST based on the type of channel. In CTS a CHANNEL FUNCTIONAL TEST shall be: for Analog channels, the injection of a simulated signal into the channel as close to the sensor as practicable to verify OPERABILITY including alarm and/or trip functions; for Bistable channels, the injection of a simulated signal into the sensor to verify OPERABILITY including alarm and/or trip functions; and for digital channels, the injection of a simulated signal into the channel as close to the sensor input to the process racks as practicable to verify OPERABILITY including alarm and/or trip functions. The CHANNEL OPERATIONAL TEST (COT) provides a similar test with the addition that the COT includes adjustments, as necessary, of the required alarm, interlock, and trip setpoints required for channel OPERABILITY such that the setpoints are within the necessary range and accuracy. This change is designated as more restrictive because the ITS requires additional acceptance criteria that is not required in the CTS.

~~M02 CTS Table 3.3-1 ACTION 5, which is the ACTION referenced in Table 3.3-1 for Functional Unit 6.B (Source Range, Neutron Flux – Shutdown), requires when both channels are inoperable in MODES 3, 4, and 5 to verify compliance with the SHUTDOWN MARGIN requirements within one hour and every 12 hours thereafter. ITS 3.3.9 ACTION A requires that when the required source range neutron flux monitoring channel is inoperable, to suspend operations involving positive reactivity additions immediately except when plant temperature changes are accounted for in the calculated SDM (Required Action A.1). ITS 3.3.9 ACTION A also requires either the restoration of the required source range neutron flux monitoring channel to OPERABLE status within one hour OR to initiate action to close one combination of unborated water source isolation valves and perform SR 3.1.1.1 within one hour (Required Actions A.2.1, A.2.2.1 and A.2.2.2, respectively). This changes the CTS by adding Required Actions (Required Actions A.1 and A.2.2.1) when the required channel is inoperable.~~

~~The purpose of Table 3.3-1 ACTION 5 is to verify that SHUTDOWN MARGIN is still within the required limits when the required source range channel is not available to monitor for changes in core reactivity. This change is acceptable because the added Required Actions are used to establish remedial measures~~

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~~that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. Furthermore, the Required Actions are consistent with safe operation under the specified Conditions. This change is considered more restrictive because additional Required Actions are required in the ITS that were not required in the CTS.~~

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS Table 3.3-1, "Reactor Trip System Instrumentation," includes three columns stating various requirements for the Source Range Neutron Flux Shutdown Function. These columns are labeled "TOTAL NO. OF CHANNELS," "CHANNELS TO TRIP," and "MINIMUM CHANNELS OPERABLE." For CTS Table 3.3.1 Functional Unit 6.B, the "CHANNELS TO TRIP COLUMN" is "0" (i.e., the Function is required to provide an indication only function and is not required to have a trip function). ITS 3.3.9 does not include the "TOTAL NO. OF CHANNELS" and "CHANNELS TO TRIP" columns. This changes the CTS by moving the information of the "TOTAL NO. OF CHANNELS" and "CHANNELS TO TRIP" columns to the Bases.

The removal of these details, which are related to system design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the requirement for the number of required channels and the appropriate Condition to enter if a required channel becomes inoperable. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LA02 *(Type 5 – Removal of SR Frequency to the Surveillance Frequency Control Program)* CTS 4.3.1.1.1 requires that each reactor trip system instrumentation channel be demonstrated OPERABLE by performance of a CHANNEL CHECK, CHANNEL CALIBRATION, and CHANNEL FUNCTIONAL TEST for the MODES and Frequencies shown in Table 4.3-1. CTS Table 4.3-1 Functional Unit 6 requires performance of a CHANNEL CHECK every 12 hours, a CHANNEL CALIBRATION every refueling outage, and a CHANNEL FUNCTIONAL TEST every month for the source range neutron flux monitors during MODES 3, 4, and 5. ITS SR 3.3.9.1, SR 3.3.9.2, and SR 3.3.9.3 require similar Surveillances and specify the periodic Frequency as, "In accordance with the Surveillance Frequency Control Program." (See DOC M01 for the discussion on changing the

DISCUSSION OF CHANGES
ITS 3.3.9, BORON DILUTION MONITORING INSTRUMENTATION

L02 *(Category 7 – Relaxation of Surveillance Frequency)* CTS Table 4.3-1 Functional Unit 6 requires a CHANNEL FUNCTIONAL TEST of the Source Range Neutron Flux at startup if not performed within the previous 31 days. The ITS does not require the "during startup if not performed within the previous 31 days" test. This changes the CTS by deleting the requirement to perform the startup Surveillance on the Source Range Neutron Flux.

The purpose of a CHANNEL FUNCTIONAL TEST is to ensure the instrumentation is functioning properly. This change is acceptable because the normal periodic CHANNEL FUNCTIONAL TEST (See DOC M01 for discussion on changing the channel FUNCTIONAL TEST to a COT) Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. This change deletes the requirement to perform the startup Surveillance on the Source Range Neutron Flux channels. ITS SR 3.0.4 requires the periodic Surveillances to be performed and be current prior to entry into the applicability. Once the applicable conditions are entered, the normal, periodic Surveillance Frequency provides adequate assurance of OPERABILITY. Therefore, the removal of this Frequency is considered acceptable. This change is designated as less restrictive because Surveillances will be performed less frequently under ITS than under the CTS.

L03 *(Category 9 – Allowed Outage Time, Surveillance Frequency, and Bypass Time Extensions Based on Generic Topical Reports)* CTS Table 4.3-1 requires a CHANNEL FUNCTIONAL TEST on a monthly bases (M) for Functional Unit 6 (Source Range Neutron Flux). ITS SR 3.3.9.2 requires performance of a COT every 184 days. (See DOC LA02 for discussion on relocating the Surveillance Frequency to the Surveillance Frequency Control Program.) This changes the CTS by changing the frequency of the Surveillances from monthly to 184 days.

The purpose of the CHANNEL FUNCTIONAL TEST/COT is to ensure that the instrumentation is functioning properly. These changes are acceptable and are the result of WCAP-10271, Revision 0 ("Evaluation of Surveillance Frequencies and Out of Service Times for the Reactor Protection Instrumentation System"), dated May 1996, and supplements, WCAP-14333, Revision 1 ("Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times"), dated October 1998, or WCAP-15376, Revision 1 ("Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times"), dated March 2003 (or a combination of the WCAPs). TVA has performed evaluations of the applicable changes associated with the three WCAPs to justify the above changes. The evaluations supporting these changes are provided in Enclosure 4 of this submittal. This change is designated as less restrictive because less stringent Frequencies are being applied in the ITS than were applied in the CTS.

~~L04~~ ~~*(Category 7 – Relaxation Of Surveillance Frequency)* CTS Table 4.3-1, in part, requires a FUNCTIONAL TEST for Functional Unit 6.B (Source Range, Neutron Flux, Shutdown) in MODES 2, 3, 4, 5, and with the reactor trip system breakers closed and the control rod drive system capable of rod withdrawal. When in the required MODES, the FUNCTIONAL TEST is required to be performed on a monthly basis (M) and prior to startup (S/U) if not performed in the previous 31 days (Note (1)). ITS SR 3.3.9.2 requires a CHANNEL OPERATIONAL TEST~~

DISCUSSION OF CHANGES
ITS 3.3.9, BORON DILUTION MONITORING INSTRUMENTATION

~~(COT) for the required Boron Dilution Monitoring Instrumentation (Source Range Neutron Flux Monitoring Channel) in MODE 3, 4, and 5. ITS SR 3.3.9.2 is modified by a note stating, "Not required to be performed prior to entering MODE 3 from MODE 2 until 24 hours after entry into MODE 3." This changes the CTS by allowing for a delay in performance of the surveillance.~~

~~The purpose of the CTS FUNCTIONAL TEST for the Source Range Neutron Flux Function is to ensure the channel will perform the intended Function. This change is acceptable because the delay in surveillance performance is similar to that allowed under SR 3.0.3 when it is determined a surveillance has been missed. The function of the Source Range Neutron flux monitoring channel is to provide the operators indication of a dilution accident with sufficient time for operator action to mitigate the accident (i.e., greater than 15 minutes). The addition of the Note allows a normal shutdown to proceed without a delay for testing in MODE 2 and for a short time in MODE 3 and prevents entry into Required Actions, which are probably unnecessary, should an unplanned reactor trip occur. ITS SR 3.3.9.3 requires a channel calibration of these instrument every 18 months. ITS SR 3.3.9.2 requires a COT performed on the required channel every 184 days when in MODES 3, 4, or 5. ITS SR 3.3.9.1 requires a CHANNEL CHECK be performed every 12 hours while in MODES 3, 4, or 5. Before exiting MODE 6 and entering MODE 5 the required channel's testing must be current and maintained current until MODE 3 is exited and MODE 2 entered. Once in MODE 2 and then MODE 1, the instruments are no longer in their MODE of Applicability and in accordance with ITS SR 3.0.1 the surveillance requirements are not required to be meet. Entry into MODE 3 from MODE 2 without performance of SR 3.3.9.2 is similar to discovery of a Surveillance not being performed within its specified Frequency. Similarly, ITS SR 3.3.1.7 Note and ITS SR 3.0.3, under the condition of a missed surveillance, allows 24 hours to perform surveillance requirements. In addition, the operators will be monitoring the source range nuclear instruments during the plant shutdown performing a qualitative assessment of the channel's behavior where any unusual behavior will be identified and evaluated. This change is designated as less restrictive because a Surveillance will be performed less frequently under the ITS than under the CTS.~~

CTS

BD~~PS~~ MI ~~(Without Setpoint Control Program)~~ 1
3.3.9~~A~~

3.3 INSTRUMENTATION

3.3.9~~A~~ Boron Dilution Monitoring Instrumentation ~~Protection System~~ (BD~~PS~~ MI) ~~(Without Setpoint Control Program)~~ 1

3.3.1.1, Table 3.3-1 Function 6.B

LCO 3.3.9~~A~~ One source range neutron flux monitoring channel ~~Two trains of the BDPS~~ shall be OPERABLE. 2

Applicability, Table 3.3-1 Function 6.B

APPLICABILITY: MODES ~~[2,]~~ 3, 4, and 5. 3

DOC L01

-----NOTE-----
The high flux at shutdown alarm ~~boron dilution flux doubling signal~~ may be blocked in MODE~~S 2 and~~ 3 during reactor startup. 4

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~A. One train inoperable.~~	~~A.1 Restore train to OPERABLE status.~~	~~72 hours~~
~~Table 3.3-1 ACTION 5 DOC M02~~ ~~B.~~ A. One required channel ~~Two trains~~ inoperable. ~~OR~~ ~~Required Action and associated Completion Time of Condition A not met.~~	~~B.~~ A.1 ~~-----NOTE----- Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SDM. ----------~~ ~~DOC M02~~ ~~Suspend operations involving positive reactivity additions.~~ ~~AND~~ ~~DOC M02~~ ~~B.2.1~~ ~~A~~ ~~Restore one train required channel to OPERABLE status.~~ ~~OR~~	~~Immediately~~ ~~1 hour~~

2 9 ~~2~~

Enclosure 2, Volume 8, Rev. 0, Page 1102 of 1148

CTS

BD~~PS (Without Setpoint Control Program)~~ MI
3.3.9~~A~~ 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC M02	~~B~~.~~2.2.1~~ A ~~Initiate action to~~ ~~one combination of~~ ~~Close unborated water source isolation valves.~~	~~1 hour~~ ~~Immediately~~ 2 4 9
	~~AND~~	
Table 3.3-1 ACTION 5	~~B~~.~~2.2.2~~ A Perform SR 3.1.1.1.	1 hour 2 AND Once per 12 hours thereafter

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
Table 4.3-1 Function 6 — SR 3.3.9.1	Perform CHANNEL CHECK.	~~[12 hours~~ ~~OR~~ 6 In accordance with the Surveillance Frequency Control Program ~~]~~ 6
Table 4.3-1 Function 6, DOC M01, DOC L01, ~~DOC L04~~ — SR 3.3.9.2	Perform COT. ~~NOTE~~ ~~Not required to be performed prior to entering MODE 3 from MODE 2 until 24 hours after entry into MODE 3~~	~~[[184] days~~ ~~7~~ ~~OR~~ 6 In accordance with the Surveillance Frequency Control Program ~~]~~ 6

CTS

BD~~PS~~ MI ~~(Without Setpoint Control Program)~~
3.3.9~~A~~ 1

3.3 INSTRUMENTATION

3.3.9~~A~~ Boron Dilution ~~Protection System~~ Monitoring Instrumentation (BD~~PS~~ MI) ~~(Without Setpoint Control Program)~~ 1

3.3.1.1, Table 3.3-1 Function 6.B

LCO 3.3.9~~A~~ ~~Two trains of the BDPS~~ One source range neutron flux monitoring channel shall be OPERABLE. 2

Applicability, Table 3.3-1 Function 6.B

APPLICABILITY: MODES ~~[2,]~~ 3, 4, and 5. 3

DOC L01

------NOTE------
The ~~boron dilution flux doubling signal~~ high flux at shutdown alarm may be blocked in MODE~~S 2 and~~ 3 during reactor startup. 4

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~A.~~ ~~One train inoperable~~.	~~A.1~~ ~~Restore train to OPERABLE status.~~	~~72 hours~~
~~B~~ A. ~~Two trains~~ One required channel inoperable. ~~OR~~ ~~Required Action and associated Completion Time of Condition A not met.~~	~~B~~ A.1 ~~------NOTE------ Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SDM. ------~~ ~~Suspend operations involving positive reactivity additions.~~ ~~AND~~ ~~B.2.1~~ ~~A~~ ~~Restore one train~~ ~~required channel~~ ~~to OPERABLE status.~~ ~~OR~~	 ~~Immediately~~ ~~1 hour~~

2

~~Table 3.3-1 ACTION 5~~ ~~DOC M02~~

~~DOC M02~~

~~DOC M02~~

2

9

~~2~~

5

CTS

BD~~PS (Without Setpoint Control Program)~~ MI
3.3.9~~A~~ 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC M02	~~B~~.2.2.1 ~~Close unborated water source isolation valves.~~ (Initiate action to / one combination of / A)	~~1 hour~~ Immediately 2 4 9
	~~AND~~	
Table 3.3-1 ACTION 5	~~B~~.2.2.2 Perform SR 3.1.1.1. (A)	1 hour 2 AND Once per 12 hours thereafter

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Table 4.3-1 Function 6 — SR 3.3.9.1 Perform CHANNEL CHECK.	~~[12 hours~~ ~~OR~~ 6 In accordance with the Surveillance Frequency Control Program ~~]~~ 6
Table 4.3-1 Function 6, DOC M01, DOC L01, DOC L04 — SR 3.3.9.2 Perform COT. ~~NOTE~~ ~~Not required to be performed prior to entering MODE 3 from MODE 2 until 24 hours after entry into MODE 3~~	~~[[184] days~~ 7 ~~OR~~ 6 In accordance with the Surveillance Frequency Control Program ~~]~~ 6

JUSTIFICATION FOR DEVIATIONS
ITS 3.3.9, BORON DILUTION MONITORING INSTRUMENTATION (BDMI)

1. The type of Setpoint Control Program (Without Setpoint Control Program) and the Specification designator "A" are deleted since they are unnecessary. This information is provided in NUREG 1431, Rev. 4.0 to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion, but serves no purpose in the plant specific implementation. In addition, ISTS 3.3.9B (with Setpoint Control Program Specification) is not used and is not shown. Additionally, the title of the Specification has been changed from "Boron Dilution Protection System (BDPS)" to "Boron Dilution Monitoring Instrumentation (BDMI)" since an actual "Protection System" does not exist at SQN.

2. ISTS 3.3.9A is not applicable to the SQN design or licensing bases. The BDPS as described in the ISTS is a two train system that provides automatic protection against boron dilution accidents by switching the charging pump suction to the RWST upon a specified high flux signal. Such a system is not part of the SQN plant design. The SQN units rely on detection of the event and operator action to mitigate the accident in MODES 3, 4, and 5.

   CTS 3.3.1.1, Reactor Trip System Instrumentation requires a single channel of source range instrumentation OPERABLE in MODES 3, 4, and 5. This requirement provides the only TS required means to monitor core reactivity under the specified plant condition. The requirement includes MODE 3 where the monitoring function serves as the only "required" means to detect a boron dilution event in progress. Although the source range channel does not actuate a system designed to mitigate a boron dilution event, it does provide the only TS required means of directly indicating neutron flux in the specified MODES. Therefore, the CTS Table 3.3-4 Functional Unit 6.B requirement for a single OPERABLE source range indication channel in MODES 3, 4, and 5 is being retained in ITS 3.3.9. The proposed LCO and ACTIONS have been changed to reflect the current requirement of one source range monitoring instrument channel to identify a possible boron dilution event.

3. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

4. ISTS 3.3.9A contains an Applicability Note which states that the boron dilution flux doubling signal may be blocked in MODES 2 and 3 during reactor startup. ITS 3.3.9 Applicability does not include MODE 2 and SQN does not have a boron dilution flux doubling signal but a High Flux at Shutdown alarm. Therefore, this information was changed to reflect the SQN design.

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

6. ISTS SR 3.3.9.1, SR 3.3.9.2 and SR 3.3.9.3 (ITS SR 3.3.9.1, SR 3.3.9.2 and SR 3.3.9.3) provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program.

7. ~~A Note has been added to ISTS SR 3.3.9.2 similar to the Note included in ITS 3.3.1.7 to delay performance of the surveillance when entering MODE 3 from~~

JUSTIFICATION FOR DEVIATIONS
ITS 3.3.9, BORON DILUTION MONITORING INSTRUMENTATION (BDMI)

~~MODE 2 allowing time for performed without entering the Required Actions for an inoperable required channel.~~

8. ~~CTS Table 3.3.1 ACTION 5 is associated with Functional Unit 6.B (Source Range, Neutron Flux – Shutdown) and requires that with the number of Source Range channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, verify compliance with the SHUTDOWN MARGIN requirements of Specification 3.1.1.1 or 3.1.1.2, as applicable, within 1 hour and at least once per 12 hours thereafter. TVA proposes to add a requirement, under this condition, to initiate action to one combination of unborated water source isolation valves immediately. This changes the ISTS requirements on closing the unborated water source isolation valve within one hour to initiating action to close one combination of unborated water source isolation valves immediately. This change from ISTS is justified because the CTS requirements are being retained and completion of the closure of the required isolation valves is being performed in a reasonable time. Requiring one hour for isolation of numerous isolation valves during a plant shutdown with shutdown margin confirmed and monitored is considered unnecessary.~~

9. ISTS Required Actions B.1, B.2.1, and B.2.2.1 have been deleted. CTS does not require suspending operations involving positive reactivity, restoring one train to OPERABLE status, or closing unborated water source isolation valves when the required source range neutron flux monitoring channel is inoperable. However, CTS Table 3.3-1, ACTION 5 does require verifying compliance with SHUTDOWN MARGIN (SDM) requirements within 1 hour and at least once per 12 hours thereafter when the required source range neutron flux monitoring channel is inoperable. Therefore, ISTS Required Action B.2.2.2 is retained as ITS Required Action A.1, which requires performance of ITS SR 3.1.1.1 (Verify SDM to be within limits specified in the COLR) within 1 hour and once per 12 hours thereafter.

BASES

ACTIONS (continued)

A

~~B~~.1~~, B.2.1, B.2.2.1, and B.2.2.2~~ 4

~~the required channel~~

~~With two trains inoperable, or the Required Action and associated Completion Time of Condition A not met, the initial action (Required Action B.1) is to suspend all operations involving positive reactivity additions immediately. This includes withdrawal of control or shutdown rods and intentional boron dilution. A Completion Time of 1 hour is provided to restore one train to OPERABLE status.~~ ~~A~~ ~~2~~ 4 ~~2~~

~~the required channel~~ ~~in one of the required valve combinations~~

~~As an alternate to restoring one train to OPERABLE status (Required Action B.2.1), Required Action B.2.2.1 requires valves listed in LCO 3.9.2 (Required Action A.2) to be secured to prevent the flow of unborated water into the RCS. Once it is recognized that two trains of the BDPS are inoperable, the operators will be aware of the possibility of a boron dilution, and the 1 hour Completion Time is adequate to complete the requirements of LCO 3.9.2.~~ ~~A~~ ~~MI is~~ ~~the required channel~~ ~~2~~ ~~4~~ ~~2~~ ~~1~~

~~are required to immediately take action~~ A ~~A~~

~~Required Action B.2.2.2 accompanies~~ Required Action ~~B.2.2~~.1 requires the verification of ~~to verify the~~ SDM according to SR 3.1.1.1 within 1 hour and once per 12 hours thereafter. This ~~backup~~ action is intended to confirm that no unintended boron dilution has occurred while the BD~~PS~~ MI was inoperable, and that the required SDM has been maintained. The specified Completion Time takes into consideration sufficient time for the initial determination of SDM and other information available in the control room related to SDM. 1 4

~~A~~

~~Required Action B.1 is modified by a Note which permits plant temperature changes provided the temperature change is accounted for in the calculated SDM. Introduction of temperature changes, including temperature increases when a positive MTC exists, must be evaluated to ensure they do not result in a loss of required SDM.~~ ~~4~~ ~~5~~

SURVEILLANCE REQUIREMENTS

SR 3.3.9.1

~~The BDPS trains are subject to a COT and a CHANNEL CALIBRATION.~~ 2

Performance of the CHANNEL CHECK ensures that 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 that the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

BASES

ACTIONS (continued)

A

~~B~~.1, ~~B~~.~~2.1~~, ~~B~~.~~2.2.1~~, and ~~B~~.~~2.2.2~~

the required channel

~~With two trains inoperable, or the Required Action and associated Completion Time of Condition A not met, the initial action (Required Action B.1) is to suspend all operations involving positive reactivity additions immediately. This includes withdrawal of control or shutdown rods and intentional boron dilution. A Completion Time of 1 hour is provided to restore one train to OPERABLE status.~~ 4 2 4 2

~~the required channel~~ ~~in one of the required valve combinations~~

~~As an alternate to restoring one train to OPERABLE status (Required Action B.2.1), Required Action B.2.2.1 requires valves listed in LCO 3.9.2 (Required Action A.2) to be secured to prevent the flow of unborated water into the RCS. Once it is recognized that two trains of the BDPS are inoperable, the operators will be aware of the possibility of a boron dilution, and the 1 hour Completion Time is adequate to complete the requirements of LCO 3.9.2.~~ 2 4 2 1

~~MI is~~ ~~the required channel~~ ~~are required to immediately take action~~ A requires the verification of

~~Required Action B.2.2.2 accompanies~~ Required Action ~~B~~.~~2.2~~.1 ~~to verify the~~ SDM according to SR 3.1.1.1 within 1 hour and once per 12 hours thereafter. This ~~backup~~ action is intended to confirm that no unintended boron dilution has occurred while the BDP~~S~~ was inoperable, and that the required SDM has been maintained. The specified Completion Time takes into consideration sufficient time for the initial determination of SDM and other information available in the control room related to SDM. 1 4

MI

~~A~~

~~Required Action B.1 is modified by a Note which permits plant temperature changes provided the temperature change is accounted for in the calculated SDM. Introduction of temperature changes, including temperature increases when a positive MTC exists, must be evaluated to ensure they do not result in a loss of required SDM.~~ 4 5

SURVEILLANCE REQUIREMENTS

SR 3.3.9.1

~~The BDPS trains are subject to a COT and a CHANNEL CALIBRATION.~~ 2

Performance of the CHANNEL CHECK ensures that 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 that the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

JUSTIFICATION FOR DEVIATIONS
ITS 3.3.9 BASES, BORON DILUTION MONITORING INSTRUMENTATION (BDMI)

1. The type of Setpoint Control Program (Without Setpoint Control Program) and the Specification designator "A" are deleted since they are unnecessary. This information is provided in NUREG 1431, Rev. 4.0 to assist in identifying the appropriate Bases to be used as a model for the plant specific ITS conversion, but serves no purpose in the plant specific implementation. In addition, ISTS B 3.3.9B (with Setpoint Control Program Specification) is not used and is not shown. Additionally, the title of the Bases has been changed from "Boron Dilution Protection System (BDPS)" to "Boron Dilution Monitoring Instrumentation (BDMI)" since an actual "Protection System" does not exist at SQN.

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

3. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

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

5. ~~The paragraph has been moved to after the discussion on Required Action B.1 since the Note is associated with Required Action B.1.~~

6. Typographical/grammatical error corrected.

7. ISTS SR 3.3.9.1, SR 3.3.9.2 and SR 3.3.9.3 Bases provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Additionally, the Frequency description which is being removed will be included in the Surveillance Frequency Control Program.

8. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

Licensee Response/NRC Response/NRC Question Closure

Id	**334**
NRC Question Number	**KAB049**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**9/15/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**9/15/2014 10:29 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**89**
NRC Question Number	**KAB050**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.9**
DOC Number	
JFD Number	**2**
JFD Bases Number	
Page Number(s)	**1108**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 1108 of Enclosure 2, Volume 8, JFD 2 discusses only Sequoyah Unit 1 CTS 3.3.1.1 and states, "Therefore, the CTS Table 3.3-4 Functional Unit 6.B requirement for a single OPERABLE source range indication channel in MODES 3, 4, and 5 is being retained in ITS 3.3.9. However, JFD 2 is used in the Sequoyah Unit 2 ITS 3.3.9 mark up. In addition, CTS Table 3.3-4 is ESFAS instrumentation setpoints and functional unit 6.b is the Auxiliary Feedwater automatic actuation logic.** **Please provide a correction to JFD 2 so that it is accurate, or explain the discrepancies.**
Attach File 1	
Attach File 2	
Issue Date	**5/23/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/23/2014 2:51 PM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**105**
NRC Question Number	**KAB050**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.9 revised JFD 2.pdf** (13KB)
Attachment 2	
Response Statement	**In response to KAB050, justification for deviation (JFD) 2, on page 1108 of Enclosure 2, Volume 8, will be revised. Specifically, additional text will be added to the CTS 3.3.1.1 reference to read, "CTS 3.3.1.1 (Unit 1) and CTS 3.1.1 (Unit 2)." Additionally, the reference to CTS Table 3.3-4 will be revised to reference CTS Table 3.3-1.** **See Attachment 1 for a draft revised JFD 2.**
Response Date/Time	**6/6/2014 6:50 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/6/2014 5:50 AM**
Date Modified	
Modified By	

JUSTIFICATION FOR DEVIATIONS
ITS 3.3.9, BORON DILUTION MONITORING INSTRUMENTATION (BDMI)

1. The type of Setpoint Control Program (Without Setpoint Control Program) and the Specification designator "A" are deleted since they are unnecessary. This information is provided in NUREG 1431, Rev. 4.0 to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion, but serves no purpose in the plant specific implementation. In addition, ISTS 3.3.9B (with Setpoint Control Program Specification) is not used and is not shown. Additionally, the title of the Specification has been changed from "Boron Dilution Protection System (BDPS)" to "Boron Dilution Monitoring Instrumentation (BDMI)" since an actual "Protection System" does not exist at SQN.

2. ISTS 3.3.9A is not applicable to the SQN design or licensing bases. The BDPS as described in the ISTS is a two train system that provides automatic protection against boron dilution accidents by switching the charging pump suction to the RWST upon a specified high flux signal. Such a system is not part of the SQN plant design. The SQN units rely on detection of the event and operator action to mitigate the accident in MODES 3, 4, and 5.

   CTS 3.3.1.1 (Unit 1) and 3.3.1 (Unit 2), Reactor Trip System Instrumentation require~~s~~ a single channel of source range instrumentation OPERABLE in MODES 3, 4, and 5. This requirement provides the only TS required means to monitor core reactivity under the specified plant condition. The requirement includes MODE 3 where the monitoring function serves as the only "required" means to detect a boron dilution event in progress. Although the source range channel does not actuate a system designed to mitigate a boron dilution event, it does provide the only TS required means of directly indicating neutron flux in the specified MODES. Therefore, the CTS Table 3.3-~~4~~1 Functional Unit 6.B requirement for a single OPERABLE source range indication channel in MODES 3, 4, and 5 is being retained in ITS 3.3.9. The proposed LCO and ACTIONS have been changed to reflect the current requirement of one source range monitoring instrument channel to identify a possible boron dilution event.

3. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

4. ISTS 3.3.9A contains an Applicability Note which states that the boron dilution flux doubling signal may be blocked in MODES 2 and 3 during reactor startup. ITS 3.3.9 Applicability does not include MODE 2 and SQN does not have a boron dilution flux doubling signal but a High Flux at Shutdown alarm. Therefore, this information was changed to reflect the SQN design.

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

6. ISTS SR 3.3.9.1, SR 3.3.9.2 and SR 3.3.9.3 (ITS SR 3.3.9.1, SR 3.3.9.2 and SR 3.3.9.3) provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program.

7. A Note has been added to ISTS SR 3.3.9.2 similar to the Note included in ITS 3.3.1.7 to delay performance of the surveillance when entering MODE 3 from

Licensee Response/NRC Response/NRC Question Closure

Id	**118**
NRC Question Number	**KAB050**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/17/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/17/2014 9:03 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**90**
NRC Question Number	**KAB051**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.9**
DOC Number	
JFD Number	
JFD Bases Number	**8**
Page Number (s)	**1109**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 1109 of Enclosure 2, Volume 8, JFD 8 discusses the changes to ITS 3.3.9 required action A.2.2.1 wording. However, JFD 8 is not referenced in the ITS 3.3.9 mark ups for Sequoyah unit 1 or 2. Please explain this discrepancy.**
Attach File 1	
Attach File 2	
Issue Date	**5/23/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/23/2014 2:52 PM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**109**
NRC Question Number	**KAB051**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.9 revised ISTS markups.pdf** (39KB)
Attachment 2	
Response Statement	**In response to KAB051, the ISTS markups for SQN, Units 1 and 2, on pages 1103 and 1106 of Enclosure 2, Volume 8, will be revised. Specifically, the justification for deviation (JFD) indicator in the right hand margin will be revised to reference JFD 8 vice JFD 4. JFD 4 is associated with the deviation to the ISTS Applicability Note and is not the correct reference for a deviation associated with ISTS Required Action B.2.2.1 (ITS Required Action A.2.2.1). This was a typographical error.** **During review of JFD 8, the following issue was identified. The sentence, "TVA proposes to add a requirement, under this condition, to initiate action to one combination of unborated water source isolation valves immediately." should be revised to read, "TVA proposes to add a requirement, under this condition, to initiate action to <u>close</u> one combination of unborated water source isolation valves immediately."** **See Attachment 1 for the draft revised ISTS markups for Units 1 and 2 and JFD 8.**
Response Date/Time	**6/6/2014 11:25 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/6/2014 10:21 AM**
Date Modified	
Modified By	

CTS

BD~~PS (Without Setpoint Control Program)~~ MI
3.3.9~~A~~ 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	~~B~~ A.2.2.1 Initiate action to Close one combination of unborated water source isolation valves. AND ~~B~~ A.2.2.2 Perform SR 3.1.1.1.	~~1 hour~~ Immediately 2 ~~4~~ 8 1 hour 2 AND Once per 12 hours thereafter

DOC M02

Table 3.3-1 ACTION 5

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.3.9.1 Perform CHANNEL CHECK.	~~[12 hours~~ ~~OR~~ 6 In accordance with the Surveillance Frequency Control Program ~~]~~ 6
SR 3.3.9.2 ---NOTE--- Not required to be performed prior to entering MODE 3 from MODE 2 until 24 hours after entry into MODE 3 ------ Perform COT.	~~[[184] days~~ 7 ~~OR~~ 6 In accordance with the Surveillance Frequency Control Program ~~]~~ 6

Table 4.3-1 Function 6

Table 4.3-1 Function 6, DOC M01, DOC L01

DOC L04

CTS

BD~~PS (Without Setpoint Control Program)~~ MI 3.3.9~~A~~ 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC M02	~~B~~ A.2.2.1 Initiate action to Close one combination of unborated water source isolation valves. AND	Immediately ~~1 hour~~ 2 ~~4~~ 8
Table 3.3-1 ACTION 5	~~B~~ A.2.2.2 Perform SR 3.1.1.1.	1 hour AND Once per 12 hours thereafter 2

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Table 4.3-1 Function 6 — SR 3.3.9.1 Perform CHANNEL CHECK.	~~[12 hours~~ ~~OR~~ 6 In accordance with the Surveillance Frequency Control Program ~~]~~ 6
Table 4.3-1 Function 6, DOC M01, DOC L01 — SR 3.3.9.2 Perform COT. -----NOTE----- Not required to be performed prior to entering MODE 3 from MODE 2 until 24 hours after entry into MODE 3 ---------- DOC L04	~~[[184] days~~ 7 ~~OR~~ 6 In accordance with the Surveillance Frequency Control Program ~~]~~ 6

JUSTIFICATION FOR DEVIATIONS
ITS 3.3.9, BORON DILUTION MONITORING INSTRUMENTATION (BDMI)

MODE 2 allowing time for performed without entering the Required Actions for an inoperable required channel.

8. CTS Table 3.3.1 ACTION 5 is associated with Functional Unit 6.B (Source Range, Neutron Flux – Shutdown) and requires that with the number of Source Range channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, verify compliance with the SHUTDOWN MARGIN requirements of Specification 3.1.1.1 or 3.1.1.2, as applicable, within 1 hour and at least once per 12 hours thereafter. TVA proposes to add a requirement, under this condition, to initiate action to one combination of unborated water source isolation valves immediately. This changes the ISTS requirements on closing the unborated water source isolation valve within one hour to initiating action to close one combination of unborated water source isolation valves immediately. This change from ISTS is justified because the CTS requirements are being retained and completion of the closure of the required isolation valves is being performed in a reasonable time. Requiring one hour for isolation of numerous isolation valves during a plant shutdown with shutdown margin confirmed and monitored is considered unnecessary.

close

Licensee Response/NRC Response/NRC Question Closure

Id	**120**
NRC Question Number	**KAB051**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/17/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/17/2014 9:33 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**91**
NRC Question Number	**KAB052**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.9**
DOC Number	
JFD Number	**8**
JFD Bases Number	
Page Number(s)	**1109**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 1109 of Enclosure 2, Volume 8, JFD 8 discusses the changes to ITS 3.3.9 required action A.2.2.1 wording. JFD 8 states, "Requiring one hour for isolation of numerous isolation valves during a plant shutdown with shutdown margin confirmed and monitored is considered unnecessary." ITS Condition B is entered when all source range channels are inoperable. Please explain how shutdown margin is monitored when both source range channels are inoperable.**
Attach File 1	
Attach File 2	
Issue Date	**5/23/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/23/2014 2:54 PM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**110**
NRC Question Number	**KAB052**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**ITS 3.3.9, "Boron Dilution Monitoring Instrumentation (BDMI)," requires that one Source Range Monitor shall be OPERABLE in Modes 3, 4, and 5. If two source range neutron flux monitors are inoperable, ITS Required Action A.2.2.2 requires performance of SR 3.1.1.1 within one hour and every twelve hours thereafter. ITS SR 3.1.1.1 is satisfied by the performance of Surveillance Instruction, 0-SI-NUC-000-038.0, Shutdown Margin. 0−SI−NUC−000−038.0 provides detailed steps to verify and/or calculate sufficient Shutdown Margin (SDM) during unit operation in Modes 1 through 6. SDM is monitored by performance of 0-SI-NUC-000-038.0 until at least one source range neutron flux monitor is returned to operable status. Boron, xenon, inverse boron worth, core burn up, temperature, and RHR flow are some of the factors used to ensure that SDM remains within technical specification limits. The factors utilized in the SDM calculation depend on reactor conditions at the time of the calculations. 0-SI-NUC-000-038.0 includes calculations for the different core conditions present at the time the calculation is performed.**
Response Date/Time	**6/6/2014 11:25 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman Kristy Bucholtz Michelle Conner Khadijah Hemphill Andrew Hon Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/6/2014 10:24 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**121**
NRC Question Number	**KAB052**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/17/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/17/2014 9:39 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**92**
NRC Question Number	**KAB053**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	**127, 159**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On pages 127 and 159 of Enclosure 2, Volume 8, ITS Table 3.3.1-1 Note 2 states, "$\tau_4 \leq$ [*] sec" and "$\tau_5 \geq$ [*] sec." However, CTS Table 2.2-1 Note 2 states, "τ_4, τ_5 = as defined in Note 1," and Note 1 states, "τ_4, τ_5 = Time constants utilized in the lead-lag controller for ΔT, $\tau_4 \geq 5$ secs, $\tau 5 \leq 3$ secs." Please explain this discrepancy.**
Attach File 1	
Attach File 2	
Issue Date	**5/27/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/27/2014 1:00 PM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**195**
NRC Question Number	**KAB053**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.1 Note 2 KAB053.pdf** (92KB)
Attachment 2	
Response Statement	**In response to KAB053, the ISTS Markups for Note 2: Overpower ΔT time constants τ_4 andτ_5 on pages 127 and 159 of Enclosure 2, Volume 8, are incorrect and will be revised. Specifically, ITS Table 3.3.1-1 Note 2: Overpower ΔT will be changed to reflect CTS such that the ISTS markup will show $\tau_4 \geq$ [*] sec and $\tau_5 \leq$ [*] sec.** **See Attachment 1 for draft revised ISTS markups for Units 1 and 2.**
Response Date/Time	**7/21/2014 8:00 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/21/2014 6:54 AM**
Date Modified	
Modified By	

CTS

RTS Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.1~~A~~

Table 2.2-1

Table 3.3.1-1 (page 8 of 8)
Reactor Trip System Instrumentation

Note 2 Note 2: Overpower ΔT

Note 4 The Overpower ΔT Function Allowable Value shall not exceed the following ~~[~~Nominal Trip Setpoint~~]~~ by more than ~~[3]~~ 1.7% of ΔT span. 3

INSERT 8

$$\cancel{\Delta T\frac{(1+T_1S)}{(1+T_2S)}\left(\frac{1}{1+T_3S}\right)\leq\Delta T_Q\left\{K_4-K_5\frac{T_7S}{1+T_7S}\left(\frac{1}{1+T_6S}\right)T-K_6\left[T\frac{1}{1+T_6S}-T''\right]-f_2(\Delta I)\right\}}$$ 2

Where: ΔT is measured RCS ΔT,°F.
$\Delta T_{\cancel{Q}}$ 0 is the indicated ΔT at RTP,°F. 2
s is the Laplace transform operator, sec^{-1}.
T is the measured RCS average temperature,°F.
T" is the nominal T_{avg} at RTP, ≤ ~~[~~*~~]~~°F. 3

K_4 ≤ ~~[~~*~~]~~ K_5 ≥ ~~[~~*~~]~~/°F for increasing T_{avg} K_6 ≥ ~~[~~*~~]~~/°F when T > T"
~~[~~*~~]~~/°F for decreasing T_{avg} ~~[~~*~~]~~/°F when T ≤ T" 3

τ ~~T_1~~ 3 ≥ ~~[~~*~~]~~ sec τ ~~T_2~~ 4 ~~≤~~ ≥ ~~[~~*~~]~~ sec τ ~~T_3~~ 5 ~~≤~~ ≥ stet ~~[~~*~~]~~ sec 2
~~T_6 ≤ [*] sec~~ ~~T_7 ≥ [*] sec~~

~~$f_2(\Delta I)$ = [*]~~ INSERT 9

INSERT 10

These values denoted with ~~[~~ (including QPNL, QPPL, QPNS, and QPPS)~~]~~ are specified in the COLR. 2

Note 5 INSERT 11

CTS

Table 2.2-1

Table 3.3.1-1 (page 8 of 8)
Reactor Trip System Instrumentation

Note 2

Note 2: Overpower ΔT

Note 4

The Overpower ΔT Function Allowable Value shall not exceed the following ~~[~~Nominal Trip Setpoint~~]~~ by more than ~~[3]~~ 1.7% of ΔT span. 3

INSERT 8

$$\Delta T \frac{(1+T_1S)}{(1+T_2S)}\left(\frac{1}{1+T_3S}\right) \le \Delta T_Q \left\{K_4 - K_5 \frac{T_7S}{1+T_7S}\left(\frac{1}{1+T_6S}\right)T - K_6\left[T\frac{1}{1+T_6S} - T''\right] - f_2(\Delta I)\right\}$$ 2

Where: ΔT is measured RCS ΔT, °F.
$\Delta T_{~~Q~~ 0}$ is the indicated ΔT at RTP, °F. 2
s is the Laplace transform operator, sec^{-1}.
T is the measured RCS average temperature, °F.
T" is the nominal T_{avg} at RTP, ≤ ~~[~~*~~]~~°F. 3

K_4 ≤ ~~[~~*~~]~~
τ ~~T₁~~ 3 ≥ ~~[~~*~~]~~ sec
~~T₆ ≤ [*] sec~~

K_5 ≥ ~~[~~*~~]~~/°F for increasing T_{avg}
~~[~~*~~]~~/°F for decreasing T_{avg}
τ ~~T₂~~ 4 ~~≤~~ ≥ ~~[~~*~~]~~ sec
~~T₇ ≥ [*] sec~~ ≥

K_6 ≥ ~~[~~*~~]~~/°F when T > T"
~~[~~*~~]~~/°F when T ≤ T" 3
τ ~~T₃~~ 5 ~~≤~~ ~~≥~~ ~~[~~*~~]~~ sec
stet 2

~~f₂(ΔI) = [*]~~ INSERT 9

INSERT 10

These values denoted with ~~[~~~~]~~ * (including QPNL, QPPL, QPNS, and QPPS) are specified in the COLR. 2

Note 5 INSERT 11

Licensee Response/NRC Response/NRC Question Closure

Id	**203**
NRC Question Number	**KAB053**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**7/22/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**7/22/2014 7:52 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**109**
NRC Question Number	**KAB054**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.1**
DOC Number	
JFD Number	
JFD Bases Number	**9**
Page Number (s)	**321**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On page 321 of Enclosure 2, Volume 8, JFD 9 discusses the surveillance frequency control program. However, JFD 9 states:** **ISTS SR 3.3.1.1 through ISTS 3.3.16 (ITS SR 3.3.1.1 through ITS 3.1.14) … Therefore, the Frequency for ITS SR 3.3.1.1 through ITS 3.3.1.14 is "In accordance with the Surveillance Frequency Control Program."** **However, ISTS does not contain a LCO 3.3.16, nor does ITS have a LCO 3.1.14. ISTS 3.3.1 does have a surveillance requirement 3.3.1.16 and ITS has a surveillance requirement 3.3.1.14. Please correct JFD 9 to reference ISTS SR 3.3.1.16 and ITS SR 3.3.1.14 or explain why ISTS 3.3.16 and ITS 3.1.14 are the correct references.**
Attach File 1	
Attach File 2	
Issue Date	**5/30/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/30/2014 8:33 AM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**126**
NRC Question Number	**KAB054**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.1 revised JFD 9.pdf** (897KB)
Attachment 2	
Response Statement	**In response to KAB054, justification for deviation (JFD) 9, on page 321 of Enclosure 2, Volume 8, will be revised. Additionally, during review it was identified that ISTS SR 3.3.1.15 and ITS SR 3.3.1.13 do not provide an option for controlling the Frequency "In accordance with the Surveillance Frequency Control Program." Therefore, JFD 9 will be revised to read, "ISTS SR 3.3.1.1 through ISTS SR 3.3.1.14 and ISTS SR 3.3.1.16 (ITS SR 3.3.1.1 through ITS SR 3.3.1.12 and ITS SR 3.3.1.14) provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Therefore, the Frequency for ITS SR 3.3.1.1 through ITS SR 3.3.1.12 and ITS SR 3.3.1.14 is 'In accordance with the Surveillance Frequency Control Program.'"** **See Attachment 1 for a draft revised JFD 9.**
Response Date/Time	**6/17/2014 1:30 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/17/2014 12:26 PM**
Date Modified	
Modified By	

JUSTIFICATION FOR DEVIATIONS
ITS 3.3.1 BASES, REACTOR TRIP SYSTEM (RTS) INSTRUMENTATION

1. NUREG 1431, Standard Technical Specifications - Westinghouse Plants, Revision 4.0 provides two sets of specification for Section 3.3.1; one for adoption "Without a Setpoint Control Program," (3.3.1.A) the other for adoption "With a Setpoint Control Program," (3.3.1.B). This information is provided in NUREG-1431, Rev. 4.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion, but serves no purpose in a plant specific implementation and is removed.

2. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description. Where a deletion has occurred, subsequent alpha-numeric designators have been changed for any applicable affected ACTIONS, SURVEILLANCE REQUIREMENTS, FUNCTIONS, and Footnotes.

3. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

4. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

5. Editorial changes made for enhanced clarity.

6. Proposed changes to the CTS removed details of system design and system description, including design limits stating that the removed detail will be located in the bases for the specification. These changes are made to be consistent with changes made to the Specification.

7. Changes are made to be consistent with changes made to the Specification.

8. SQN source could not be found to support this statement, therefore it is removed.

9. ~~ISTS SR 3.3.1.1 through ISTS 3.3.16 (ITS SR 3.3.1.1 through ITS 3.1.14) provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Therefore, the Frequency for ITS SR 3.3.1.1 through ITS 3.3.1.14 is "In accordance with the Surveillance Frequency Control Program."~~

ISTS SR 3.3.1.1 through ISTS SR 3.3.1.14 and ISTS SR 3.3.1.16 (ITS SR 3.3.1.1 through ITS SR 3.3.1.12 and ITS SR 3.3.1.14) provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Therefore, the Frequency for ITS SR 3.3.1.1 through ITS SR 3.3.1.12 and ITS SR 3.3.1.14 is "In accordance with the Surveillance Frequency Control Program."

Licensee Response/NRC Response/NRC Question Closure

Id	**128**
NRC Question Number	**KAB054**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/18/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/18/2014 1:05 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**110**
NRC Question Number	**KAB055**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.1**
DOC Number	
JFD Number	
JFD Bases Number	**9**
Page Number (s)	**188, 266**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On pages 188 and 266 of Enclosure 2, Volume 8, a reference is made to JFD 9 for deletion of a sentence in the pressurizer water level high discussion. JFD 9 discusses the surveillance frequency control program. Please explain why JFD 9 applies since this change was not part of TSTF-425.**
Attach File 1	
Attach File 2	
Issue Date	**5/30/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**5/30/2014 8:35 AM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**190**
NRC Question Number	**KAB055**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.1 Bases JFD 8.pdf** (26KB)
Attachment 2	
Response Statement	**In response to KAB055, the ISTS 3.3.1 Bases for Units 1 and 2, on pages 188 and 266 of Enclosure 2, Volume 8, where reference is made to justification for deviation (JFD) 9 for the deletion of a sentence in the pressurizer water level high discussion, will be revised. Specifically, ITS JFD 9 will be changed to JFD 8. JFD 8 states, "SQN source could not be found to support this statement, therefore it is removed."** **JFD 9 discusses the option for controlling Surveillance Frequencies under the Surveillance Frequency Control Program and is not applicable to this deletion of information from the ISTS Bases.** **See Attachment 1 for draft revised ISTS Bases markups for Units 1 and 2.**
Response Date/Time	**7/17/2014 5:15 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/17/2014 4:13 AM**
Date Modified	
Modified By	

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The Pressurizer Pressure - High LSSS is selected to be below the pressurizer safety valve actuation pressure and above the power operated relief valve (PORV) setting. This setting minimizes challenges to safety valves while avoiding unnecessary reactor trip for those pressure increases that can be controlled by the PORVs.

In MODE 1 or 2, the Pressurizer Pressure - High trip must be OPERABLE to help prevent RCS overpressurization and minimize challenges to the relief and safety valves. In MODE 3, 4, 5, or 6, the Pressurizer Pressure - High trip Function does not have to be OPERABLE because transients that could cause an overpressure condition will be slow to occur. Therefore, the operator will have sufficient time to evaluate unit conditions and take corrective actions. Additionally, low temperature overpressure protection systems provide overpressure protection when below MODE 4.

9. Pressurizer Water Level - High

The Pressurizer Water Level - High trip Function provides a backup signal for the Pressurizer Pressure - High trip and also provides protection against water relief through the pressurizer safety valves. These valves are designed to pass steam in order to achieve their design energy removal rate. A reactor trip is actuated prior to the pressurizer becoming water solid. The LCO requires three channels of Pressurizer Water Level - High to be OPERABLE. The pressurizer level channels are used as input to the Pressurizer Level Control System. A fourth channel is not required to address control/protection interaction concerns. The level channels do not actuate the safety valves, and the high pressure reactor trip is set below the safety valve setting. Therefore, with the slow rate of charging available, pressure overshoot due to level channel failure cannot cause the safety valve to lift before reactor high pressure trip.

There are three Pressurizer Level - High channels arranged in a two-out-of-three logic. 6

In MODE 1, when there is a potential for overfilling the pressurizer, the Pressurizer Water Level - High trip must be OPERABLE. This trip Function is automatically enabled on increasing power by the P-7 interlock. On decreasing power, this trip Function is automatically blocked below P-7. ~~Below the P-7 setpoint, transients that could raise the pressurizer water level will be slow and the operator will have sufficient time to evaluate unit conditions and take corrective actions.~~ 8 ~~9~~

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The Pressurizer Pressure - High LSSS is selected to be below the pressurizer safety valve actuation pressure and above the power operated relief valve (PORV) setting. This setting minimizes challenges to safety valves while avoiding unnecessary reactor trip for those pressure increases that can be controlled by the PORVs.

In MODE 1 or 2, the Pressurizer Pressure - High trip must be OPERABLE to help prevent RCS overpressurization and minimize challenges to the relief and safety valves. In MODE 3, 4, 5, or 6, the Pressurizer Pressure - High trip Function does not have to be OPERABLE because transients that could cause an overpressure condition will be slow to occur. Therefore, the operator will have sufficient time to evaluate unit conditions and take corrective actions. Additionally, low temperature overpressure protection systems provide overpressure protection when below MODE 4.

9. Pressurizer Water Level - High

The Pressurizer Water Level - High trip Function provides a backup signal for the Pressurizer Pressure - High trip and also provides protection against water relief through the pressurizer safety valves. These valves are designed to pass steam in order to achieve their design energy removal rate. A reactor trip is actuated prior to the pressurizer becoming water solid. The LCO requires three channels of Pressurizer Water Level - High to be OPERABLE. The pressurizer level channels are used as input to the Pressurizer Level Control System. A fourth channel is not required to address control/protection interaction concerns. The level channels do not actuate the safety valves, and the high pressure reactor trip is set below the safety valve setting. Therefore, with the slow rate of charging available, pressure overshoot due to level channel failure cannot cause the safety valve to lift before reactor high pressure trip.

There are three Pressurizer Level - High channels arranged in a two-out-of-three logic.

In MODE 1, when there is a potential for overfilling the pressurizer, the Pressurizer Water Level - High trip must be OPERABLE. This trip Function is automatically enabled on increasing power by the P-7 interlock. On decreasing power, this trip Function is automatically blocked below P-7. ~~Below the P-7 setpoint, transients that could raise the pressurizer water level will be slow and the operator will have sufficient time to evaluate unit conditions and take corrective actions.~~ 6

8 ~~9~~

Licensee Response/NRC Response/NRC Question Closure

Id	**193**
NRC Question Number	**KAB055**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**7/17/2014**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**7/17/2014 7:21 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**129**
NRC Question Number	**KAB056**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	
JFD Number	
JFD Bases Number	**8**
Page Number(s)	**675**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

On page 675 of Enclosure 2, Volume 8, JFD 8 discusses the surveillance frequency control program. However, JFD 8 states:

> **ISTS SR 3.3.2.1 through ISTS 3.3.2.11 (ITS SR 3.3.2.1 through ITS 3.3.2.10) … Therefore, the Frequency for ITS SR 3.3.2.1 through ITS 3.3.2.10 is "In accordance with the Surveillance Frequency Control Program."**

However, ISTS does not contain a LCO 3.3.2.11, nor does ITS have a LCO 3.3.2.10. ISTS 3.3.2 does have a surveillance requirement 3.3.2.11 and ITS has a surveillance requirement 3.3.2.10. Please correct JFD 8 to reference ISTS SR 3.3.2.11 and ITS SR 3.3.2.10 or explain why ISTS 3.3.2.11 and ITS 3.3.2.10 are the correct references.

Attach File 1	
Attach File 2	
Issue Date	**6/3/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**6/3/2014 9:17 AM**
Notification	**Scott Bowman**

Michelle Conner
Khadijah Hemphill
Andrew Hon
Lynn Mynatt
Ray Schiele
Roger Scott

Licensee Response/NRC Response/NRC Question Closure

Id	**127**
NRC Question Number	**KAB056**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.2 revised Bases JFD.pdf** (28KB)
Attachment 2	
Response Statement	**In response to KAB056, justification for deviation (JFD) 8, on page 675 of Enclosure 2, Volume 8, will be revised. Additionally, during review it was identified that ISTS SR 3.3.2.11 and ITS SR 3.3.2.10 do not provide an option for controlling the Frequency "In accordance with the Surveillance Frequency Control Program." Therefore, the sentence, "ISTS SR 3.3.2.1 through ISTS 3.3.2.11 (ITS SR 3.3.2.1 through ITS 3.3.2.10) provide two options for controlling the Frequencies of Surveillance Requirements." will be revised to read, "ISTS SR 3.3.2.1 through ISTS SR 3.3.2.10 (ITS SR 3.3.2.1 through ITS SR 3.3.2.9) provide two options for controlling the Frequencies of Surveillance Requirements."** **Based on the issue identified during review, the final sentence of JFD 8 will be revised to read, "Therefore, the Frequency for ITS SR 3.3.2.1 through ITS SR 3.3.2.9 is "In accordance with the Surveillance Frequency Control Program.""** **See Attachment 1 for a draft revised JFD 8.**
Response Date/Time	**6/17/2014 1:30 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/17/2014 12:29 PM**
Date Modified	
Modified By	

JUSTIFICATION FOR DEVIATIONS
ITS 3.3.2 BASES, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

1. NUREG 1431, Standard Technical Specifications - Westinghouse Plants, Revision 4.0 provides two sets of specification for Section 3.3.2; one for adoption "Without a Setpoint Control Program," (3.3.2.A) the other for adoption "With a Setpoint Control Program," (3.3.2.B). This information is provided in NUREG-1431, Rev. 4.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion, but serves no purpose in a plant specific implementation and is removed.

2. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description. Where a deletion has occurred, subsequent alpha-numeric designators have been changed for any applicable affected ACTIONS, SURVEILLANCE REQUIREMENTS, FUNCTIONS, and Footnotes.

3. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

4. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

5. Changes are made to be consistent with changes made to the Specification.

6. Editorial changes are made for clarity.

7. Changes made to explain the basis for the Note added to the Required Actions consistent with NRC approval contained in SQN License Amendment 319/312, reference ADAMS Accession Nos. ML082401385 and ML082401446.

8. ISTS SR 3.3.2.1 through ISTS SR 3.3.2.~~11~~ 10 (ITS SR 3.3.2.1 through ITS SR 3.3.2.~~10~~ 9) provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Therefore, the Frequency for ITS SR 3.3.2.1 through ITS SR 3.3.2.~~10~~ 9 is "In accordance with the Surveillance Frequency Control Program."

Licensee Response/NRC Response/NRC Question Closure

Id	**129**
NRC Question Number	**KAB056**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/18/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/18/2014 1:05 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**130**
NRC Question Number	**KAB057**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.2**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**474, 508, 591, 669**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On pages 474, 508, 591 and 669 of Enclosure 2, Volume 8, footnotes (b) and (c) have been deleted from ISTS SR 3.3.2.8 (ITS SR 3.3.2.7) and a paragraph that discusses the TSTF-493 notes (b) and (c) has been deleted from SR 3.3.2.8 bases. ISTS SR 3.3.2.8 (ITS SR 3.3.2.7) is a trip actuating device operational test as applied to the trip of all main feedwater pumps. Please remove the proposed changes or explain why the TSTF-493 footnotes are not applicable to the trip of all main feedwater pumps, and include a discussion of the TSTF-493 exclusion criteria if it is applicable.**
Attach File 1	
Attach File 2	
Issue Date	**6/3/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**6/3/2014 9:19 AM**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**205**
NRC Question Number	**KAB057**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**ITS SR 3.3.2.7 (ISTS SR 3.3.2.8) requires performance of a Trip Actuating Device Operational Test (TADOT). ITS SR 3.3.2.7 is applicable to ITS Table 3.3.2-1 Functions 1.a (Safety Injection - Manual Initiation), 2.a (Containment Spray - Manual Initiation), 3.a.(1) (Containment Isolation, Phase A Isolation - Manual Initiation), 3.b.(1) (Containment Isolation, Phase B Isolation - Manual Initiation), 4.a (Steam Line Isolation - Manual Initiation), and 6.e (Auxiliary Feedwater - Trip of all Main Feedwater Pumps). None of these Functions have an Allowable Value or a Nominal Trip Setpoint listed, but rather list these values as NA. The Allowable Value and Nominal Trip Setpoint for ITS Function 6.e (Auxiliary Feedwater - Trip of all Main Feedwater Pumps) is "NA." This is consistent with CTS Functional Unit 6.f (Auxiliary Feedwater - Trip of Main Feedwater Pumps). Therefore, no Functions associated with ITS SR 3.3.2.7 have an associated Allowable Value or Nominal Trip Setpoint, to which Footnotes (b) and (c) relate.**

ITS Table 3.3.2-1 Footnotes (b) and (c) describe actions to take when the as-found channel setpoint is outside its predefined as-found tolerance or cannot be reset to within the as-left tolerance around the Nominal Trip Setpoint. Because ITS Function 6.e's (Auxiliary Feedwater - Trip of all Main Feedwater Pumps) Allowable Value and Nominal Trip Setpoint values are listed as "NA," Footnotes (b) and (c) do not apply as with no listed value there is no as-found or as-left tolerance. In addition, because there are no Functions associated with ITS SR 3.3.2.7 where Footnote (b) or (c) are applied, the information associated with these footnotes in the Bases was deleted.

In addition, TSTF-493-A, Rev.4, states that all Functions in the affected specifications were included unless one or more of the following exclusions apply, then lists three exclusions. Of these three exclusions, the first exclusion applies. The discussion for the first exclusion states that the two Notes are not applied to Functions which utilize mechanical components to sense the trip setpoint, or to manual initiation circuits (the latter are not explicitly modeled in the accident analysis) because current functional Surveillance Requirements, which have no setpoint verifications, adequately demonstrate the OPERABILITY of these functions. As stated above for this function, current functional Surveillance Requirements, which have no setpoint, adequately demonstrate the OPERABILITY of this

function. The TSTF-493 exclusion discussion also states that while it may be possible to verify a limit switch functions at a point of travel (similar to the pressure switch in this instance) a change in the surveillance results probably indicates that the switch has moved, not that the input/output relationship has changed. In this instance verifying the state of the mechanical device (i.e., open or closed pressure switch) when the pump is running and when the pump is tripped, adequately demonstrates the OPERABILITY of the function.

Response Date/Time	**7/22/2014 11:45 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/22/2014 10:41 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**210**
NRC Question Number	**KAB057**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**7/23/2014**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**7/23/2014 11:45 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**131**
NRC Question Number	**KAB058**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.3**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**736, 737, 760, 761**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On pages 736, 737, 760 and 761 of Enclosure 2, Volume 8, the bases for TS 3.3.3 states that the reactor coolant T_h and T_{cold}, containment pressure wide range, and containment pressure narrow range channels provide indication over a range of 0°F to 700°F, -5 to 60 psig, and -1 to 15psig respectively. However, Sequoyah's UFSAR states that the minimum range for reactor coolant T_h and T_{cold} is from 50, the range for containment pressure wide range is -4.7 to 48 psig, and the range for containment pressure narrow range is -1 to 13 psig. Please explain why the bases do not match the UFSAR.**
Attach File 1	
Attach File 2	
Issue Date	**6/3/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**6/3/2014 2:09 PM**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**163**
NRC Question Number	**KAB058**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	

In response to KAB058, the following information is provided to explain why the ITS 3.3.3 Bases and the SQN UFSAR do not match for the reactor coolant T_{hot} and T_{cold}, containment pressure wide range, and containment pressure narrow range channels range.

SQN UFSAR Section 7.5, Safety-Related Display Instrumentation for Post Accident Monitoring (PAM), includes Table 7.5-2, which lists the process information required at the initiation of an accident, during the course of an accident, and until the unit is in cold shutdown following an accident. UFSAR Section 7.5.2.3.1, Display Requirements, states that PAM parameters have associated required accident ranges and that the minimum required ranges are given in Table 7.5-2. SQN UFSAR Table 7.5-2, Table of Variables for Post Accident Monitoring, lists the necessary PAM variable and provides columns stating the variable's Type/Category, Minimum Range From, Minimum Range To, Redundancy Required, and Notes.

SQN UFSAR Table 7.5-2, Sheet 8 lists the "RCS Cold Leg Water Temp" and the "RCS Hot Leg Water Temp" variables as requiring a "Minimum Range From" of 50 with a "Minimum Range To" of 700 Deg F. SQN ITS Bases associated with the RCS Hot and Cold Leg Water Temperature variables lists the actual range of the instruments from 0 to 700°F. The range of RCS Cold and Hot Leg Temperature instruments provides an indication range equal to or greater than that listed in UFSAR Table 7.5-2.

SQN UFSAR Table 7.5-2, Sheet 3 lists the "Containment Pressure (WR)" variable as requiring a "Minimum Range From" of -4.7 PSIG with a "Minimum Range To" of 48 PSIG. SQN ITS Bases associated with the Containment Pressure (Wide Range) variable lists the actual range of the instruments from -5 to 60 psig. The range of the Containment Pressure (Wide Range) instruments provides an indication range equal to or greater than that listed in UFSAR Table 7.5-2.

SQN UFSAR Table 7.5-2, Sheet 3 lists the "Containment Pressure (NR)" variable as requiring a "Minimum Range From" of -1 with a "Minimum Range To" of 13 PSIG. SQN ITS Bases associated with the Containment

Pressure (Narrow Range) variable lists the actual range of the instruments from -1 to 15 psig. The range of the Containment Pressure (Narrow Range) instruments provides an indication range equal to or greater than that listed in UFSAR Table 7.5-2.

Therefore, the ITS Bases do not match the SQN UFSAR because the UFSAR lists the "Minimum Range From" and "Minimum Range To" values, whereas, the Bases lists the instruments actual range.

Response Date/Time	**6/30/2014 1:20 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Carl Schulten**
Added By	**Scott Bowman**
Date Added	**6/30/2014 12:19 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**170**
NRC Question Number	**KAB058**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**7/2/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**7/2/2014 3:16 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**132**
NRC Question Number	**KAB059**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.3**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	**739, 763**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On pages 739 and 763 of Enclosure 2, Volume 8, the bases for TS 3.3.3 states that the auxiliary feedwater flow channels provide indication over a range of 0 to 440 gpm. However, Sequoyah's UFSAR states that the range for auxiliary feedwater flow 0 to 242 gpm. Please explain why the bases do not match the UFSAR.**
Attach File 1	
Attach File 2	
Issue Date	**6/3/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**6/3/2014 2:10 PM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**206**
NRC Question Number	**KAB059**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**In response to KAB059, the following information is provided to explain why the ITS 3.3.3 Bases do not match the SQN UFSAR for the auxiliary feedwater (AFW) flow channels' range.** **SQN UFSAR Section 7.5, Safety-Related Display Instrumentation for Post Accident Monitoring (PAM), includes Table 7.5-2, which lists the process information required at the initiation of an accident, during the course of an accident, and until the unit is in cold shutdown following an accident. UFSAR Section 7.5.2.3.1, Display Requirements, states that PAM parameters have associated required accident ranges and that the minimum required ranges are given in Table 7.5-2. SQN UFSAR Table 7.5-2, Table of Variables for Post Accident Monitoring, lists the necessary PAM variable and provides columns stating the variable's Type/Category, Minimum Range From, Minimum Range To, Redundancy Required, and Notes.** **SQN UFSAR Table 7.5-2, Sheet 1 lists the "AFW Flow" variable as requiring a "Minimum Range From" as 0 with a "Minimum Range To" as 242 GPM. SQN ITS Bases associated with the AFW Flow variable lists the actual range of the instruments from 0 to 440 gpm. This range of AFW Flow provides indication range equal to or greater than that listed in UFSAR Table 7.5-2.** **Therefore, the ITS Bases do not match the UFSAR because the UFSAR lists the "Minimum Range From" and "Minimum Range To" values, whereas, the Bases lists the instruments actual range.**
Response Date/Time	**7/22/2014 11:45 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill**

	Andrew Hon **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/22/2014 10:44 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**211**
NRC Question Number	**KAB059**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**7/23/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**7/23/2014 11:46 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**133**
NRC Question Number	**KAB060**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.3**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	**741, 765**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On pages 741 and 765 of Enclosure 2, Volume 8, the bases for TS 3.3.3 states that the neutron flux channels provide indication over a range of 1 to 10^6 cps source range and 10^{-8} to 200% RTP intermediate range. However, Sequoyah's UFSAR states that the range for neutron flux is 1E-6 % to 100 %. Please explain why the bases do not match the UFSAR.**
Attach File 1	
Attach File 2	
Issue Date	**6/3/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**6/3/2014 2:11 PM**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**207**
NRC Question Number	**KAB060**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**In response to KAB060, the following information is provided to explain why the ITS 3.3.3 Bases do not match the SQN UFSAR for the neutron flux channels' range.** **SQN UFSAR Section 7.5, Safety-Related Display Instrumentation for Post Accident Monitoring (PAM), includes Table 7.5-2, which lists the process information required at the initiation of an accident, during the course of an accident, and until the unit is in cold shutdown following an accident. UFSAR Section 7.5.2.3.1, Display Requirements, states that PAM parameters have associated required accident ranges and that the minimum required ranges are given in Table 7.5-2. UFSAR also states that where two or more instruments are needed to cover a particular range, overlapping of instrument spans have been provided to ensure one of the two instruments will be on scale at all times. SQN UFSAR Table 7.5-2, Table of Variables for Post Accident Monitoring, list the necessary PAM variable and provides columns stating the variable's Type/Category, Minimum Range From, Minimum Range To, Redundancy Required, and Notes.** **SQN UFSAR Table 7.5-2, Sheet 5 lists the "Neutron Flux Monitoring" variable as requiring a "Minimum Range From" of 1E-6% with a "Minimum Range To" of 100% (Full PWR). SQN ITS Bases associated with the Neutron Flux variable lists the actual range of the instruments with the Source Range as 1 to 10^6 CPS and the Intermediate Range 10^{-8} to 200% RTP. This range of neutron flux monitoring channels provides an indication range equal to or greater than that listed in UFSAR Table 7.5-2.** **Therefore, the ITS Bases do not match the SQN UFSAR because the UFSAR lists the "Minimum Range From" and "Minimum Range To" values, whereas, the Bases lists the instruments actual range.**
Response Date/Time	**7/22/2014 11:50 PM**
Closure Statement	
Question Closure	

Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/22/2014 10:47 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**212**
NRC Question Number	**KAB060**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**7/23/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**7/23/2014 11:47 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**135**
NRC Question Number	**KAB061**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.7**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**1012, 1024**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On pages 1012 and 1024 of Enclosure 2, Volume 8, the reference to WCAP 15376, Rev. 0, October 2000, has been deleted. WCAP-15376 and TSTF-411 added ISTS SR 3.3.7.5 and SR 3.3.7.6. ITS proposes to delete ISTS SR 3.3.7.3 and SR 3.3.7.4 and proposes utilize ISTS SR 3.3.7.5 and SR 3.3.7.6. Since ITS is utilizing ISTS SR 3.3.7.5 and SR 3.3.7.6, which is provide by WCAP-15376, it is appropriate to list WCAP-15376 as a reference. Add WCAP-15376 as a reference to TS 3.3.7 bases or remove ISTS SR 3.3.7.5 and SR 3.3.7.6 from ITS and add ISTS SR 3.3.7.3 and SR 3.3.7.4 to ITS.**
Attach File 1	
Attach File 2	
Issue Date	**6/4/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**6/4/2014 6:40 AM**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**111**
NRC Question Number	**KAB061**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.7 revised ISTS Bases pages.pdf** (23KB)
Attachment 2	
Response Statement	**In response to KAB061, the ISTS Bases, Reference Section markup, on pages 1012 and 1024 of Enclosure 2, Volume 8, will be revised. Specifically, ITS will retain the Reference, WCAP-15376, Rev.0, October 2000, for ITS Bases 3.3.7.** **See Attachment 1 for draft revised ISTS Bases markups for Units 1 and 2.**
Response Date/Time	**6/6/2014 11:30 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/6/2014 10:27 AM**
Date Modified	
Modified By	

1

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~--]~~

7

REFERENCES ~~1. WCAP-15376, Rev. 0, October 2000.~~ None

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Enclosure 2, Volume 8, Rev. 0, Page 1012 of 1148

1

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~--]~~

7

REFERENCES ~~1. WCAP-15376, Rev. 0, October 2000.~~ None

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Enclosure 2, Volume 8, Rev. 0, Page 1024 of 1148

Licensee Response/NRC Response/NRC Question Closure

Id	**122**
NRC Question Number	**KAB061**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/17/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/17/2014 9:42 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**136**
NRC Question Number	**KAB062**
Category	**Editorial**
ITS Section	**3.3**
ITS Number	**3.3.8**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**1063, 1074**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On pages 1063 and 1074 of Enclosure 2, Volume 8, under the discussion of Condition B a change is made to add the words, "one reqired." However, required is misspelled. Please provide a correction.**
Attach File 1	
Attach File 2	
Issue Date	**6/4/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**6/4/2014 1:00 PM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**112**
NRC Question Number	**KAB062**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.8 revised ISTS Bases.pdf** (29KB)
Attachment 2	
Response Statement	**In response to KAB062, the ISTS Bases ACTIONS markup, on pages 1063 and 1074 of Enclosure 2, Volume 8, will be revised. Specifically, the insert, "one reqired," in ISTS ACTION B.1.1, B.1.2, B.2 (ITS ACTION B.1 and B.2) description will be revised to read, "one required."** **See Attachment 1 for the draft revised ISTS Bases pages for Units 1 and 2.**
Response Date/Time	**6/6/2014 11:30 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/6/2014 10:29 AM**
Date Modified	
Modified By	

BASES

ACTIONS (continued)

A second Note has been added to the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in Table 3.3.8-1 in the accompanying LCO. 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.

A.1

Condition A applies to the ~~actuation logic train function of the Solid State Protection System (SSPS), the radiation monitor functions, and the~~ manual function. Condition A applies to the failure of a single ~~actuation logic train, radiation monitor channel, 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~~ channel cannot be restored to OPERABLE status, one ~~FBACS~~ 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. The basis for this time is the same as that provided in LCO 3.7.~~13~~12. 5 1 3

B.~~1.~~1~~;~~ and B.~~1.~~2~~, B.2~~ 5

Condition B applies to the failure of ~~two FBACS actuation logic trains, two radiation monitors,~~ one ~~required~~ required or two manual channels. The Required Action is to place one ~~FBACS~~ 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 LCO 3.7.~~13~~12 must also be entered for the ~~FBACS~~ ABGTS train made inoperable by the inoperable actuation instrumentation. This ensures appropriate limits are placed on train inoperability as discussed in the Bases for LCO 3.7.~~13~~12. 5 1 3 1 3

~~Alternatively, both trains may be placed in the emergency [radiation protection] mode. This ensures the FBACS Function is performed even in the presence of a single failure.~~ 5

BASES

ACTIONS (continued)

A second Note has been added to the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in Table 3.3.8-1 in the accompanying LCO. 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.

A.1

Condition A applies to the ~~actuation logic train function of the Solid State Protection System (SSPS), the radiation monitor functions, and the~~ manual function. Condition A applies to the failure of a single ~~actuation logic train, radiation monitor channel, 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~~ channel cannot be restored to OPERABLE status, one ~~FBACS~~ 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. The basis for this time is the same as that provided in LCO 3.7.~~13~~12. 5 1 3

B.~~1.~~1~~,~~ and B.~~1.~~2~~, B.2~~ 5

Condition B applies to the failure of ~~two FBACS actuation logic trains, two~~ one required radiation monitor~~s,~~ or two manual channels. The Required Action is to place one ~~FBACS~~ 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 LCO 3.7.~~13~~12 must also be entered for the ~~FBACS~~ ABGTS train made inoperable by the inoperable actuation instrumentation. This ensures appropriate limits are placed on train inoperability as discussed in the Bases for LCO 3.7.~~13~~12. 5 1 3 1 3

~~Alternatively, both trains may be placed in the emergency [radiation protection] mode. This ensures the FBACS Function is performed even in the presence of a single failure.~~ 5

Licensee Response/NRC Response/NRC Question Closure

Id	**123**
NRC Question Number	**KAB062**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/17/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/17/2014 9:44 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**137**
NRC Question Number	**KAB063**
Category	**Technical**
ITS Section	**3.3**
ITS Number	**3.3.9**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**1118, 1127**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**On pages 1118 and 1127 of Enclosure 2, Volume 8, the reference to WCAP 15376, Rev. 0, October 2000, has been deleted. WCAP-15376 and TSTF-411 changed the surveillance frequency for ISTS SR 3.3.9.2 to 184 days. ITS proposes to utilize ISTS SR 3.3.9.2. Since ITS is utilizing ISTS SR 3.3.9.2 with the frequency of 184 days, which is provide by WCAP-15376, it is appropriate to list WCAP-15376 as a reference. Add WCAP-15376 as a reference to TS 3.3.9 bases or remove the surveillance frequency changes provided by WCAP-15376 from ITS SR 3.3.9.**
Attach File 1	
Attach File 2	
Issue Date	**6/4/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**6/4/2014 1:01 PM**
Notification	**Scott Bowman Michelle Conner Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**115**
NRC Question Number	**KAB063**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 3.3.9 revised ISTS Bases pages.pdf** (38KB)
Attachment 2	
Response Statement	**In response to KAB063, the ISTS Bases, Reference Section markup, on pages 1118 and 1127 of Enclosure 2, Volume 8, will be revised. Specifically, ITS will retain the Reference, WCAP-15376, Rev.0, October 2000.** **See Attachment 1 for draft revised ISTS Bases markups for Units 1 and 2.**
Response Date/Time	**6/12/2014 4:55 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/12/2014 3:52 AM**
Date Modified	
Modified By	

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---]~~ 8

SR 3.3.9.3

SR 3.3.9.3 is the performance of a CHANNEL CALIBRATION. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor ~~except the neutron detector of the SRM circuit~~. 2 There is a plant specific program which verifies that the instrument channel functions as required by verifying and as-left and as-found setting are consistent with those established by the setpoint methodology. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy. ~~For the BDPS,~~ tThe CHANNEL INSERT 6

CALIBRATION shall include ~~verification that on a simulated or actual boron dilution flux doubling signal the centrifugal charging pump suction valves from the RWST open, and the normal CVCS volume control tank discharge valves close in the required closure time of ≤ 20 seconds.~~ 2

~~[The Frequency of 18 months is based on operating experience and consistency with the typical industry refueling cycle.~~ 7

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---]~~ 8

REFERENCES

1. U FSAR, ~~Chapter~~ Section ~~[~~15~~]~~ 2.4. 2 3

~~2. WCAP-15376, Revision 0, October 2000.~~ stet 2

Enclosure 2, Volume 8, Rev. 0, Page 1118 of 1148

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ 8

SR 3.3.9.3

SR 3.3.9.3 is the performance of a CHANNEL CALIBRATION. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor ~~except the neutron detector of the SRM circuit~~. 2 There is a plant specific program which verifies that the instrument channel functions as required by verifying and as-left and as-found setting are consistent with those established by the setpoint methodology. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy. ~~For the BDPS,~~ the CHANNEL CALIBRATION shall include INSERT 6 ~~verification that on a simulated or actual boron dilution flux doubling signal the centrifugal charging pump suction valves from the RWST open, and the normal CVCS volume control tank discharge valves close in the required closure time of ≤ 20 seconds.~~ 2

~~[The Frequency of 18 months is based on operating experience and consistency with the typical industry refueling cycle.~~

~~OR~~ 7

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ 8

REFERENCES

1. U FSAR, Section ~~Chapter [~~15 2.4~~]~~. 2 3

~~2. WCAP-15376, Revision 0, October 2000.~~ stet 2

Licensee Response/NRC Response/NRC Question Closure

Id	**124**
NRC Question Number	**KAB063**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**6/17/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Kristy Bucholtz**
Date Added	**6/17/2014 9:50 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**167**
NRC Question Number	**KAB064**
Category	**Technical**
ITS Section	**3.3**
ITS Number	
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**For Sequoyah's CTS that are converting to ITS Section 3.3, explain if Administrative Letter 98-10 is currently being applied to any of these CTS. For each application of Administrative Letter 98-10 provide a technical evaluation for the NRC staff to review and explain how it is being corrected in the ITS.**
Attach File 1	
Attach File 2	
Issue Date	**6/19/2014**
Added By	**Kristy Bucholtz**
Date Modified	
Modified By	
Date Added	**6/19/2014 7:16 AM**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**362**
NRC Question Number	**KAB064**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 for KAB064.pdf** (137KB)
Attachment 2	**Attachment 2 for KAB064 from EDMS.pdf** (15MB)

Response Statement

SQN is currently controlling the reactor coolant pump (RCP) undervoltage trip allowable value (AV) and the RCP underfrequency setpoint and AV under administrative controls, as described in Administrative Letter 98-10, to ensure adequate performance of the reactor protection system. Changes to the RCP underfrequency and undervoltage values were previously proposed in SQN license amendment request (LAR) TVA-SQN-TS-02-01, Revision 1 (ML042430467), but later withdrawn in TVA-SQN-TS-02-01, Revision 2 (ML061990303) pending resolution of issues with Technical Specification Task Force (TSTF)-493, which at the time was under NRC review.

The original ITS submittal contains the changes required for the RCP underfrequency setpoint and AV, and a technical evaluation was previously submitted. NRC questions associated with the technical evaluation for this change are being addressed in RAI KAB065.

Regarding the RCP undervoltage AV, ITS Table 3.3.1-1, Function 11 (Undervoltage RCPs), on pages 119 and 151 of Enclosure 2, Volume 8, will be revised to indicate an AV of ≥ 4952 V. Additionally, the following changes will be necessary:

1. **The CTS markups for CTS Table 2.2-1, Functional Unit 15 (Undervoltage-Reactor Coolant Pumps) will be revised to reflect the revised AV. (pages 22 and 46)**
2. **A new Discussion of Change (DOC) M25 will be added, as well as, DOC M25 indicators, to justify the more restrictive change to CTS. (pages 22, 46, and 76)**

See Attachment 1 for the draft revised CTS and ISTS markups and new DOC M25.

See Attachment 2 for the technical evaluation associated with the change to the RCP undervoltage AV.

Response Date/Time	**9/30/2014 8:50 AM**
Closure Statement	

Question Closure Date	
Notification	**Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**9/30/2014 7:45 AM**
Date Modified	
Modified By	

ITS A01 ITS 3.3.1

Table 3.3.1-1

TABLE 2.2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

ITS	FUNCTIONAL UNIT	NOMINAL TRIP SETPOINT	ALLOWABLE VALUES
	14. Deleted		
11	15. Undervoltage-Reactor Coolant Pumps	5022 volts-each bus	≥ ~~4739~~ 4952 volts-each bus (M25)
12	16. Underfrequency-Reactor Coolant Pumps	~~56.0~~ 57.0 Hz - each bus (M24)	≥ ~~55.9~~ 56.3 Hz - each bus (M24)
14	17. Turbine Trip		
	A. Low Trip System Pressure	45 psig	≥ 39.5 psig
	B. Turbine Stop Valve Closure	1% open	≥ 1% open
15	18. Safety Injection Input from ESF	Not Applicable	Not Applicable
16.a	19. Intermediate Range Neutron Flux - (P-6) ~~Enable Block Source Range Reactor Trip~~ (LA07)	1 x 10^{-4}% of RATED THERMAL POWER	≥ 6 x 10^{-5}% of RATED THERMAL POWER
16.e	20. Power Range Neutron Flux (~~not~~ P-10) ~~Input to Low Power Reactor Trips Block P-7~~ (LA07) (A21)	10% of RATED THERMAL POWER	≤ 12.4% of RATED THERMAL POWER

Enclosure 2, Volume 8, Rev. 0, Page 22 of 1148

ITS | A01 | ITS 3.3.1

Table 3.3.1-1

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)	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
14. Deleted		M25
11 15. Undervoltage-Reactor Coolant Pumps	5022 volts-each bus	≥ ~~4739~~ 4952 volts - each bus
		M24
12 16. Underfrequency-Reactor Coolant Pumps	~~56.0~~ 57.0 Hz - each bus	≥ ~~55.9~~ 56.3 Hz - each bus
14 17. Turbine Trip		
14.a A. Low Trip System Pressure	45 psig	≥ 39.5 psig
14.b B. Turbine Stop Valve Closure	1% open	> 1% open
15 18. Safety Injection Input from ESF	Not Applicable	Not Applicable

DISCUSSION OF CHANGES
ITS 3.3.1, REACTOR TRIP SYSTEM (RTS) INSTRUMENTATION

requirements to ensure that the automatic protective action will correct the abnormal situation before a safety limit is exceeded. This change is consistent with TSTF-493 Option A. This change is considered a more restrictive change because additional requirements have been added to Surveillance Requirements.

M24 CTS Table 2.2-1 for Functional Unit 16 (Underfrequency-Reactor Coolant Pumps) lists the Nominal Trip Setpoint as 56.0 Hz – each bus, and the Allowable Value as ≥ 55.9 Hz – each bus. ITS Table 3.3.1-1 for Function 12 (Underfrequency RCPs) lists the Nominal Trip Setpoint as 57.0 Hz and the Allowable Value as ≥ 56.3 Hz. This changes the CTS by increasing the Nominal Trip Setpoint and the Allowable Value for the Underfrequency RCP reactor trip.

The purpose of the Underfrequency RCP reactor trip is to ensure that protection is provided against violating the DNBR limit due to a loss of flow in two or more RCS loops from a major network frequency disturbance. TVA has determined that to provide adequate protection changes to the Underfrequency RCP Nominal Trip Setpoint and the Allowable Value are needed. This change was previously proposed in SQN license amendment request TVA-SQN-TS-02-01, Revision 1 (ADAMS Accession No. 042430467) but later withdrawn in TVA-SQN-TS-02-01, Revision 2 (ADAMS Accession No. ML061990303) pending resolution of issues with TSTF-493. In Revision 2 TVA stated that a new TS amendment request would be submitted to the NRC once TSTF-493 receives NRC approval. As TSTF-493 has been approved by the NRC and is being adopted under this conversion, TVA is proposing to change the setpoints to those proposed in the previous submittal. This change is acceptable because the revised Allowable Value and Nominal Trip Setpoint continue to provide assurance that the safety limit for the underfrequency reactor trip function is not impacted. In addition, this change ensures instrument uncertainties have been included in the as-found tolerance calculations in a manner that is acceptable and the surveillance Note requirements also ensure that there will be a reasonable expectation that these instruments will perform their safety function if required. This change is designated as more restrictive because more stringent acceptance requirements are being applied in the ITS than were applied in the CTS.

$\boxed{\text{Insert M25}}$

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 5 – Removal of SR Frequency to the Surveillance Frequency Control Program)* The proposed change removes all designated periodic Surveillance Frequencies from CTS 4.3.1.1.1, as addressed in CTS Table 4.3-1, CTS 4.3.1.1.2, and CTS 4.3.1.1.3, and places the Frequencies under licensee control in accordance with a new program, the Surveillance Frequency Control Program. ITS 3.3.1 Surveillance Requirements require similar Surveillances and, except for special or conditional frequencies stated in the individual surveillance, specifies the periodic Frequency as, "In accordance with the Surveillance Frequency

M25 CTS Table 2.2-1 for Functional Unit 15 (Undervoltage-Reactor Coolant Pumps) lists the Allowable Value as ≥ 4739 volts – each bus. ITS Table 3.3.1-1 for Function 11 (Undervoltage RCPs) lists the Allowable Value as ≥ 4952 volts. This changes the CTS by increasing the Allowable Value for the Undervoltage RCP reactor trip.

The purpose of the Undervoltage RCP reactor trip is to ensure that protection is provided against violating the DNBR limit due to a loss of flow in two or more RCS loops. TVA has determined that to provide adequate protection, a change to the Undervoltage Allowable Value is needed. This change was previously proposed in SQN license amendment request TVA-SQN-TS-02-01, Revision 1 (ADAMS Accession No. ML042430467) but later withdrawn in TVA-SQN-TS- 02-01, Revision 2 (ADAMS Accession No. ML061990303) pending resolution of issues with TSTF-493. In Revision 2, TVA stated that a new license amendment request would be submitted to the NRC once TSTF-493 received NRC approval. TSTF-493 has since been approved by the NRC and is being adopted under this conversion. Therefore, TVA is proposing to change the Undervoltage RCPs Allowable Value to those proposed in the previous submittal. This change is acceptable because the revised Allowable Value continues to provide assurance that the safety limit for the undervoltage reactor trip function is not impacted. In addition, this change ensures instrument uncertainties have been included in the as-found tolerance calculations in a manner that is acceptable and the surveillance Note requirements also ensure that there will be a reasonable expectation that these instruments will perform their safety function if required. This change is designated as more restrictive because more stringent acceptance requirements are being applied in the ITS than were applied in the CTS.

CTS

RTS Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.1~~A~~

Table 3.3-1
Table 4.3-1
Table 2.2-1 (unless otherwise noted)

Table 3.3.1-1 (page 3 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	~~[~~NOMINAL~~(f)~~ TRIP SETPOINT~~]~~	3
	8. Pressurizer Pressure							
9	a. Low	1~~(f)~~ (g)	~~[4]~~	K	SR 3.3.1.1 SR 3.3.1.7(b)(c) SR 3.3.1.10(b)(c) SR 3.3.1.~~16~~ 14	≥ ~~[1886]~~ 1964.8 psig	~~[1900]~~ 1970 psig	13 3 9
10	b. High	1,2	~~[~~4~~]~~	E	SR 3.3.1.1 SR 3.3.1.7(b)(c) SR 3.3.1.10(b)(c) SR 3.3.1.~~16~~ 14	≤ ~~[2396]~~ 2390.2 psig	~~[~~2385~~]~~ psig	3 9
11	9. Pressurizer Water Level - High	1(g)	3	K	SR 3.3.1.1 SR 3.3.1.7(b)(c) SR 3.3.1.10(b)(c)	≤ ~~[93.8]~~ 92.7%	~~[~~92~~]~~%	3
12 13	10. Reactor Coolant Flow - Low	1(g)	3 per loop	K	SR 3.3.1.1 SR 3.3.1.7(b)(c) SR 3.3.1.10(b)(c) SR 3.3.1.~~16~~ 14	≥ ~~[89.2]~~ 89.6%	~~[~~90~~]~~%	3 9
	~~11. Reactor Coolant Pump (RCP) Breaker Position~~							2
	~~a. Single Loop~~	~~1(h)~~	~~1 per RCP~~	~~L~~	~~SR 3.3.1.14~~	~~NA~~	~~NA~~	
	~~b. Two Loops~~	~~1(i)~~	~~1 per RCP~~	~~M~~	~~SR 3.3.1.14~~	~~NA~~	~~NA~~	
16 Table 2.2-1 Function 15	~~12~~ 11. Undervoltage RCPs	1(g)	~~[3]~~ 1 per bus	K	SR 3.3.1.9 SR 3.3.1.10(b)(c) SR 3.3.1.~~16~~ 14	≥ ~~[4760]~~ ~~4739~~ 4952 V	~~[4830]~~ 5022 V	2 3 9

DOC M22 (b) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

DOC M23 (c) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The ~~NTSP and the~~ methodologies used to determine the as-found and as-left tolerances are specified in ~~[insert the facility FSAR reference or the name of any document incorporated into the facility FSAR by reference]~~ UFSAR Section 7.1.2. 10 3

DOC L02 (g) Above the P-7 (Low Power Reactor Trips Block) interlock.

~~(h) Above the P-8 (Power Range Neutron Flux) interlock.~~ 2

~~(i) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) interlock.~~

~~REVIEWER'S NOTE~~

~~(f) Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.~~ 4

CTS

RTS Instrumentation ~~(Without Setpoint Control Program)~~ 1
3.3.1~~A~~

Table 3.3-1
Table 4.3-1
Table 2.2-1 (unless otherwise noted)

Table 3.3.1-1 (page 3 of 8)
Reactor Trip System Instrumentation

CTS	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	~~[~~NOMINAL[~~(l)~~] TRIP SETPOINT~~]~~	
	8. Pressurizer Pressure							
9	a. Low	1(~~f~~)(g)	~~[4]~~	K	SR 3.3.1.1 SR 3.3.1.7(b)(c) SR 3.3.1.10(b)(c) SR 3.3.1.~~16~~ 14	≥ ~~[1886]~~ 1964.8 psig	~~[1900]~~ 1970 psig	13 3 9
10	b. High	1,2	~~[4]~~	E	SR 3.3.1.1 SR 3.3.1.7(b)(c) SR 3.3.1.10(b)(c) SR 3.3.1.~~16~~ 14	≤ ~~[2396]~~ 2390.2 psig	~~[~~2385~~]~~ psig	3 9
11	9. Pressurizer Water Level - High	1(g)	3	K	SR 3.3.1.1 SR 3.3.1.7(b)(c) SR 3.3.1.10(b)(c)	≤ ~~[93.8]~~ 92.7%	~~[~~92~~]~~%	3
12 13	10. Reactor Coolant Flow - Low	1(g)	3 per loop	K	SR 3.3.1.1 SR 3.3.1.7(b)(c) SR 3.3.1.10(b)(c) SR 3.3.1.~~16~~ 14	≥ ~~[89.2]~~ 89.6%	~~[~~90~~]~~%	3 9
	~~11. Reactor Coolant Pump (RCP) Breaker Position~~							2
	~~a. Single Loop~~	~~1(h)~~	~~1 per RCP~~	~~L~~	~~SR 3.3.1.14~~	~~NA~~	~~NA~~	
	~~b. Two Loops~~	~~1(i)~~	~~1 per RCP~~	~~M~~	~~SR 3.3.1.14~~	~~NA~~	~~NA~~	
16 Table 2.2-1 Function 15	~~12~~ 11. Undervoltage RCPs	1(g)	~~[3]~~ 1 per bus	K	SR 3.3.1.9 SR 3.3.1.10(b)(c) SR 3.3.1.~~16~~ 14	≥ ~~[4760]~~ ~~4739~~ 4952 V	~~[4830]~~ 5022 V	2 3 9

DOC M22 (b) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

DOC M23 (c) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The ~~NTSP and the~~ methodologies used to determine the as-found and as-left tolerances are specified in ~~[insert the facility FSAR reference or the name of any document incorporated into the facility FSAR by reference]~~ UFSAR Section 7.1.2. 10 3

DOC L02 (g) Above the P-7 (Low Power Reactor Trips Block) interlock.

~~(h) Above the P-8 (Power Range Neutron Flux) interlock.~~ 2

~~(i) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) interlock.~~

~~REVIEWER'S NOTE~~

~~(l) Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.~~ 4

Enclosure 2, Volume 8, Rev. 0, Page 151 of 1148

ORIGINAL

NPG CALCULATION COVERSHEET / CTS UPDATE

QA Record

REV 0 EDMS/RIMS NO.	CTS TYPE:	EDMS TYPE:	EDMS ACCESSION NO (N/A for REV. 0)
B43870421903	Calculation	CALCULATIONS (NUCLEAR)	B87 140924 017

Calc Title: Demonstrated Accuracy Calculation 27DAT

	ORG	PLANT	BRANCH	NUMBER	CUR REV	NEW REV
CALC ID	NUC	SQN	EEB	27DAT	008	009

CTS UPDATE ONLY ☐ (Verifier and Approval Signatures Not Required)

NO CTS CHANGES ☐ (For calc revision, CTS has been reviewed and no CTS changes required)

UNIT (check one) 0 ☒, 1 ☐, 2 ☐, 3 ☐

SYSTEMS: 202

UNIDS: N/A

DCN,EDC,N/A: DCN D23339

APPLICABLE DESIGN DOCUMENT(S): SQN-DC-V-11.4.1 and SQN-DC-V-27.9

CLASSIFICATION: E

QUALITY RELATED?	SAFETY RELATED? (If yes, QR = yes)	UNVERIFIED ASSUMPTION	SPECIAL REQUIREMENTS AND/OR LIMITING CONDITIONS?	DESIGN OUTPUT ATTACHMENT?	SAR/TS and/or ISFSI SAR/CoC AFFECTED
Yes ☒ No ☐	Yes ☒ No ☐	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☐ No ☒

CALCULATION NUMBER REQUESTOR	PREPARING DISCIPLINE	VERIFICATION METHOD	NEW METHOD OF ANALYSIS
Name: PHONE:	E	DESIGN REVIEW	☐ Yes ☒ No

PREPARER (PRINT NAME AND SIGN)	DATE	CHECKER (PRINT NAME AND SIGN)	DATE
DuWayne Wacha *DuWayne Wacha*	8/21/14	Kirk R. Melson *Kirk R. Melson*	8/21/14
VERIFIER (PRINT NAME AND SIGN)	**DATE**	**APPROVAL (PRINT NAME AND SIGN)**	**DATE**
Kirk R. Melson *Kirk R. Melson*	8/21/14	JANICE CRUZ *Janice Cruz*	9/24/14

STATEMENT OF PROBLEM/ABSTRACT

Problem:
Determine the accuracy of the subject instrument loops and demonstrate that the accuracy is adequate for the intended purpose. Primary elements are located in a mild environment. Subject devices are not part of PAM.

Abstract:
Calculations were performed to determine the accuracy of the subject instrument loop(s). The determined accuracies were compared to the required accuracies, setpoints, safety limits and/or operating limits and the accuracy for the loop(s) listed below were demonstrated to be acceptable for the intended function of the instrument loop(s). This calculation applies to the instrument loop(s) stated below:

6900 volt Shutdown Board 1A-A, 1 B-B, 2A-A and 2B-B under voltage relays.

MICROFICHE/EFICHE Yes ☐ No ☒ FICHE NUMBER(S)

NPG CALCULATION COVERSHEET / CTS UPDATE

Page A2

CALC ID	ORG	PLANT	BRANCH	NUMBER	REV
	NUC	SQN	EEB	27DAT	009

BUILDING	ROOM	ELEVATION	COORD/AZIM	FIRM
NA	NA	NA	NA	TVA

CATEGORIES D09

KEYWORDS (A-add, D-delete)

ACTION (A/D)	KEYWORD	A/D	KEYWORD

CROSS-REFERENCES (A-add, D-delete)

ACTION (A/D)	XREF CODE	XREF PLANT	XREF TYPE	XREF NUMBER	XREF REV
A	P	SQN	DCN	D23339	

CTS ONLY UPDATES:

Following are required only when making keyword/cross reference CTS updates and page 1 of form NEDP-2-1 is not included:

N/A	N/A	N/A	N/A
PREPARER (PRINT NAME AND SIGN)	DATE	CHECKER (PRINT NAME AND SIGN)	DATE

PREPARER PHONE NO. N/A EDMS ACCESSION NO. N/A

ORIGINAL

QA Record

NPG CALCULATION COVERSHEET / CTS UPDATE

Page ____

REV 0 EDMS/RIMS NO.	CTS TYPE:	EDMS TYPE:	EDMS ACCESSION NO (N/A for REV. 0)
B43 870421 903	Calculation	CALCULATIONS (NUCLEAR)	B87 130509 002

Calc Title:
DEMONSTRATED ACCURACY CALCULATION 27DAT

	ORG	PLANT	BRANCH	NUMBER	CUR REV	NEW REV
CALC ID	NUC	SQN	EEB	27DAT	7	8

CTS UPDATE ONLY ☐ (Verifier and Approval Signatures Not Required)

NO CTS CHANGES ☐ (For calc revision, CTS has been reviewed and no CTS changes required)

UNIT (check one)	SYSTEMS	UNIDS
0 ☒, 1 ☐, 2 ☐, 3 ☐	202	N/A

DCN,EDC,N/A	APPLICABLE DESIGN DOCUMENT(S)	CLASSIFICATION
N/A	SQN-DC-V-11.4.1 and SQN-DC-V-27.9	E

QUALITY RELATED?	SAFETY RELATED? (If yes, QR = yes)	UNVERIFIED ASSUMPTION	SPECIAL REQUIREMENTS AND/OR LIMITING CONDITIONS?	DESIGN OUTPUT ATTACHMENT?	SAR/TS and/or ISFSI SAR/CoC AFFECTED
Yes ☒ No ☐	Yes ☒ No ☐	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☒ No ☒	Yes ☐ No ☒

CALCULATION NUMBER REQUESTOR	PREPARING DISCIPLINE	VERIFICATION METHOD	NEW METHOD OF ANALYSIS
Name: G G MAILEN PHONE:843-8065	EEB	DESIGN REVIEW	☐ Yes ☒ No

PREPARER (PRINT NAME AND SIGN)	DATE	CHECKER (PRINT NAME AND SIGN)	DATE
Gregory G. Mailen *Gregory G. Mailen*	4/24/13	*Navin S. Shah* NAVIN S. SHAH	5/2/13
VERIFIER (PRINT NAME AND SIGN)	**DATE**	**APPROVAL (PRINT NAME AND SIGN)**	**DATE**
Navin S. Shah NAVIN S. SHAH	5-2-13	*John M. Campbell* JOHN M. CAMPBELL	5/3/13

STATEMENT OF PROBLEM/ABSTRACT

Problem
Determine the accuracy of the subject instrument loops and demonstrate that the accuracy is adequate for the intended purpose. Primary elements are located in a mild environment. Subject devices are not part of PAM

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6900 volt Shutdown Board 1A-A, 1B-B, 2A-A and 2B-B under voltage relays.

MICROFICHE/EFICHE Yes ☐ No ☐ FICHE NUMBER(S)

NPG CALCULATION COVERSHEET / CTS UPDATE

Page ______________

CALC ID	ORG	PLANT	BRANCH	NUMBER	REV
	NUC	SQN	EEB	27DAT	8

BUILDING	ROOM	ELEVATION	COORD/AZIM	FIRM

CATEGORIES

KEYWORDS (A-add, D-delete)

ACTION (A/D)	KEYWORD	A/D	KEYWORD

CROSS-REFERENCES (A-add, D-delete)

ACTION (A/D)	XREF CODE	XREF PLANT	XREF TYPE	XREF NUMBER	XREF REV

CTS ONLY UPDATES.
Following are required only when making keyword/cross reference CTS updates and page 1 of form NEDP-2-1 is not included.

PREPARER (PRINT NAME AND SIGN)	DATE	CHECKER (PRINT NAME AND SIGN)	DATE
PREPARER PHONE NO	EDMS ACCESSION NO		

ORIGINAL

QA Record

NPG CALCULATION COVERSHEET / CTS UPDATE

Page ____________

REV 0 EDMS/RIMS NO.	CTS TYPE:	EDMS TYPE:	EDMS ACCESSION NO (N/A for REV. 0)
B43 870421 903	Calculation	CALCULATIONS (NUCLEAR)	B87 130104 001

Calc Title:
DEMONSTRATED ACCURACY CALCULATION 27DAT

	ORG	PLANT	BRANCH	NUMBER	CUR REV	NEW REV
CALC ID	NUC	SQN	EEB	27DAT	6	7

CTS UPDATE ONLY ☐
(Verifier and Approval Signatures Not Required)

NO CTS CHANGES ☐
(For calc revision, CTS has been reviewed and no CTS changes required)

UNIT (check one)	SYSTEMS	UNIDS
0 ☒, 1 ☐, 2 ☐, 3 ☐	202	N/A

DCN,EDC,N/A	APPLICABLE DESIGN DOCUMENT(S)	CLASSIFICATION
N/A	SQN-DC-V-11.4.1 and SQN-DC-V-27.9	E

QUALITY RELATED?	SAFETY RELATED? (If yes, QR = yes)	UNVERIFIED ASSUMPTION	SPECIAL REQUIREMENTS AND/OR LIMITING CONDITIONS?	DESIGN OUTPUT ATTACHMENT?	SAR/TS and/or ISFSI SAR/CoC AFFECTED
Yes ☒ No ☐	Yes ☒ No ☐	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☒ No ☒	Yes ☐ No ☒

CALCULATION NUMBER REQUESTOR	PREPARING DISCIPLINE	VERIFICATION METHOD	NEW METHOD OF ANALYSIS
Name: G G MAILEN PHONE:8438065	EEB	DESIGN REVIEW	☐ Yes ☒ No

PREPARER (PRINT NAME AND SIGN)	DATE	CHECKER (PRINT NAME AND SIGN)	DATE
Gregory G. Mailen Gregory G. Mailen	10-5-12	NAVIN S. SHAH Navin S Shah	12-31-12
VERIFIER (PRINT NAME AND SIGN)	**DATE**	**APPROVAL (PRINT NAME AND SIGN)**	**DATE**
NAVIN S. SHAH Navin S Shah	12-31-12	JRB [signature]	12-31-12

STATEMENT OF PROBLEM/ABSTRACT

Problem
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6900 volt Shutdown Board 1A-A, 1B-B, 2A-A and 2B-B under voltage relays.

MICROFICHE/EFICHE Yes ☐ No ☐ FICHE NUMBER(S)

NPG CALCULATION COVERSHEET / CTS UPDATE

Page ______________

CALC ID	ORG	PLANT	BRANCH	NUMBER	REV
	NUC	SQN	EEB	27DAT	7

BUILDING	ROOM	ELEVATION	COORD/AZIM	FIRM

CATEGORIES

KEYWORDS (A-add, D-delete)

ACTION (A/D)	KEYWORD	A/D	KEYWORD

CROSS-REFERENCES (A-add, D-delete)

ACTION (A/D)	XREF CODE	XREF PLANT	XREF TYPE	XREF NUMBER	XREF REV

CTS ONLY UPDATES:
Following are required only when making keyword/cross reference CTS updates and page 1 of form NEDP-2-1 is not included:

PREPARER (PRINT NAME AND SIGN)	DATE	CHECKER (PRINT NAME AND SIGN)	DATE
PREPARER PHONE NO.	EDMS ACCESSION NO.		

ORIGINAL

QA Record

TVAN CALCULATION COVERSHEET/CCRIS UPDATE

Page ______

REV 0 EDMS/RIMS NO.	EDMS TYPE:	EDMS ACCESSION NO (N/A for REV. 0)
B43 870421 903	calculations(nuclear)	B87 060807 001

Calc Title:
DEMONSTRATED ACCURACY CALCULATION 27DAT

CALC ID	TYPE	ORG	PLANT	BRANCH	NUMBER	CUR REV	NEW REV	REVISION APPLICABILITY
CURRENT	CN	NUC	SQN	EEB	27DAT	5	6	Entire calc ☒
NEW	CN	NUC						Selected pages ☐

ACTION: NEW ☐ REVISION ☒ | DELETE ☐ RENAME ☐ | SUPERSEDE ☐ DUPLICATE ☐ | CCRIS UPDATE ONLY ☐ (Verifier Approval Signatures Not Required) | No CCRIS Changes ☐ (For calc revision, CCRIS been reviewed and no CCRIS changes required)

UNITS	SYSTEMS	UNIDS
1 & 2	202	N/A

DCN,EDC,N/A	APPLICABLE DESIGN DOCUMENT(S)	CLASSIFICATION
N/A	SQN-DC-V-11.4.1 and SQN-DC-V-27.9	E

QUALITY RELATED?	SAFETY RELATED? (If yes, QR = yes)	UNVERIFIED ASSUMPTION	SPECIAL REQUIREMENTS AND/OR LIMITING CONDITIONS?	DESIGN OUTPUT ATTACHMENT?	SAR/TS and/or ISFSI SAR/CoC AFFECTED
Yes ☒ No ☐	Yes ☒ No ☐	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☐ No ☒

PREPARER ID	PREPARER PHONE NO	PREPARING ORG (BRANCH)	VERIFICATION METHOD	NEW METHOD OF ANALYSIS
G G Mailen	843-8065	EEB	Design Review	☐ Yes ☒ No

PREPARER SIGNATURE	DATE	CHECKER SIGNATURE	DATE
G G Mailen	8/4/06	LM Begley	8/4/06
VERIFIER SIGNATURE	DATE	APPROVAL SIGNATURE	DATE
LM Begley	8/4/06	[signature]	8/7/06

STATEMENT OF PROBLEM/ABSTRACT

Problem
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6900 volt Shutdown Board 1A-A, 1B-B, 2A-A and 2B-B under voltage relays.

MICROFICHE/EFICHE Yes ☐ No ☒ FICHE NUMBER(S)

☐ LOAD INTO EDMS AND DESTROY
☒ LOAD INTO EDMS AND RETURN CALCULATION TO CALCULATION LIBRARY. ADDRESS: O&PS-1 SQN
☐ LOAD INTO EDMS AND RETURN CALCULATION TO:

TVAN CALCULATION COVERSHEET/CCRIS UPDATE

Page ______

CALC ID	TYPE	ORG	PLANT	BRANCH	NUMBER	REV
	CN	NUC	SQN	EEB	27DAT	6

ALTERNATE CALCULATION IDENTIFICATION

BLDG	ROOM	ELEV	COORD/AZIM	FIRM	Print Report Yes ☐

CATEGORIES

KEY NOUNS (A-add, D-delete)

ACTION (A/D)	KEY NOUN	A/D	KEY NOUN

CROSS-REFERENCES (A-add, C-change, D-delete)

ACTION (A/C/D)	XREF CODE	XREF TYPE	XREF PLANT	XREF BRANCH	XREF NUMBER	XREF REV

CCRIS ONLY UPDATES:
Following are required only when making keyword/cross reference CCRIS updates and page 1 of form NEDP-2-1 is not included:

PREPARER SIGNATURE	DATE	CHECKER SIGNATURE	DATE
PREPARER PHONE NO.	EDMS ACCESSION NO.		

TVAN CALCULATION COVERSHEET/CCRIS UPDATE

Page

REV 0 EDMS/RIMS NO.	EDMS TYPE:	EDMS ACCESSION NO (N/A for REV. 0)
B43 870421 903	calculations(nuclear)	B8[illegible] 904

Calc Title:
DEMONSTRATED ACCURACY CALCULATION 27DAT

CALC ID	TYPE	ORG	PLANT	BRANCH	NUMBER	CUR REV	NEW REV	REVISION APPLICABILITY
CURRENT	CN	NUC	SQN	EEB	27DAT	4	5	Entire calc ☒
NEW	CN	NUC						Selected pages ☐

ACTION	NEW ☐ REVISION ☒	DELETE ☐ RENAME ☐	SUPERSEDE ☐ DUPLICATE ☐	CCRIS UPDATE ONLY ☐ (Verifier Approval Signatures Not Required)	No CCRIS Changes ☐ (For calc revision, CCRIS been reviewed and no CCRIS changes required)

UNITS	SYSTEMS	UNIDS
1 & 2	202	N/A

DCN,EDC,N/A	APPLICABLE DESIGN DOCUMENT(S)	CLASSIFICATION
EDC E20689	N/A	E

QUALITY RELATED?	SAFETY RELATED? (If yes, QR = yes)	UNVERIFIED ASSUMPTION	SPECIAL REQUIREMENTS AND/OR LIMITING CONDITIONS?	DESIGN OUTPUT ATTACHMENT?	SAR/TS AFFECTED
Yes ☒ No ☐	Yes ☒ No ☐	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☒ No ☐

PREPARER ID	PREPARER PHONE NO	PREPARING ORG (BRANCH)	VERIFICATION METHOD	NEW METHOD OF ANALYSIS
G G Mailen	843-8065	EEB	Design Review	☐ Yes ☒ No

PREPARER SIGNATURE	DATE	CHECKER SIGNATURE	DATE
Gregory D. Mailen	9/24/03	L M Begley	9/25/03
VERIFIER SIGNATURE	**DATE**	**APPROVAL SIGNATURE**	**DATE**
L M Begley	9/25/03	R R Aladna	9/25/03

STATEMENT OF PROBLEM/ABSTRACT

Problem
Determine the accuracy of the subject instrument loops and demonstrate that the accuracy is adequate for the intended purpose. Primary elements are located in a mild environment. Subject devices are not part of PAM.

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6900 volt Shutdown Board 1A-A, 1B-B, 2A-A and 2B-B under voltage relays.

MICROFICHE/EFICHE Yes ☐ No ☒ FICHE NUMBER(S)

☐ LOAD INTO EDMS AND DESTROY
☒ LOAD INTO EDMS AND RETURN CALCULATION TO CALCULATION LIBRARY. ADDRESS: O&PS-1 SQN
☐ LOAD INTO EDMS AND RETURN CALCULATION TO:

TVAN CALCULATION COVERSHEET/CCRIS UPDATE

Page ______

CALC ID	TYPE	ORG	PLANT	BRANCH	NUMBER	REV
	CN	NUC	SQN	EEB	27DAT	5

ALTERNATE CALCULATION IDENTIFICATION

BLDG	ROOM	ELEV	COORD/AZIM	FIRM	Print Report Yes ☐

CATEGORIES

KEY NOUNS (A-add, D-delete)

ACTION (A/D)	KEY NOUN	A/D	KEY NOUN

CROSS-REFERENCES (A-add, C-change, D-delete)

ACTION (A/C/D)	XREF CODE	XREF TYPE	XREF PLANT	XREF BRANCH	XREF NUMBER	XREF REV
A~~A~~ mm 11-23--	P	DN	SQN	EEB	E20689	A
A	P	CN	SQN	EEB	SQNETAPAC	4
A	S	CN	SQN	EEB	SQNETAPAC	4

CCRIS ONLY UPDATES:
Following are required only when making keyword/cross reference CCRIS updates and page 1 of form NEDP-2-1 is not included:

PREPARER SIGNATURE	DATE	CHECKER SIGNATURE	DATE
PREPARER PHONE NO. 843-8065	EDMS ACCESSION NO.		

QA Record

ORIGINAL

TVAN CALCULATION COVER SHEET

Title			Page
DEMONSTRATED ACCURACY CALCULATION 27DAT		Plant SQN Unit 1/2	

Preparing Organization	Key Nouns (For EDM)		
EEB-I&C	I&C, INSTR, CALIBRATION, SETPOINT, ACCURACY		
Calculation Identifier	Each time these calculations are issued, preparer must ensure that the original (R0) RIMS/EDM accession number is filled in.		
27DAT	Rev	(for EDM use)	EDM Accession Number
Applicable Design Document(s)	R0	870422C0011	B43 870421 903
	R4		B87 000823 001
UNID System(s)	R5		
	R6		

	R0	R4	R5	R6		Yes	No
					Quality Related?	☒	☐
DCN, EDC, NA	NA	E20689A			Safety related? If yes, mark Quality Related yes	☒	☐
Prepared	Fabio Chomichi	[signature]					
Checked	Oirbi Chauckar	[signature]			These calculations contain unverified assumption(s) that must be verified later?	☐	☒
Design Verified	J. D. Hutson	[signature]			These calculations contain special requirements and/or limiting conditions?	☐	☒
Approved	J. D. Hutson	[signature]			These calculations contain a design output attachment?	☐	☒
Approval Date	4/20/87	8/17/00			Calculation Classification		
SAR Affected?	Yes ☐ No ☒	Yes ☐ No ☒	Yes ☐ No ☐	Yes ☐ No ☐	Microfiche generated	☐	☒
Revision applicability	Entire calc ☒	Entire calc ☒ Selected pgs ☐	Entire calc ☐ Selected pgs ☐	Entire calc ☐ Selected pgs ☐	Number		

Statement of Problem:

Determine the accuracy of the subject instrument loop(s) and demonstrate that the accuracy is adequate for the intended purpose.

Abstract

6900 volt Shutdown Board 1A-A, 1B-B, 2A-A and 2B-B under voltage relays.

☐ Microfilm and return calculation to Calculation Library. Address:

☒ Microfilm and return calculation to: ERCU

☐ Microfilm and destroy.

TVA 10697 (DNE-QA-6-86) ORIGINAL DNE CALCULATIONS QA Record QA Record 72

Title: DEMONSTRATED ACCURACY CALCULATION 27 DAT					Plant/Unit: SEQUOYAH / 1 & 2
Preparing Organization: EEB-I&C	KEY NOUNS (Consult RIMS Descriptors List): I&C, INSTR, CALIBRATION, SETPOINT, ACCURACY				
Branch/Project Identifiers: 27DAT	Each time these calculations are issued, preparers must ensure that the original (RO) RIMS accession number is filled in.				
	Rev	(for RIMS' use)		rims accession number	
	R0	870422C0011		B43 '87 0421 903	
Applicable Design Document(s)	R1	930617G0004 (R1)		B87 930614 004	
	R2	[illegible]		B87 951129 007	
SAR Section(s) | UNID System(s)	R3	B87 000114 001			
Revision 0	R1	R2	R3	Safety-related? Yes (✓) No ( )	
ECN No. (or Indicate Not Applicable): NA	M09394A M09395A M09179A	M09179A	N/A	Statement of Problem	
Prepared: Fabio Chomichi	HHMailon	HHMailon	HHMailon	Determine the accuracy of the subject instrument loop(s) and demonstrate that the accuracy is adequate for the intended purpose. Primary elements are located in a MILD environment. Subject devices / /are /✓/are not part of PAM.	
Checked: Oishi Ghawkar	TMBegley	TMBegley	TMBegley		
Reviewed: [illegible]	TMBegley	TMBegley	TMBegley		
Approved: [illegible]	JKG [illegible]	JKG [illegible]	[illegible]	R3 Contains ALL Pages.	
Date: 4/20/87	6/10/93	11/14/95	11/9/98		
USE FORM TVA 10534 IF MORE SPACE REQUIRED — List all pages added by this revision	REFER TO REV. LOG	REFER TO REV. LOG	REFER TO REV LOG		
List all pages deleted by this revision					
List all pages changed by this revision					

ABSTRACT [These calculations contain an unverified assumption(s) that must be verified later. Yes ( ) No (✓)]
Calculations were performed to determine the accuracy of the subject instrument loop(s). The determined accuracies were compared to the required accuracies, setpoints, safety limits and/or operating limits and the accuracy for the loop(s) listed below were demonstrated to be acceptable for the intended function of the instrument loop(s). This calculation applies to the instrument loop(s) listed below:

6.9 KV SHUTDOWN BOARD 1A-A, 1B-B, 2A-A & 2B-B UNDERVOLTAGE RELAYS.

~~THIS CALCULATION CONSISTS of 51 PAGES AND 7 ATTACHMENTS FOR A TOTAL of 123 PAGES~~ | R1

( ) Microfilm and store calculations in RIMS Service Center — Microfilm and destroy. ( )
( ) Microfilm and return calculations to: ~~J. D. Hutson~~ EAC4 — Address: ~~WB Bill C-K~~ SQN

cc: RIMS, SL 26 C-K

NPG CALCULATION RECORD OF REVISION

CALCULATION IDENTIFIER 27DAT

Title DEMONSTRATED ACCURACY CALCULATION 27DAT

Revision No.	DESCRIPTION OF REVISION
9	This revision is being performed to support TSTF-493 implementation for the Undervoltage RCPs and 6.9 kV Shutdown Board – Loss of Voltage functions. Corrected Note 6 on Sheet 14. Pages Added: R9 Coversheet/CTS Update (2 pg), R9 Calculation Verification, R9 Record of Revision Pages Deleted: R8 Calculation Verification Pages changed: 1, 2, 3B, 9, 10, 11C, 14, 22, 23A, 24, 24A, 39, 47, 49B This revision contains 238 sheets Note: A review of the SAR, ISFSI SAR, Tech Specs and ISFSI CoC applicable to this calculation revision is performed under DCN D23339.

Title: 27DAT Accuracy Calculation		REVISION LOG
Revision No.	DESCRIPTION OF REVISION	DATE APPROVED
7	This revision adds a discussion about the DV Timer Lower Operating Limit not being used due to the Tech Spec Lower Allowable Value being higher than the Lower Operating Limit. Pages Added: Cover sheets & Rev Log Pages Deleted: None Pages Changed: 3-3B, 7B, 27A, Attachment 17 Page 1 Legibility evaluated and accepted for issue. John M. Campbell (Signature) 12/31/12 (Date) Total number of pages 233.	12/31/12
8	This revision is the removal of the DV Timer Lower Operating Limit of 7 seconds which was missed on the previous revision. This problem was identified on PER 691473. Pages Added: Cover sheets, Calc. Verification Form Pages Deleted: FSAR Compliance Review Pages Changed: Rev Log, ~~3~~-3B, 46 3A - 5/9/13 FSAR sections 8.1.2, 8.2 and 8.3 have been reviewed and are not affected by the results of this calculation. Legibility evaluated and accepted for issue. John M Campbell (Signature) 5/3/13 (Date) Total number of pages 235.	5-3-13

Title: 27DAT Accuracy Calculation	REVISION LOG	
Revision No.	DESCRIPTION OF REVISION	DATE APPROVED
5	This revision changes the upper allowable value for the loss of voltage relays for the revised calculation SQNETAPAC to establish an upper limit below the normal anticipated dip in voltage. Pages Added: Cover sheet & Rev Log, 7C, Attachments 14 pages 4-7, 16 pages 1-2, 17 pages 1-4 Pages Deleted: None Pages Changed: Design verification, FSAR review, 3B, 7, 7B, 11A, 11C, 26A, 26B, 44, 45, 47, 50, 51, Attachment 14 pages 1-3 Legibility evaluated and accepted for issue. R K Gladney (Signature) 9/23/03 (Date) Total number of pages 229.	
6	This revision corrects typographical errors and updated references; the calculated results are not changed by these corrections. Pages Added: Cover sheets Pages Deleted: Design verification Pages Changed: Rev Log, FSAR review, 3-3B, 8A, 18B, 26B, 39, 49B, Attachment 17 Legibility evaluated and accepted for issue. [illegible] 8/7/06 Total number of pages 230.	

Title: 27DAT Accuracy Calculation		REVISION LOG
Revision No.	DESCRIPTION OF REVISION	DATE APPROVED
4	This revision will determine a Tech Spec high voltage limit value for relays 27TS1A, 27TS1B and 27TS1C. It will also determine a Tech Spec minimum time value for relays DV1 and DV2. This change will address the concern of unnecessary Diesel Generator Starts due to the possibility of protective relays being set too close to normal bus voltage values. Additionally, this revision and the previous revision resolves the deficiency noted in SQ981574PER by using Westinghouse Set-Point Methodology for the portion of this calculation addressing the Reactor Coolant Pump under voltage requirements. Pages Added: Cover sheet, Rev Log, 26B, Attachment 14, Attachment 15 Pages Deleted: N/A Pages Changed: Indep review, FSAR review, 3B, 7, 7A, 21, 26A, 27A, 44, 46, 47 Legibility evaluated and accepted for issue. [signature] 8/17/00 Signature Date Total number of pages 216.	

Title: 27DAT Accuracy Calculation		REVISION LOG
Revision No.	DESCRIPTION OF REVISION	DATE APPROVED
3	This revision will change allowable value for relays 271A, 271B, 272A and 272B to the Westinghouse Setpoint Methodology. Pages Added: Rev Log, 23A Pages Deleted: N/A Pages Changed: Indep review, FSAR review, 3, 3A, 8A, 24, 39, 40, 49B, 49C, 52 Legibility evaluated and accepted for issue. [signature] 11/9/98 Signature Date Total number of pages 208.	

Title: 27DAT Accuracy Calculation		REVISION LOG
Revision No.	DESCRIPTION OF REVISION	DATE APPROVED
2	This revision for M09179B will change time delay relays back to Agastat 7000 series and removes time delay relays LGV1 and LGV2. Relays 27TS1A, 27TS1B, 27TS1C will change back to type 27H. Pages Added: Rev Log, 3B, 11B, 11C Attmnts 3, 11, 12, 13 Pages Deleted: Ref review, 7C, 12A, 15, 27B, 49 Pages Changed: Indep review, FSAR review, 1-3, 3A, 6, 7A-7B, 7D, 8, 8A, 11A, 12-14, 22, 22B, 23-27A, 40, 43, 46-48, 49C, 51 Legibility evaluated and accepted for issue. CBritts 11/14/95 Signature Date Total number of pages 206	

TVA Title: 27DAT Accuracy Calculation		REVISION LOG
Revision No.	**DESCRIPTION OF REVISION**	**DATE APPROVED**
1	For DCN M09179A; revised setpoints on relays 27DAT, 27DBT, 27DCT, changed time delay relay to Agastat ETR. Added to this calc. relays 27TS1A, 27TS1B, 27TS1C and time delay relays LGV1 , LGV2 and added potential transformer. For DCNs M09394A and M09395A; added potential transformer, relays 271A, 271B, 272A, 272B for under voltage on Reactor Coolant Pumps. Added Pages: 3A, 6A, 7A, 7B, 7C, 7D, 8A, 12A, 22A 22B, 22C, 24, 27A, 27B, 39, 40, 49A, 49B, 49C, 52, Attmt 8 & 10, Page 18A-18C, 11A Changed Pages: 1-3A, 6, 7, 11-18, 22-27, 38, 43-51, 8, 10 Deleted Pages: 40-42, Attmt 3 Legibility evaluated and accepted for issue. CBuell 6/12/03 Signature Date FSAR Compliance Review. CBuell 6/12/03 Signature Date Total Number of Pages ________ .	

NPG CALCULATION VERIFICATION FORM

Calculation Identifier 27DAT | Revision 009

Method of verification used:		
1. Design Review	☒	Verifier Kirk R. Melson Date 8/21/14
2. Alternate Calculation	☐	
3. Qualification Test	☐	

Comments:

This revision was performed to incorporate TSTF-493 requirements for the Undervoltage RCPs and 6.9 kV Shutdown Board – Loss of Voltage functions. All comments have been resolved. This calculation revision is found to be in compliance with NEDP-2. The methodology utilized in revision 9 of this calculation is commensurate with the guidelines provided in Branch Technical Instruction EEB-TI-28, R10.

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

TABLE OF CONTENTS

SHEET NO.

REV	9	PREP	DAW	DATE	8/21/14	CHECK	KRM	DATE	8/21/14	SHEET	1	C/O	2
REV		PREP		DATE		CHECK		DATE		SHEET		C/O	
REV		PREP		DATE		CHECK		DATE		SHEET		C/O	

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

PURPOSE

The purpose of this calculation is a) to determine the accuracy of the instrumentation covered by this calculation, and b) to demonstrate that the instrumentation is sufficiently accurate to perform its intended function without safety or operational limits being exceeded.

ASSUMPTIONS

_X_ This calculation contains no assumptions.

____ The following assumptions were used in the performance of this calculation. These assumptions require further analysis. This calculation may require revision if the assumptions below are shown to be invalid.

CALCULATION REQUIREMENTS:

1. Under Voltage Relays (Undervoltage RCPs) 271A, 271B, 272A, 272B

   The acceptance band for calibration shall be set equal to the Re (±0.2% of value) per the requirements of TSTF-493 (see Reference 33). However, an acceptance band equal to ±0.5% of value is conservatively retained from previous revisions of this calculation to compute accuracy values.

   Under Voltage Relays (6.9kV Shutdown Board – Loss of Voltage) 27TS1A, 27TS1B, 27TS1C

   The acceptance band for calibration shall be set equal to the relay settability (±0.5% of value) per the requirements of TSTF-493 (see References 27 and 33). R9

   Under Voltage Relays (6.9 kV Shutdown Board – Degraded Voltage) 27DAT, 27DBT, 27DCT

   The acceptance band for calibration shall be ±0.5% of value. The requirements of TSTF-493 do not apply to these relays.

   Time Delay Relays DV1, DV2

   The acceptance band for calibration shall be set equal to the Re (±10% of value). The requirements of TSTF-493 do not apply to these relays.

2. Test equipment (voltmeter) must be a digital voltmeter capable of an accuracy of ±0.2% of value.

3. Calibration Interval = 22.5 Months or less.

REQUIREMENTS / LIMITING CONDITIONS

None.

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

SOURCE OF DESIGN INPUT INFORMATION
(REFERENCES)

REF #	ATT #	REFERENCE (RIMS#)
1	1	PSO RELAY INFORMATION AND SETTING
2	2	BBC LETTER TO TVA (B43 870326 005)
3	3	AGASTAT BULLETIN SR-3
4	4	Addendum to Seismic Certification Report 33-47035
5		1,2-47W200-3 R8
6	16	Design Criteria SQN-DC-V-21.0, Environmental Design
7	5	ANSI STANDARD C57.13-1968
8	6	SQNP-Calibration Data Sheets
9		1,2-45N765-18 R17
10		DNE CALC "ETR" (B87 900718 003)
11	8	Drift Data and Analyses

R7

REV 3 PREP GGM DATE 11/05/98 CHECK LMB DATE 11/05/98 SHEET 3 C/O 3A
REV 6 PREP GGM DATE 07/10/06 CHECK LMB DATE 8/ 4/06 SHEET 3 C/O 3A
REV 7 PREP GGM DATE 10/ 5/12 CHECK NGS DATE 12/31/12 SHEET 3 C/O 3A

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

SOURCE OF DESIGN INPUT INFORMATION
(REFERENCES)

REF #	ATT #	REFERENCE (RIMS#)	
12		PSO 1,2-45N724-1 R21, -2 R22, 2-45N724-3 R23, 2-45N724-4 R30	
13	7	Transformer Walkdown Data	
14		NE Calc. SQN-EEB-MS-TI06-0008 R4	
15	15	NE Calc. SQN-EEB-MS-TI06-0002 R75	
16		Procurement Request SE-1660	
17		NE Calc. - Demonstrated Accuracy Calc. 27S1A R6	
18		Reactor Coolant Pump Calc. No. SQN-RSS-002 R2	
19		Not Used	R8
20		1,2-47W200-4 R9	R8
21	9	ABB Instructions IB7.4.1.7-7 issue D	
21a	10	Transformer Data (for 271A, 271B, 272A, 272B)	R8
22		NE Calc SQN-EEB-PL&S R48	R8
23		TVA Contract No. 71-54499	
24		Procurement Request SE-1716 R3	

REV 3 PREP GGM DATE 11/05/98 CHECK LMB DATE 11/05/98 SHEET 3A C/O 3B
REV 6 PREP GGM DATE 07/10/06 CHECK LMB DATE 8/ 4/06 SHEET 3A C/O 3B
REV 7 PREP GGM DATE 10/ 5/12 CHECK NSS DATE 12/31/12 SHEET 3A C/O 3B
REV 8 PREP GGM DATE 04/23/13 CHECK ASS DATE 5/2/13 SHEET 3A C/O 3B

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

SOURCE OF DESIGN INPUT INFORMATION
(REFERENCES)

REF	ATT	REFERENCE (RIMS NO.)	
25	11	Drift Data and Analyses (27TS1A, 1B, 1C)	
26	12	ABB Instruction IB 18.4.7-2 Issue E	
27	13	MEMO Discussion of IB 18.4.7-2	
28		NE Demonstrated Accuracy Calc. DS1-2 Rev 8	R9
29		Design Criteria No. SQN-DC-V-11.4.1 R15, Normal Emergency AC Auxiliary Power Systems.	
30	14	Tech Spec Change No. 02-01, Normal Trip Setpoints	
31		Not Used	
32	17	Calculation SQNETAPAC Rev. 56	
33		EEB Branch Technical Instruction For Setpoint Calculations BTI-EEB-TI-28 Revision 10	R9

D E S I G N   I N P U T   D A T A

A) DEFINITIONS & ABBREVIATIONS

Aa	ACCIDENT ACCURACY-ACCURACY OF A DEVICE IN A HARSH ENVIRONMENT CAUSED BY AN ACCIDENT
Aas	COMBINED ACCIDENT AND SEISMIC ACCURACY
Ab	ACCEPTANCE BAND-THE RANGE OF VALUES AROUND THE CORRECT VALUE DETERMINED TO BE ACCEPTABLE WITHOUT RECALIBRATION
AB	AUXILIARY BOILER LINE BREAK
AF	AFW PUMP TURBINE STEAM SUPPLY LINE BREAK
An	NORMAL ACCURACY-ACCURACY OF A DEVICE LOCATED IN A ENVIRONMENT NOT AFFECTED BY AN ACCIDENT OR PRIOR TO AN ACCIDENT
As	POST SEISMIC ACCURACY
AV	ALLOWABLE VALUE-SAFETY LIMIT/REQUIRED ACCURACY MINUS NON-MEASUREABLES; USED FOR THE PURPOSE OF DETERMINING REPORTABILITY ONLY.
CV	CVCS LETDOWN LINE BREAK
De	DRIFT INACCURACY
HELB	HIGH ENERGY LINE BREAK
IAD	INTEGRATED ACCIDENT DOSE
ICRe	INPUT TEST INSTRUMENT READING INACCURACY
ICTe	INPUT TEST INSTRUMENT CALIBRATION INACCURACY
INDRe	INDICATOR READING ERROR
IRe	INACCURACY DUE TO CABLE LEAKAGE
L	LOSS OF COOLANT ACCIDENT
M	MARGIN-THE DIFFERENCE BETWEEN THE SAFETY LIMIT/OPERATING LIMIT AND THE NORMAL/ACCIDENT ACCURACY (Mn=NORMAL MARGIN Ma=ACCIDENT MARGIN)
N/A	NOT APPLICABLE
OCRe	OUTPUT TEST INSTRUMENT READING INACCURACY

5

D E S I G N   I N P U T   D A T A

A) DEFINITIONS & ABBREVIATIONS CONTINUED

OCTe OUTPUT TEST INSTRUMENT CALIBRATION INACCURACY

PRCSe PROCESS UNCERTAINTY

PSEe INACCURACY DUE TO POWER SUPPLY VARIATIONS

PV PROCESS VALUE (ACTUAL)

RADe INACCURACY DUE TO ACCIDENT RADIATION EXPOSURE

Re REPEATABILITY INACCURACY

RH RHR LINE BREAK

RNDe NORMAL RADIATION DOSE BETWEEN CALIBRATION

Se INACCURACY FOLLOWING A SEISMIC EVENT

SECu SPAN ERROR CORRECTION UNCERTAINTY

SL SAFETY LIMIT

SP SETPOINT

SPEe ZERO ERROR DUE TO EFFECTS OF OPERATING PRESSURE

TAe TEMPERATURE EFFECT AT ACCIDENT CONDITIONS

TID TOTAL 40 YEARS INTEGRATED DOSE

TNe TEMPERATURE EFFECT IN THE MAXIMUM/MINIMUM ABNORMAL TEMPERATURE RANGES

TPRe TEST POINT RESISTOR ERROR

WLe WATERLEG UNCERTAINTY

WLHP WATERLEG HIGH POINT

WLLP WATERLEG LOW POINT

AFPU AS FOUND - PICK UP

ALPU AS LEFT - PICK UP

AFDO AS FOUND - DROP OUT

ALDO AS LEFT - DROP OUT

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA

B) LOOP COMPONENT LIST

LOOP ID#	COMPONENT ID#
27 DAT	27 DAT
	POTENTIAL TRANSFORMER
DV1, DV2	TIMER - 10-300 SEC.
27 DBT	SAME AS 27DAT
27 DCT	
27TSIA	Same as 27DAT
27TSIB	
27TSIC	
	Potential Transformer

R1

R1

R2

7

REV 0	PREP 72	DATE 4-17-87	CHECK WE	DATE 4/17/87	SHEET 6	C/O 7
REV 1	PREP JBM	DATE 4-6-93	CHECK MMP	DATE 5-3-93	SHEET 6	C/O 6A
REV 2	PREP [illegible]	DATE 8-13-95	CHECK AMP	DATE 10-11-95	SHEET 6	C/O 6A

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA
B) LOOP COMPONENT LIST

LOOP ID#	COMPONENT ID#
271A	271A
	Potential Transformer
271B	
272A	same as 271A
272B	

R1

REV 1	PREP [illegible]	DATE 5-27-93	CHECK [illegible]	DATE 6-7-93	SHEET 6A	C/O 7
REV	PREP	DATE	CHECK	DATE	SHEET	C/O
REV	PREP	DATE	CHECK	DATE	SHEET	C/O

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

D E S I G N   I N P U T   D A T A

C) LOOP FUNCTION

These relays are part of the degraded voltage transfer scheme. They initiate transfer to diesel generator power upon sustained low voltage on the 6.9 KV shutdown board bus. There is one relay per phase and the relays are connected to the 6.9 KV bus through a potential transformer with a transformer ratio of 60:1. The contacts are arranged in a two out ~~of~~ of three logic which is required before a trip signal (Drop out) is sent to a timer relay. The timer relay times for 300 sec if a reset signal (Pickup) is not received. At the end of the time out period, a start signal is sent to the diesel generators. (This calculation will conservatively ignore the 2 out of 3 logic and consider each relay separately.)

C) LOOP REQUIREMENTS AND LIMITS (BISTABLE) 27DAT, 27DBT, 27DCT

RESPONSE TIME: The transfer occurs after low voltage has been sensed for 300 sec. Response time is an issue separate from accuracy of voltage measurement in this case and will be treated ~~be~~ separately in these calculations. (See "Conclusion" section of this calculation).

SAFETY LIMITS: Drop Out: 6400 VAC (Transient of Sustained) (Ref. 32) or 106.67 at Relay

ANALYTICAL UPPER LIMITS: Drop Out: 6526 VAC (Ref. 32)
Pick Up: 6558.8 VAC (Ref. 32)

SETPOINT: Drop Out: 6456 VAC or 107.6 at Relay

Interface Review: (EEB Electrical) DSDePRIEST - 9/12/2003

R5

REV 1	PREP GGM	DATE 4/06/93	CHECK LMB	DATE 5/ 3/93	SHEET 7	C/O 7A
REV 4	PREP GGM	DATE 7/18/00	CHECK LMB	DATE 7/26/00	SHEET 7	C/O 7A
REV 5	PREP GGM	DATE 9/11/03	CHECK TMD	DATE 9/23/03	SHEET 7	C/O 7B

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA

C) LOOP FUNCTION

These relays are part of the degraded voltage transfer scheme. They initiate transfer to diesel generator power upon loss of voltage on the 6.9 KV shutdown board bus. There is one relay per phase and the relays are connected to the 6.9 KV buss through a potential transformer with a transformer ratio of 60:1. The contacts are arranged in a two out of three logic which is required before a trip signal (Drop out) is sent. (This calculation will conservatively ignore the 2 out of three logic and consider each relay separately.)

C) LOOP REQUIREMENTS AND LIMITS (BISTABLE) 27TSIA, 27TSIB, 27TSIC

RESPONSE TIME: The transfer occurs after low voltage has been sensed by two out of three logic. (See "Conclusion" section of this calculation).

SAFETY LIMITS: 5300 VAC or 88.33 at Relays (Ref. 32)

ANALYTICAL UPPER LIMITS: 5700 VAC or 95 at relays (Ref. 32) R5

SETPOINT: 5520 VAC or 92.0 at Relays

Interface Review: (Electrical) [signature] 9/25/2003 R5

REV 2 PREP GGM DATE 9/06/95 CHECK LMB DATE 10/27/95 SHEET 7A C/O 7B
REV 3 PREP GGM DATE 7/25/00 CHECK LMB DATE 7/26/02 SHEET 7A C/O 7B
REV 5 PREP GGM DATE 9/11/03 CHECK [illegible] DATE 9/25/03 SHEET 7B C/O 7C

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA

C) LOOP FUNCTION

See Page 7.

C) LOOP REQUIREMENTS AND LIMITS (BISTABLE) DV1 & DV2

RESPONSE TIME: For the time delay relays, this calculation defines the accuracy of the response time.

SAFETY LIMITS: N/A

OPERATING LIMITS: 370 seconds (Ref 14,32)
Lower Limit not used. See discussion on page 27A R7

SETPOINT: 300 seconds (Ref 29)

Interface Review: (Electrical) M Boeh

REV 1	PREP GGM	DATE 5/04/93	CHECK LMB	DATE 5/04/93	SHEET 7B	C/O 7C
REV 2	PREP GGM	DATE 9/06/95	CHECK LMB	DATE 10/27/95	SHEET 7B	C/O 7D
REV 5	PREP GGM	DATE 9/13/02	CHECK LMB	DATE 9/24/02	SHEET 7C	C/O 7D
REV 7	PREP GGM	DATE 10/5/12	CHECK ASS	DATE 12/3/12	SHEET 7C	C/O 7D

BRANCH/PROJECT IDENTIFIER 27DAT

DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA

C) LOOP FUNCTION

The undervoltage bus trips provide reactor core protection against DNB as a result of loss of voltage to more than one reactor coolant pump. The specified set points assure a reactor trip signal is generated before the low flow trip set point is reached. Time delays are incorporated in the undervoltage trips to prevent spurious reactor trips from momentary electrical power translents.

C) LOOP REQUIREMENTS AND LIMITS (BISTABLE) 27IA R1

RESPONSE TIME: Response time is an issue seperate from accuracy of voltage meaurement in this case and is addressed in Calc. No. 2-99-6218

SAFETY LIMITS: 4692 VAC or 78.2 VAC (Secondary) (Reference 22) R2

OPERATING LIMITS: NA

SETPOINT: Drop Out: 5022 VAC or 83.7 VAC (Secondary)

Pickup: 5076 VAC or 84.6 VAC (Secondary)

(Reference 22)

Interface Review: R.O. [signature] 6/11/93

REV 1	PREP [initials]	DATE 5-27-93	CHECK	DATE	SHEET 7D	C/O 8
REV 2	PREP [initials]	DATE 10-6-95	CHECK [initials]	DATE 10-11-95	SHEET 7D	C/O 8
REV	PREP	DATE	CHECK	DATE	SHEET	C/O

BRANCH/PROJECT IDENTIFIER 27DAT

DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA

D) COMPONENT DATA

27DAT, 27DBT, 27DCT R2

VALID FOR DEVICES IDENTIFIED ON SHEET(S): 6

COMPONENT: UNDER VOLTAGE RELAY CONTRACT #: 54499 REFERENCE #:

MANUFACTURER/MODEL: ITE / 211T0175 REFERENCE #: 1 R2

INPUT RANGE & UNITS: 70 TO 120V NOTE #: REFERENCE #: 2

OUTPUT RANGE & UNITS: NA NOTE #: REFERENCE #:

OVERRANGE LIMIT: 150V AC CONTINUOUS NOTE #: REFERENCE #: 2

CALIBRATED SPAN: NA NOTE #: REFERENCE #:

ROOM #/ PANEL #: SEE NOTE 7 NOTE #: 7 REFERENCE #: 5

ELEVATION/ COORDINATE: 734' / SEE NOTE 7 NOTE #: 7 REFERENCE #: 5

MIN/MAX ABNORMAL TEMP: 60 / 104°F NOTE #: REFERENCE #: 6

ACCIDENT TEMPERATURE: N/A NOTE #: REFERENCE #: 6

RADIATION TID (RAD): 1.8×10^3 NOTE #: REFERENCE #: 6

RADIATION IAD (RAD): $<1 \times 10^4$ NOTE #: REFERENCE #: 6

INSTRUMENT TAP INFORMATION REFERENCE #: NA

WLHP TAP ELEVATION: NA WLHP CONDENSING POT ELEVATION: NA

WLLP TAP ELEVATION: NA WLLP CONDENSING POT ELEVATION: NA

EVENT/CATEGORY/OPERATING TIME: NA (MILD ENVIRONMENT) NOTE #: REFERENCE #:

REV	PREP	DATE	CHECK	DATE	SHEET	C/O
0	[illegible]	[illegible]	[illegible]	4/17/87	8	9
1	[illegible]	6-8-93	[illegible]	6-11-93	8	9A
2	[illegible]	7-17-95	[illegible]	10-11-95	7	9A

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

D E S I G N   I N P U T   D A T A

D) **COMPONENT DATA** **271A, 271B, 272A, 272B**

VALID FOR DEVICES IDENTIFIED ON SHEET(S): 6A

COMPONENT: Undervoltage Relay CONTRACT #: PR-SE-1716 REFERENCE #: 24

MANUFACTURER/MODEL: ABB / 411T 0175 REFERENCE #: 24

INPUT RANGE & UNITS: 60 - 110 VAC NOTE #: __ REFERENCE #: 21

OUTPUT RANGE & UNITS: NA NOTE #: __ REFERENCE #: __

OVERRANGE LIMIT: 150 V continuous NOTE #: __ REFERENCE #: 21

CALIBRATED SPAN: NA NOTE #: __ REFERENCE #: __

ROOM # / PANEL #: 6.9 KV RCP PT and Relay Board No. 1 and 2 NOTE #: __ REFERENCE #: 20

ELEVATION / COORDINATE: 714' AB, A3-Q, A14-Q NOTE #: __ REFERENCE #: 20

MIN / MAX ABNORMAL TEMP: 50°/110°F NOTE #: __ REFERENCE #: 6 R6

ACCIDENT TEMPERATURE: NA NOTE #: __ REFERENCE #: 6

RADIATION TID (RAD): 1.8×10^3 RADS NOTE #: __ REFERENCE #: 6

RADIATION IAD (RAD): $< 1 \times 10^4$ RADS NOTE #: __ REFERENCE #: 6

INSTRUMENT TAP INFORMATION REFERENCE #: NA

WLHP TAP ELEVATION: NA WLHP CONDENSING POT ELEVATION: NA

WLLP TAP ELEVATION: NA WLLP CONDENSING POT ELEVATION: NA

EVENT / CATEGORY / OPERATING TIME: NOTE #: ____ REFERENCE #: ____

L / C / NA

RH/A / C / NA

CV/A / C / NA

AF / C / NA

AB / C / NA

REV 2 PREP GGM DATE 9/06/95 CHECK LMB DATE 10/11/95 SHEET 8A C/O 9
REV 3 PREP GGM DATE 11/05/98 CHECK LMB DATE 11/05/98 SHEET 8A C/O 9
REV 6 PREP GGM DATE 8/02/06 CHECK [illegible] DATE 8/7/06 SHEET 8A C/O 9

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA
D) COMPONENT DATA CONTINUED

COMPONENT: UNDER VOLTAGE RELAY 27DAT, 27DBT, 27DCT, 271A, 271B, 272A, 272B | R9

PARAMETER	VALUE/UNITS	NOTE #	Reference #
Re	±0.2%	1	2
De	±0.5%	9	
TNe	±0.2%	2	2
SPEe	NA		
SECu	NA		
PSEe	±0.2%	3	2
RNDe	NA	5	
TPRe	NA		
ICTe	±0.2%	8	
ICRe	NA	8	
OCTe	NA		
OCRe	NA		
Ab	±0.5%	4, 4a	
Ab_{493}	±0.2%	4a	
Se	Negligible	6	
RADe	NA	5	
TAe	NA		
WLe	NA		
PRCSe	NA		
INDRe	NA		
IRe	NA		

| R9

REV 9 PREP DAW DATE 8/21/14 CHECK KRM DATE 8/21/14 SHEET 9 C/O 10
REV ___ PREP ___ DATE ___ CHECK ___ DATE ___ SHEET ___ C/O ___
REV ___ PREP ___ DATE ___ CHECK ___ DATE ___ SHEET ___ C/O ___

DESIGN INPUT DATA
E) COMPONENT DATA NOTES

COMPONENT: UNDER VOLTAGE RELAY 27DAT, 27DBT, 27DCT, 271A, 271B, 272A, 272B R9

#	NOTE
1.	Vendor information (Ref. 2) states that the repeatability of this device is ±0.2%.
2.	Vendor information (Ref. 2) states that the effect of normal temperature fluctuations between 0 and 40°C is ±0.2%. The plant environment is +60 to +104°F for relays on Sheet 8 and +50 to 110°F for relays on Sheet 8A which is enveloped by the vendor specifications. Therefore, TNe = ±0.2%.
3.	Vendor information (Ref. 2) states that the power supply effect is ±0.2% for a control voltage range of 100 to 140 volts.
4.	An Ab = ±0.5% of value is a requirement of this calculation. Applies to 27DAT, 27DBT, 27DCT.
4a.	Per Requirement 1, the acceptance band for calibration of the under voltage relays shall be set equal to the Re (±0.2% of value) per the requirements of TSTF-493. However, an acceptance band of 0.5% of value is conservatively retained from previous revisions in the calculation of the accuracy values for determination of the Allowable Values. Applies to 271A, 271B, 272A, 272B. R9
	Ab_{493} = Re = ±0.2% of value (for use in calibration tolerances)
	Ab = ±0.5% of value (for use in accuracy calculations)
5.	This device is located in an environment where the TID does not exceed 5 x 10^4 RADs. Based on information contained in DNE Calculation titled, "A Review of Electronic Components in a Radiation Environment of ≤5 x 10^4 RADS," Rev. 0 (RIMS No. B43860721903) radiation effects are negligible.

D E S I G N   I N P U T   D A T A
E) COMPONENT DATA NOTES

COMPONENT: UNDER VOLTAGE RELAY

#	NOTE
6.	THIS DEVICE IS A SOLID STATE RELAY which THE MANUFACTURER CONFIRMS AS having "INHERENTLY high SEISMIC AND TRANSIENT IMMUNITY." (SEE REF. 2) Addendum TO SEISMIC CERTIFICATION REPORT 33-47035, SECTION 6.0 "RESULTS" (SEE Ref 4) STATES THAT NO MIS-OPERATIONS WERE found WITHIN THE SEISMIC LIMITATIONS of THE RELAY. THIS information SUPPORTS THE ENGINEERING JUDGEMENT THAT POST-SEISMIC EFFECTS ARE NEGLIGIBLE FOR THIS SOLID STATE RELAY.
7.	THE RELAYS ARE MOUNTED WITHIN 6900V SHUTDOWN BOARDS and Logic Panels |R1

BOARD NO.	ELEVATION	COL.
1A - A	734'	A5-T
2A - A	734'	A5-R
1B - B	734'	A11-T
2B - B	734'	A11-R

PER Ref. 5 \|R1

#	NOTE
8.	A DIGITAL VOLTMETER WITH AN ACCURACY of ± 0.2% of VALUE IS A REQUIREMENT of THIS CALCULATION.
9.	SEE COMPUTATIONS / ANALYSES BEGINNING SHEET 26

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA 27TS1A, 27TS1B, 27TS1C
D) COMPONENT DATA

VALID FOR DEVICES IDENTIFIED ON SHEET(S): 6

COMPONENT: Under Voltage Relay CONTRACT #: 54499 REFERENCE #:

MANUFACTURER/MODEL: ITE / 211 RO 175 REFERENCE #: 1

INPUT RANGE & UNITS: 60 - 110 V NOTE #: REFERENCE #: 26

OUTPUT RANGE & UNITS: NA NOTE #: REFERENCE #:

OVERRANGE LIMIT: 160 V NOTE #: REFERENCE #: 26

CALIBRATED SPAN: NA NOTE #: REFERENCE #:

ROOM #/ PANEL #: See Note 10 NOTE #: 10 REFERENCE #: 5

ELEVATION/ COORDINATE: 734'/See Note 10 NOTE #: REFERENCE #: 5

MIN/MAX ABNORMAL TEMP: 60°/104°F NOTE #: REFERENCE #: 6 R2

ACCIDENT TEMPERATURE: N/A NOTE #: REFERENCE #: 6

RADIATION TID (RAD): 1.8×10^3 NOTE #: REFERENCE #: 6

RADIATION IAD (RAD): 5.0×10^2 NOTE #: REFERENCE #: 6 R5

INSTRUMENT TAP INFORMATION REFERENCE #: NA

WLHP TAP ELEVATION: NA WLHP CONDENSING POT ELEVATION: NA

WLLP TAP ELEVATION: NA WLLP CONDENSING POT ELEVATION: NA

EVENT/CATEGORY/OPERATING TIME: NA NOTE #: REFERENCE #:
(Mild Environment)

___/___/___

___/___/___

___/___/___

___/___/___

___/___/___

10

REV 02	PREP [illegible]	DATE 8-4-95	CHECK [illegible]	DATE 10-11-95	SHEET ~~8A~~ 11A	C/O ~~8B~~ 11B
REV 15	PREP [illegible]	DATE 9/24/03	CHECK [illegible]	DATE 9-25-03	SHEET 11A	C/O 11B
REV	PREP	DATE	CHECK	DATE	SHEET	C/O

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

D E S I G N   I N P U T   D A T A
D) COMPONENT DATA CONTINUED

COMPONENT: UNDER VOLTAGE RELAY   27TS1A, 27TS1B, 27TS1C

PARAMETER	VALUE/UNITS	NOTES	REFERENCE #
Re	± 0.25%	1	27
De	± 1.9%	2	25
TNe	± .54%	3	26
SPEe	NA		
SECu	NA		
PSEe	± 2.0%	4	26
RNDe	NA	5	
TPRe	NA		
ICTe	± 0.2%	7	
ICRe	NA	7	
OCTe	NA	8	
OCRe	NA	8	
Ab	± 0.5%	6	
Se	Negligible	9	26, 27
RADe	NA	5	
TAe	NA		
WLe	NA		
PRCSe	NA		
INDRe	NA		
IRe	NA		
	NA		
	NA		

R2

REV 2 PREP GGM DATE 8/22/95 CHECK JMB DATE 10/11/95 SHEET 11B C/O 11C
REV ___ PREP ___ DATE _/_/_ CHECK ___ DATE _/_/_ SHEET ___ C/O ___
REV ___ PREP ___ DATE ___ CHECK ___ DATE ___ SHEET ___ C/O ___

DESIGN INPUT DATA
E) COMPONENT DATA NOTES

COMPONENT: UNDER VOLTAGE RELAY 27TS1A, 27TS1B, 27TS1C

#	NOTE
1.	Per Vendor information (Ref. 27) the repeat accuracy of the device is ±0.25% of SP.
2.	Per drift analysis attachment 11 of this calculation the drift value is ±1.9% of SP.
3.	Per Vendor information (Ref. 26) the effects of normal temperature variation between 20 and 40°C is ±0.5 volt of set point, (0.5/92) x 100 = ±054% of SP.
4.	Per Vendor information (Ref 26) the power supply effect is 0.2 volt per 10 volt variation in power supply voltage. The power supply is the 125 volt battery and per design criteria SQN-DC-V-11.2 during normal operation (480 VAC available) each charger shall maintain a floating voltage of 135 volt and shall be capable of maintaining 140 volt during "equalizing". Therefore 130 to 140 voltage range will be used in this calculation. Voltage effect then is equal to (0.2/10) x 100 = ±2% of SP.
5.	This device is located in an environment where the TID does not exceed 5 x 10^4 RADs. Based on information contained in DNE Calculation titled, "A Review of Electronic Components in a Radiation Environment of ≤5 x 10^4 RADS," radiation effects are negligible.
6	An Ab = ±0.5% of value is a requirement of this calculation.
	Per Reference 27, the settability of Type 27H relays is considered to be no better than 0.5% of value due to the use of a single-turn adjustment potentiometer. In this case, the precision of the potentiometer may be considered equivalent to an M&TE error and the settability is the result of the combination of the Re and the M&TE error. Therefore, an Ab = ±0.5% of setpoint meets the requirement of TSTF-493 (see Reference 33). R9
7.	A Digital Voltmeter with an accuracy of ±0.2% of value is a requirement of this calculation.
8.	The output of the relay is a contact closure.
9.	The interpretation of the vendor seismic capability of the relay is the seismic effect is negligible, per the vendor the relay operated within the repeatability value following a seismic event (Reference 27).
10.	The relays are mounted within 6900V shutdown boards and logic panels (Reference 5)

Board No.	Elevation / Room	Col.
1A-A	734' / A2	A5-T
2A-A	734' / A2	A5-R
1B-B	734' / A24	A11-T
2B-B	734' / A24	A11-R

BRANCH/PROJECT IDENTIFIER 27 DAT
DEMONSTRATED ACCURACY CALCULATION

D E S I G N   I N P U T   D A T A

D) COMPONENT DATA

VALID FOR DEVICES IDENTIFIED ON SHEET(S): 6 DV1 & DV2

COMPONENT: TIME DELAY RELAY CONTRACT #: 54499 REFERENCE #: .. R2

MANUFACTURER/MODEL: AGASTAT/ E7012PK002 REFERENCE #: 1

INPUT RANGE & UNITS: N/A NOTE #: ___ REFERENCE #: ___

OUTPUT RANGE & UNITS: 1-300 SEC DELAY NOTE #: ___ REFERENCE #: 1 R2

OVERRANGE LIMIT: NA NOTE #: ___ REFERENCE #: ___

CALIBRATED SPAN: NA NOTE #: ___ REFERENCE #: ___

ROOM #/ PANEL #: SEE NOTE 7, PAGE 11 NOTE #: ___ REFERENCE #: 5

ELEVATION/ COORDINATE: 734 / SEE NOTE 7, PAGE 11 NOTE #: ___ REFERENCE #: 5

MIN/MAX ABNORMAL TEMP: 66 / 104°F NOTE #: ___ REFERENCE #: 6

ACCIDENT TEMPERATURE: N/A NOTE #: ___ REFERENCE #: 6

RADIATION TID (RAD): 1.8×10^3 NOTE #: ___ REFERENCE #: 6

RADIATION IAD (RAD): $<1 \times 10^4$ NOTE #: ___ REFERENCE #: 6

INSTRUMENT TAP INFORMATION REFERENCE #: NA

WLHP TAP ELEVATION: NA WLHP CONDENSING POT ELEVATION: NA

WLLP TAP ELEVATION: NA WLLP CONDENSING POT ELEVATION: NA

EVENT/CATEGORY/OPERATING TIME: NA NOTE #: ___ REFERENCE #: ___

___ / ___ / ___
___ / ___ / ___
___ / ___ / ___
___ / ___ / ___
___ / ___ / ___

REV 0	PREP [illegible]	DATE 4-17-87	CHECK GE	DATE 4/17/87	SHEET 12	C/O 12A
REV 1	PREP MBM	DATE 4-7-93	CHECK [illegible]	DATE 5-3-93	SHEET 12	C/O 12A
REV 2	PREP [illegible]	DATE 7-17-95	CHECK [illegible]	DATE 10-11-95	SHEET 12	C/O 13

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA

D) COMPONENT DATA CONTINUED

COMPONENT: TIME DELAY RELAY

PARAMETER	VALUE/UNITS	NOTES	REFERENCE #
Re	± 10%	1	3
De	± 2.7%	2	28
TNe	(Random) ± 7.2% (Bias) ± 5.6%	3	28
SPEe	NA		
SECu	NA		
PSEe	Negligible	4	28
RNDe	Negligible	5	
TPRe	NA		
ICTe	Negligible	6	
ICRe	NA	7	
OCTe	NA	8	
OCRe	NA	8	
Ab	± 10%	9	
Se	Negligible	10	28
RADe	NA	5	
TAe	NA		
WLe	NA		
PRCSe	NA		
INDRe	NA		
IRe	NA		
	NA		
	NA		

R2

REV 0	PREP FC	DATE 4/17/87	CHECK CG	DATE 4/17/87	SHEET 13	C/O 14
REV 1	PREP GGM	DATE 4/5/93	CHECK LMB	DATE 5/3/93	SHEET	C/O
REV 2	PREP GGM	DATE 7/18/95	CHECK WMP	DATE 10-11-95	SHEET 13	C/O 14

DESIGN INPUT DATA
E) COMPONENT DATA NOTES

COMPONENT: TIME DELAY RELAY

#	NOTE
1.	Per Vendor information (Ref 3) the repeat accuracy of the device, (7012 Model), is ±10%.
2.	See note 2 of reference 28.
3.	See note 5 of reference 28.
4.	See note 4 of reference 28.
5.	This device is located in an environment where the TID does not exceed $5x10^4$ RADs. Based on information contained in DNE Calculation Titled, "A Review of Electronic Components in a Radiation Environment of <$5x10^4$ RADs ," Rev 0 (RIMs No. B43860721903) Radiation effects are negligible.
6	See note 6 of reference 28. | R9
7.	Digital timer, therefore no reading error.
8.	Device output is a contact transfer, therefore OCTe & OCRe are NA.
9.	The Acceptance Band (Ab) is arbitrarily chosen to be one times Re.
10.	See note 3 of reference 28.

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA

D) COMPONENT DATA

VALID FOR DEVICES IDENTIFIED ON SHEET(S): 6

COMPONENT: POTENTIAL TRANSFORMER CONTRACT #: 54999 REFERENCE #:

MANUFACTURER/MODEL: TYPE WT or PTM or VIZ REFERENCE #: 1 R1

INPUT RANGE & UNITS: NA NOTE #: REFERENCE #:

OUTPUT RANGE & UNITS: NA NOTE #: REFERENCE #:

OVERRANGE LIMIT: NA NOTE #: REFERENCE #:

CALIBRATED SPAN: NA NOTE #: REFERENCE #:

ROOM #/ PANEL #: SAME AS UNDERVOLTAGE RELAYS NOTE #: REFERENCE #:

ELEVATION/ COORDINATE: NOTE #: REFERENCE #:

MIN/MAX ABNORMAL TEMP: NOTE #: REFERENCE #:

ACCIDENT TEMPERATURE: NOTE #: REFERENCE #:

RADIATION TID (RAD): NOTE #: REFERENCE #:

RADIATION IAD (RAD): NOTE #: REFERENCE #:

INSTRUMENT TAP INFORMATION REFERENCE #: NA

WLHP TAP ELEVATION: NA WLHP CONDENSING POT ELEVATION: NA

WLLP TAP ELEVATION: NA WLLP CONDENSING POT ELEVATION: NA

EVENT/CATEGORY/OPERATING TIME: NA NOTE #: REFERENCE #:

___/___/___

___/___/___

___/___/___

___/___/___

___/___/___

REV 0	PREP [illegible]	DATE [illegible]	CHECK TOG	DATE 4/17/87	SHEET 16	C/O 17
REV 1	PREP JDM	DATE 4-27-93	CHECK AMB	DATE 5-3-93	SHEET 16	C/O 17
REV 2	PREP	DATE	CHECK	DATE	SHEET	C/O

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA

D) COMPONENT DATA CONTINUED

COMPONENT: POTENTIAL TRANSFORMER

PARAMETER	VALUE/UNITS	NOTE #	REFERENCE #
Re	NA		
De			
TNe			
SPEe			
SECu			
PSEe			
RNDe			
TPRe			
ICTe			
ICRe			
OCTe			
OCRe			
Ab			
Se			
RADe			
TAe			
WLe			
PRCSe			
INDRe			
IRe			
RATIO CORRECTION FACTOR (RCF)	1.003 .997	1	13 R1

REV 0	PREP TC	DATE 4-17-87	CHECK GE.	DATE 4/17/87	SHEET 17 C/O 18
REV 1	PREP 9/8m	DATE 4-7-93	CHECK [illegible]	DATE 5-3-93	SHEET 17 C/O 18
REV 2	PREP	DATE	CHECK	DATE	SHEET C/O

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

D E S I G N   I N P U T   D A T A

E) COMPONENT: Potential Transformer

#	NOTE
1.	See attachment number 7 for accuracy associated with the potential transformers.

R1

REV	PREP	DATE	CHECK	DATE	SHEET	C/O
1	GGM	4/29/93	[illegible]	5-3-93	18	18A

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA

D) COMPONENT DATA

VALID FOR DEVICES IDENTIFIED ON SHEET(S): 6A

COMPONENT: Potential Transformer CONTRACT #: ~~82582~~ 71-54499 DDM 6-7-93 REFERENCE #: 23

MANUFACTURER/MODEL: Type JVM-5 REFERENCE #: 23

INPUT RANGE & UNITS: NA NOTE #: ___ REFERENCE #: ___

OUTPUT RANGE & UNITS: NA NOTE #: ___ REFERENCE #: ___

OVERRANGE LIMIT: NA NOTE #: ___ REFERENCE #: ___

CALIBRATED SPAN: NA NOTE #: ___ REFERENCE #: ___

ROOM #/ PANEL #: Same as undervoltage Relays NOTE #: ___ REFERENCE #: ___

ELEVATION/ COORDINATE: ___ NOTE #: ___ REFERENCE #: ___

MIN/MAX ABNORMAL TEMP: ___ NOTE #: ___ REFERENCE #: ___

ACCIDENT TEMPERATURE: ___ NOTE #: ___ REFERENCE #: ___ R1

RADIATION TID (RAD): ___ NOTE #: ___ REFERENCE #: ___

RADIATION IAD (RAD): ___ NOTE #: ___ REFERENCE #: ___

INSTRUMENT TAP INFORMATION REFERENCE #: NA

WLHP TAP ELEVATION: NA WLHP CONDENSING POT ELEVATION: NA

WLLP TAP ELEVATION: NA WLLP CONDENSING POT ELEVATION: NA

EVENT/CATEGORY/OPERATING TIME: NOTE #: ___ REFERENCE #: ___

L / C / NA
RH/A / C / NA
CV/A / C / NA
AF / C / NA
AB / C / NA

10

REV 1	PREP DDM	DATE 6-1-93	CHECK [illegible]	DATE 6-11-93	SHEET 18A	C/O 18B
REV ___	PREP ___	DATE ___	CHECK ___	DATE ___	SHEET ___	C/O ___
REV ___	PREP ___	DATE ___	CHECK ___	DATE ___	SHEET ___	C/O ___

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA

D) COMPONENT DATA CONTINUED

COMPONENT: Potential Transformer (271A, 271B, 272A, 272B)

PARAMETER	VALUE/UNITS	NOTE #	REFERENCE #
Re	NA		
De			
TNe			
SPEe			
SECu			
PSEe			
RNDe			
TPRe			
ICTe			
ICRe			
OCTe			
OCRe			
Ab			
Se			
RADe			
TAe			
WLe			
PRCSe			
INDRe			
IRe			
Ratio Correction Factor (RCF)	1.003 .997	1	21a

R1

R6

11

REV	PREP	DATE	CHECK	DATE	SHEET	C/O
1	GBM	6-1-93	MWB	6-11-93	18B	18C
6	GJM	7-10-00	YM	7-31-00	18B	18C

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

DESIGN INPUT DATA

E) COMPONENT: Potential Transformer for 271A, 271B, 272A, 272B

#	NOTE
1.	See attachment number 10 for accuracy associated with the potential transformers.

R1

REV	PREP	DATE	CHECK	DATE	SHEET	C/O
1	GGM	6/01/93	JMP	6-11-93	18C	19

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

C O M P U T A T I O N S / A N A L Y S E S

A) PROCESS UNCERTAINTY DISCUSSION/CALCULATION

✓ NO PROCESS UNCERTAINTY EXISTS FOR THIS CALCULATION BECAUSE:

- ✓ THE MEASURED PARAMETER IS THE PARAMETER OF CONCERN; THEREFORE, PROCESS VARIATIONS ARE ACCOUNTED FOR IN THE DETERMINATION OF SAFETY AND/OR OPERATIONAL LIMITS.
- ___ OTHER: SEE DISCUSSION BELOW.

___ PROCESS UNCERTAINTY DOES EXIST AND IS DETAILED IN THE FOLLOWING DISCUSSION/CALCULATION.

REV 0	PREP JC	DATE 4-17-87	CHECK TOG.	DATE 4/17/87	SHEET 19	C/O 20
REV 1	PREP	DATE	CHECK	DATE	SHEET	C/O
REV 2	PREP	DATE	CHECK	DATE	SHEET	C/O

COMPUTATIONS/ANALYSES

B) WATERLEG UNCERTAINTY DISCUSSION/CALCULATION

✓ APPLICABLE TO ALL LOOPS LISTED ON SHEET 6.

___ APPLICABLE ONLY TO LOOPS: ___

✓ WATERLEG UNCERTAINTY IS NOT CONSIDERED FOR THE CALCULATION BECAUSE:

✓ NO WATERLEG EXISTS FOR THIS CALCULATION.

___ THE EFFECTS OF WATERLEG CHANGES ARE INSIGNIFICANT. SEE DISCUSSION/CALCULATION BELOW.

___ OTHER. SEE DISCUSSION/CALCULATION BELOW.

___ A WATERLEG UNCERTAINTY DOES EXIST FOR THIS LOOP. SEE CALCULATION/DISCUSSION BELOW.

___ SEE SENSING LINE DIAGRAM ON SHEET ___ OF THIS CALCULATION.

COMPUTATIONS/ANALYSES

C) ACCURACY DISCUSSION

___ The accuracy of this instrument for normal, post seismic and accident conditions will be determined by considering the parameters tabulated in the design input section of this calculation.

The accuracy calculation for seismic (As) is bounding for all seismic events.

✓ The square root of the sum of the squares method shall be used in this calculation for calculating accuracy since the factors affecting accuracy are independent variables.

___ Bi-directional errors and uni-directional errors will be combined in a manner such that the sum of the positive uni-directional errors will be added to the positive portion of the bi-directional error (obtained from the square root of the sum of the squares method), and the sum of the negative uni-directional errors will be added to the negative portion of the bi-directional error.

This method is conservative. Therefore, it will be used in this calculation.

Example: (+/-)10 = bi-directional error
+5 = first uni-directional error
-2 = second uni-directional error

Total Error = (+10 +5) to (-10 -2) = +15 to -12

✓ other: The RCP undervoltage portion of this calculation is performed per the methodology defined in the Westinghouse Setpoint Methodology (Ref. 22). R4

For the purpose of this calculation, accuracy is defined as the range of actual process values that may exist for a given indicated or bistable trip value, e.g. an accuracy of +10 psig to -5 psig means that for a indicated or bistable trip value of 100 psig, the actual process pressure may be anywhere between 95 and 110 psig.

All system analysis based on or using accuracy values from this calculation should take into account the fact that operator action and/or automatic initiations may occur at a process value differing from the indicated or setpoint values by the amount of the calculated inaccuracies.

REV 0	PREP JC	DATE 4-17-87	CHECK WG	DATE 4/17/87	SHEET 21	C/O 22
REV ~~1~~ 4	PREP [illegible]	DATE 7-18-00	CHECK JMB	DATE 7-19-00	SHEET 21	C/O 22
REV 2	PREP	DATE	CHECK	DATE	SHEET	C/O

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

COMPUTATIONS / ANALYSES
C) ACCURACY DISCUSSION (CONTINUED)

X The following devices are calibrated individually.
Their Acceptance Bands are as follows:

DEVICE	Ab	REFERENCE
271A, B; 272A, B	±0.2% of value	Ab_{493} - See Sheet 9
27DAT, 27DBT, 27DCT	±0.5% of value	See Sheet 9
27TS1A, B, C	±0.5% of value	See Sheet 11B
Time Delay Relay	±10% of SP	See Sheet 13
PT	NA	

R9

____ The following devices are calibrated together.
The Acceptance Band for the combination of these devices are as follows:

DEVICE	Ab	REFERENCE

COMPUTATIONS/ANALYSES
C) ACCURACY DISCUSSION (CONTINUED)

PICKUP VERSUS DROPOUT VALUE DETERMINATION

Relays 27DAT
27DBT
27DCT

Per reference number 14 set point for shutdown buss transfer must be greater than 6400 volts.

6456.0 volts was picked to be the undervoltage drop out value.

Drop out value is defined as 99.5% of the undervoltage relay pick up value.

Pick up value is
6456.0 / .995 = 6488.4 volts

The undervoltage relays sense the buss voltage on the secondary of a potential transformer.

Drop out value / transformer ratio of 60 = 107.6 volts

Pick up value / transformer ratio of 60 = 108.1 volts

Rounding to the tenths place results in the following values to be used in this calculation.

Drop out = 107.6 volts or 6456.0 volts

Pick up = 108.1 volts or 6488.4 volts

R1

PICKUP VERSUS DROPOUT VALUE DETERMINATION

Relays 27TS1A
27TS1B
27TS1C

Per reference number 15 set point for shutdown buss transfer is 80.0% of 6900 volts.

.80 x 6900 = 5520.0 volts

The above value is the undervoltage relay drop out value. Differential between Operate (drop out) and Reset (pickup) voltages is not adjustable and is approximately 3% (Reference 26).

Pickup value is approximately
5520.0 x 103% =5685.6

The undervoltage relays sense the buss voltage on the secondary of a potential transformer.

Drop out value / transformer ratio of 60 = 92.0 volts R2

Pick up value / transformer ratio of 60 = 94.76 volts

The following values will be used in this calculation.

Drop out = 92.0 volts or 5520.0 volts

Pick up ≈ 94.76 volts or 5685.6 volts

COMPUTATIONS/ANALYSES
C) ACCURACY DISCUSSION (CONTINUED)

Relays	271A	RCP Loop 1
	271B	RCP Loop 2
	272A	RCP Loop 3
	272B	RCP Loop 4

Per reference number 18, set point must be greater than 4739 VAC.

5022 VAC is the undervoltage drop out value.

Drop out value is defined as 99% of the undervoltage relay pick up value.

Pick up value is
5022 / .99 = 5072.727 volts

The pickup value will be rounded up to 5076 volts to allow the secondary value to be 84.6 volts instead of (5072.727/60) 84.545 which also agrees with the requirements listed on page 7D.

The undervoltage relays sense the buss voltage on the secondary of a potential transformer. R1

Drop out value / transformer ratio of 60 = 83.7 volts

Pick up value / transformer ratio of 60 = 84.6 volts

The following values will be used in this calculation.

Drop out = 83.7 volts (Secondary) or 5022 volts (Primary)

Pick up = 84.6 volts (Secondary) or 5076 volts (Primary)

COMPUTATIONS/ANALYSES
D) ACCURACY CALCULATION INDEX

A. UNDER VOLTAGE RELAY
I. A_n/A_s (%)
II. A_n/A_s (Volts)
A. Pick up
B. Drop out } 27DAT, 27DBT, 27DCT
C. Pick up
D. Drop out } 27TSIA, 27TSIB, 27TSIC
III. PT errors
A. Pick up
B. Drop out } 27DAT, 27DBT, 27DCT
C. Pick up
D. Drop out } 27TSIA, 27TSIB, 27TSIC
IV. Under Voltage Transfer: Total Errors
A. Pick up
B. Drop out } 27DAT, 27DBT, 27DCT
C. Pick up
D. Drop out } 27TSIA, 27TSIB, 27TSIC R1

B. TIME DELAY RELAY
~~I. TN_e (Bias)~~ R2
II. A_n (%) and S_e (%)
III. Time Delay for DV1 and DV2 and A_s (%) R2

C. ~~Drift – Undervoltage Relay~~
D. RCP Under Voltage Relays 271A, 271B, 272A, 272B
I An/As volts
II PT Errors
III Total Errors

COMPUTATIONS / ANALYSES
D) ACCURACY CALCULATIONS

A. UNDER VOLTAGE RELAY 271A, 271B, 272A, 272B

I.) An = As: (Relay values)

Per Westinghouse Setpoint Methodology

$An = CSA = \pm((RCA + RD + RMTE + RCSA)^2 + (PSEe)^2 + (RTE)^2)^{1/2}$

Re is RCA
De is RD
ICTe is RMTE
Ab is RCSA
TNe is RTE

$An = As = \pm((Re + De + ICTe + Ab)^2 + PSEe^2 + TNe^2)^{1/2}$

$An = As = \pm((0.2 + 0.5 + 0.2 + 0.5)^2 + (0.2)^2 + (0.2)^2)^{1/2}$

$An = As = \pm((1.4)^2 + (0.2)^2 + (0.2)^2)^{1/2}$

$An = As = \pm1.4\%$ of setpoint An = As = Anf

Acceptable-As-Found, Component (Afc)

Per Reference 33, the TSTF-493 acceptable as-found will be the SRSS combination of the Re, M&TE error (ICTe and OCTe), M&TE readability error (ICRe and OCRe), and De. R9

$Afc = \pm(Re^2 + De^2 + ICTe^2)^{1/2}$

$Afc = \pm(0.2\%^2 + 0.5\%^2 + 0.2\%^2)^{1/2}$

$Afc = \pm0.57\%$ of setpoint

COMPUTATIONS / ANALYSES
D) ACCURACY CALCULATIONS

A. UNDER VOLTAGE RELAY (continued)

I.) An = As: (Relay values) (27DAT, 27DBT, 27DCT)

$An = As = \pm(Re^2 + De^2 + TNe^2 + PSEe^2 + ICTe^2 + Ab^2)^{1/2}$

$An = As = \pm(0.2\%^2 + 0.5\%^2 + 0.2\%^2 + 0.2\%^2 + 0.2\%^2 + 0.5\%^2)^{1/2}$

<u>An = As = ±0.81% of setpoint</u> An = As = Anf

An = As: (Relay values) (27TS1A, 27TS1B, 27TS1C)

$An = As = \pm(Re^2 + De^2 + TNe^2 + PSEe^2 + ICTe^2 + Ab^2)^{1/2}$

$An = As = \pm(0.25\%^2 + 1.9\%^2 + 0.54\%^2 + 2.0\%^2 + 0.2\%^2 + 0.5\%^2)^{1/2}$

<u>An = As = ±2.873% of setpoint</u> An = As = Anf

Per Reference 33, the TSTF-493 acceptable as-found will be the SRSS combination of the Re, M&TE error (ICTe and OCTe), M&TE readability error (ICRe and OCRe), and De.

Acceptable-As-Found, Component (Afc)

$Afc = \pm(Re^2 + De^2 + ICTe^2)^{1/2}$

$Afc = \pm(0.25\%^2 + 1.9\%^2 + 0.2\%^2)^{1/2}$

<u>Afc = ±1.926% of setpoint</u> R9

II.) An = As: (6900V Buss Voltage)
<u>27DAT, 27DBT, 27DCT</u> R9

A.) PICK UP:

An = As = ±| | [(setpoint) (1 ± error) (transformation ratio)] | - [6488.4] |

An = As = ±| | [(108.1) (1 ± 0.81%) (60)] | - [6488.4] |

<u>An = As = ±52.56 VAC</u> for primary; or ±52.56 / 60 = ±0.876 VAC for secondary

B.) DROP OUT:

An = As = ±| | [(setpoint) (1 ± error) (transformation ratio)] | - [6456] |

An = As = ±| | [(107.6) (1 ± 0.81%) (60)] | - [6456] |

<u>An = As = ±52.29 VAC</u> for primary; or ±52.29 / 60 = ±0.872 VAC for secondary

COMPUTATIONS / ANALYSES
D) ACCURACY CALCULATIONS

II.) An = As: (6900V Buss Voltage) continued
27TS1A, 27TS1B, 27TS1C

C.) PICK UP:
An = As = ±| | [(setpoint) (1 ± error) (transformer ratio)] | - [5685.6] |
An = As = ±| | [(94.76) (1 ± 2.873%) (60)] | - [5685.6] |
An = As = ±| [5848.95] - 5685.6 |
An = As = ±163.35 VAC for primary; or ±163.35 / 60 = ±2.72 VAC for secondary

D.) DROP OUT:
An = As = ±| | [(setpoint) (1 ± error) (transformer ratio)] | - [5520] |
An = As = ±| | [(92) (1 ± 2.873%) (60)] | - [5520] |
An = As = ±| [5678.59] – 5520 |
An = As = ±158.59 VAC for primary; or ±158.59 / 60 = ±2.64 VAC for secondary

Afc = ±| | [(setpoint) (1 ± error) (transformer ratio) | - [5520] | R9
Afc = ±| | [(92) (1 ± 1.926%) (60)] | - [5520] |
Afc = ±106.31 VAC for primary; or ±106.31 / 60 = ±1.77 VAC for secondary

COMPUTATIONS/ANALYSES
D) ACCURACY CALCULATIONS

III.) PT ERRORS:

A.) PICK UP:

(SETPOINT)(TRANSFORMATION RATIO)(RATIO CORRECTION FACTOR) − [6488.4] = ± PT ERRORS

$|(108.1)(60)(1 \pm .003)| - 6488.4 = \pm$ PT errors

± PT errors = ± 19.47 VAC for Primary; or $\frac{\pm 19.47}{60} = \pm .325$ VAC for Secondary

R1

B) DROP OUT:

(SETPOINT)(TRANSFORMATION RATIO)(RATIO CORRECTION FACTOR) − 6456 = ± PT errors

$(107.6)(60)(1 \pm .003) - 6456 = \pm$ PT errors

PT errors = ± 19.37 VAC for Primary; or $\frac{\pm 19.37}{60} = \pm .323$ VAC for Secondary

R1

C. Pickup (27TS1A, 27TS1B, 27TS1C)

(Setpoint)(Transformer ratio)(Ratio correction factor) − Pickup voltage = ± PT errors

[(94.76)(60)(1±.003)] − 5685.6 = ± PT errors

± PT errors = ± 17.06 VAC for Primary; or ± 17.06/60 = ±.284 VAC for Secondary

R2

D. Dropout (27TS1A, 27TS1B, 27TS1C)

(Setpoint)(Transformer ratio)(Ratio correction factor) − Dropout voltage = ± PT errors

[(92.0)(60)(1±.003)] − 5520 = ± PT errors

± PT errors = ± 16.56 VAC for Primary; or ± 16.56/60 = ± .276 VAC for Secondary

COMPUTATIONS/ANALYSES

D) ACCURACY CALCULATION

IV. UNDERVOLTAGE TRANSFER: TOTAL ERRORS

A.) Pickup: (27DAT,27DBT,27DCT)

$$LAn = LAs = \pm\ ((An/As)^2_{Relay} + PT^2_{Errors})^{1/2}$$

$$LAn = LAs = \pm\ (52.56^2 + 19.47^2)^{1/2}$$

$LAn = LAs = \pm$ 56.05 VAC for primary;
or ±56.05/60 = ±.934 VAC for secondary

B.) Dropout: (27DAT,27DBT,27DCT)

$$LAn = LAs = \pm\ ((An/As)^2_{Relay} + PT^2_{Errors})^{1/2}$$

$$LAn = LAs = \pm\ (52.29^2 + 19.37^2)^{1/2}$$

$LAn = LAs = \pm$ 55.77 VAC for primary;
or ±55.77/60 = ±.93 VAC for secondary

C.) Pickup: (27TS1A,27TS1B,27TS1C)

$$LAn = LAs = \pm\ ((An/As)^2_{Relay} + PT^2_{Errors})^{1/2}$$

$$LAn = LAs = \pm\ (163.35^2 + 17.06^2)^{1/2}$$

$LAn = LAs = \pm$ 164.24 VAC for primary;
or ±164.24/60 = ±2.74 VAC for secondary

R2

D.) Dropout: (27TS1A,27TS1B,27TS1C)

$$LAn = LAs = \pm\ ((An/As)^2_{Relay} + PT^2_{Errors})^{1/2}$$

$$LAn = LAs = \pm\ (158.59^2 + 16.56^2)^{1/2}$$

$LAn = LAs = \pm$ 159.45 VAC for primary;
or ±159.45/60 = ±2.66 VAC for secondary

COMPUTATIONS / ANALYSES
D) ACCURACY CALCULATION

V. ALLOWABLE VALUES

Note: Since the PT device is not measured, it will be treated as "unmeasureable". Therefore, Adbe in the Av calculation will be defined as loop accuracy (LAn).

$An_{relay} = Anf_{relay}$

Av(max) = Al - (Adbe - Anf) = Increasing Setpoint Max Limit

Av(max) = Al + (Adbe - Anf) = Decreasing Setpoint Max Limit

A. 27DAT 27DBT 27DCT (6.9 KV SDBD Degraded Voltage Transfer to DG)

Determination of Av for Upper Operational Limit

Dropout +Av = operating limit (oplim) - (LAn - Anf_{relay})

oplim := 6526.0 LAn := 55.77 Anf_relay := 52.29

Av := oplim − (LAn − Anf_relay)

Av = 6522.52 volts

R5

Rounding down to tenths, Tech Spec defined Allowable Value

Tech_Spec_Av := (Av)

Tech_Spec_Av = 6522.5 volts

Determination of Av for Lower Safety Limit

Dropout -Av = safety limit(saflim) + (LAn - Anf_{relay})

saflim := 6400

Av := saflim + (LAn − Anf_relay)

Av = 6403.48 volts

Rounding up to tenths, Tech Spec defined Allowable Value

Tech_Spec_Av := (Av)

Tech_Spec_Av = 6403.5 volts

B. 2TS1A 27TS1B 27TS1C 6.9 KV SDBD Loss of Voltage Transfer to DG

Determination of Av for Lower Safety Limit

Dropout $-Av_{max}$ = safety limit + (LAn - Anf_{relay})

saflim := 5300 LAn := 159.45 Anf_relay := 158.59

Av_max := saflim + (LAn − Anf_relay)

Av_max = 5300.86 volts

Dropout $-Av_{min}$ = setpoint - LAn

setpoint := 5520

Av_min := setpoint − LAn

Av_min = 5360.55 volts

For conservatism, this calculation will use a value between the max and min for -Av.

-Av = 5331 VAC for Primary; or 5331/60 = 88.85 VAC for secondary.

COMPUTATIONS / ANALYSES
D) ACCURACY CALCULATION

V. ALLOWABLE VALUES

B. (Continued) 27TS1A 27TS1B 27TS1C (6.9 KV SDBD Loss of Voltage Transfer to DG) | R6

Determination of Av for Upper Operational Limit
Dropout $+Av_{max}$ = operational limit(oplim) - (LAn - Anf_{relay})

oplim := 5700

Av_max := oplim − (LAn − Anf_relay)

Av_max = 5699.14 volts

Dropout $+Av_{min}$ = setpoint + Anf

setpoint := 5520
Av_min := setpoint + Anf_relay

Av_min = 5678.59 olts

The difference between Av_max and Av_min is smaller than the value of LAn, therefore this calculation will use a value between the max and min for +Av.

$$Av := \frac{Av\_max + Av\_min}{2}$$

Av = 5688.9 volts

Rounding down for conservatism the Tech Spec value will be this determined Allowable Value.

Tech_Spec_Av := floor(Av)

Tech_Spec_Av = 5688 volts

$$Secondary := \frac{Tech\_Spec\_Av}{60}$$

Secondary = 94.8 volts

The Tech Spec value will be 5688 VAC for Primary; or 94.8 VAC for Secondary.

COMPUTATIONS/ANALYSES

D) ACCURACY CALCULATION

B. Time Delay Relay

II) An

$$An = \pm (Re^2 + De^2 + TNe^2{}_{(Random)} + Ab^2)^{1/2} \pm TNe_{(Bias)}$$

$$= \pm (10^2 + 2.7^2 + 7.2^2 + 10^2)^{1/2} \pm 5.6\ \%$$

$$= \pm (16.1\ \%) \pm 5.6\ \%$$

$$= \pm 21.7\ \%\ SP$$

R2

Anf = An

An = As

C O M P U T A T I O N S / A N A L Y S E S

D) ACCURACY CALCULATION

III) DV1 and DV2

T_D = 300 Sec ± 21.7 % SP

= 300 Sec ± 65.1 Sec

T_D(max) = 365.1 Sec

V) ALLOWABLE VALUES

DV1 and DV2

$+ Av_{(MAX)}$ = Al - (Adbe - Anf) Adbe = As
= limit - (Adbe - Anf)
= 370 - (65.1 - 65.1)
= 370 Sec

$-Av_{(MAX)}$ = Al + (Adbe - Anf) Adbe = As
= limit + (Adbe - Anf)
= Lower limit + (65.1 - 65.1)
= Lower limit Seconds
Note: Lower Limit not used because the setpoint value is much higher, to avoid unnecessary Diesel Generator Startups. R7

TECH SPEC. ALLOWABLE VALUE SELECTION

Determination of a more conservative Tech Spec allowable value instead of -Av(max) is deemed necessary. A value much higher than the $-Av_{(MAX)}$ will satisfy the concern of having a set point which is too close to normal operating values which would result in an unnecessary Diesel Generator Start. Therefore, a value of Anf plus 25% from the setpoint will be used as follows:

-Av(TS) (Tech Spec allowable value) = setpoint - (125% x Anf)
= 300 - (1.25 x 65.1)
= 300 - 81.375
= 218.6 seconds

REV 1	PREP GGM	DATE 5/07/93	CHECK LMB	DATE 5-13-93	SHEET 27A	C/O 27B
REV 2	PREP GGM	DATE 7/17/95	CHECK LMB	DATE 10/27/95	SHEET 27A	C/O 28
REV 4	PREP GGM	DATE 6/22/00	CHECK LMB	DATE 7/26/00	SHEET 27A	C/O 28
REV 7	PREP GGM	DATE 10/5/12	CHECK [illegible]	DATE 12/31/12	SHEET 27A	C/O 28

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

COMPUTATIONS/ANALYSES

D) ACCURACY CALCULATIONS

DRIFT ANALYSIS FOR UNDERVOLTAGE RELAY

BOARD 1A-A

DAT

	3-19-86	9-27-85	3-13-85	9-21-84	3-15-84
A fPU	109.9	110.0	110.4	109.68	109.51
ALPU	109.9	110.0	109.96	110.03	110.03
A fDO	109.2	109.35	109.8	108.97	108.79
ALDO	109.2	109.35	109.32	109.32	109.32

DBT

	3-19-86	9-27-85	3-13-85	9-21-84	3-15-84
A fPU	110.2	110.2	110.5	109.59	109.51
A LPU	110.2	110.2	110.14	110.02	110.03
A fDO	109.2	109.25	109.6	108.84	108.79
AL DO	109.2	109.25	109.24	109.34	109.32

DCT

	3-19-86	9-27-85	3-13-85	9-21-85	3-15-84
A fPU	110.0	109.95	110.5	109.71	109.56
A LPU	110.0	109.95	109.99	109.98	110.06
A fDO	109.2	109.25	109.8	108.95	108.87
ALDO	109.2	109.25	109.3	109.28	109.32

NOTE: ALL DATA ON THIS ~~AND~~ FOLLOWING PAGES FROM Ref. 7

REV 0	PREP TC	DATE [illegible]	CHECK TGG	DATE 4/17/87	SHEET 28	C/O 29
REV 1	PREP	DATE	CHECK	DATE	SHEET	C/O
REV 2	PREP	DATE	CHECK	DATE	SHEET	C/O

COMPUTATIONS/ANALYSES

D) ACCURACY CALCULATIONS

BOARD 1B-B

DAT

	4-8-86	9-12-85	3-20-85	9-19-84	3-20-84
Afpu	110.1	110	111.11	110.4	109.6
ALpu	110.1	110	110.9	110.0	110.0
AfDO	109.3	109.3	110.29	109.75	108.5
ALDO	109.3	109.3	109.33	109.3	109.3

DBT

	4-8-86	9-12-85	3-20-85	9-19-84	3-20-84
Afpu	110.2	110.1	111.28	110.4	109.2
ALpu	110.2	110.1	110.09	110.0	110.0
AfDO	109.3	109.3	110.39	109.74	108.5
ALDO	109.3	109.3	109.29	109.3	109.3

DCT

	4-8-86	9-12-85	3-20-85	9-19-84	3-20-84
Afpu	110.1	110.1	111.19	110.4	109.2
ALpu	110.1	110.1	110.09	110.0	110.0
AfDO	109.2	109.3	110.38	109.77	108.5
ALDO	109.2	109.3	109.29	109.3	109.3

C O M P U T A T I O N S / A N A L Y S E S

D) ACCURACY CALCULATIONS

BOARD 2A-A

DAT

	3-19-86	9-27-85	7-13-85	3-14-85	9-24-84	3-14-84
AfPY	110.0	110.1	110.0	110.5	109.57	109.59
ALPY	110.0	110.1	110.0	110.0	110.03	110
AfDO	109.3	109.35	109.3	109.6	108.94	108.88
ALDO	109.3	109.35	109.3	109.3	109.35	109.3

DBT

	3-19-86	9-27-85	7-13-85	3-14-85	9-24-84	3-14-84
AfPY	110.1	110.0	110.0	110.45	109.67	109.56
ALPY	110.0	110.0	110.0	109.99	110.02	110
AfDO	109.4	109.35	109.3	109.54	108.95	108.86
ALDO	109.3	109.35	109.3	109.3	109.28	109.27

DCT

	3-19-86	9-27-85	7-13-85	3-14-85	* 9-24-84	3-14-84
AfPY	110.0	110.0	110.0	110.3	109.59	109.59
ALPY	110.0	110.0	110.0	110.0	110.04	110.04
AfDO	109.3	109.35	109.3	109.4	108.92	108.89
ALDO	109.3	109.35	109.3	109.3	109.33	109.32

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

COMPUTATIONS/ANALYSES
D) ACCURACY CALCULATIONS

BOARD 2B-B

DAT

	4-3-86	9-12-85	3-19-85	9-19-84	3-20-84
AfPY	109.9	110.1	111.18	110.55	109.5
ALPY	109.9	110.0	110.05	110.0	110.0
AfDO	109.3	109.4	110.26	109.8	108.8
ALDO	109.3	109.3	109.35	109.3	109.3

9-3-86

DBT

	9-3-86	9-12-85	3-19-85	9-19-84	3-20-84
AfPY	110.0	110.0	111.25	110.37	109.9
ALPY	110.0	110.0	110.04	110.0	110.0
AfDO	109.3	109.4	110.35	109.76	108.75
ALDO	109.3	109.3	109.35	109.8	109.3

DCT

	9-3-86	9-12-85	3-19-85	9-19-84	3-20-84
ALPY	110.0	110.0	111.15	110.35	109.4
ALPY	110.0	110.0	110.4	110.0	110.0
AfDO	109.3	109.4	110.34	109.77	108.75
ALDO	109.3	109.3	109.34	109.3	109.3

REV 0	PREP 7c	DATE 4/17/87	CHECK GG.	DATE 4/17/87	SHEET 31 C/O 32
REV 1	PREP	DATE	CHECK	DATE	SHEET C/O
REV 2	PREP	DATE	CHECK	DATE	SHEET C/O

BRANCH/PROJECT IDENTIFIER 27 DAT
DEMONSTRATED ACCURACY CALCULATION

COMPUTATIONS/ANALYSES
D) ACCURACY CALCULATIONS

BOARD 1A-A

PICK UP DEVIATIONS:

DAT	% of SP	DBT	% of SP	DCT	
-.35	-.32%	-.49	-.45%	-.35	-.32%
+.37	+.34%	+.48	+.44%	+.52	+.47%
+.04	+.04%	+.06	+.05%	+.01	+.01%
-.10	-.09%	0	0	+.05	+.05%

DROP OUT DEVIATIONS:

DAT	% of SP	DBT		DCT	
-.35	-.32%	-.44	-.40%	-.37	-.34%
+.48	+.44%	+.26	+.24%	+.52	+.48%
+.03	+.03%	+.01	+.01%	-.05	-.05%
-.15	-.14%	-.05	-.05%	-.05	-.05%

REV 0	PREP SL	DATE 4/17/87	CHECK TOG.	DATE 4/17/87	SHEET 32 C/O 33
REV 1	PREP	DATE	CHECK	DATE	SHEET C/O
REV 2	PREP	DATE	CHECK	DATE	SHEET C/O

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

COMPUTATIONS/ANALYSES
D) ACCURACY CALCULATIONS

BOARD 1B-B

PICK UP DEVIATIONS:

DAT	% of SP	DBT	% of SP	DCT	
+.40	+.36	+.4	+.36%	+.40	+.36%
+1.11	+1.01%	+1.29	+1.17%	+1.19	+1.08% *
-0.90	-.82%	+.01	+.01%	+.01	+.01%
+.10	+.09%	+.10	+.09%	0	0

DROP OUT DEVIATIONS

DAT	% of SP	DBT		DCT	
+.95	+.91%	+.44	+.40%	+.47	+.93%
+.99	+.91%	+1.09	+1.0%	+1.08	+.99% *
-.03	-.03%	+.01	+.01%	+.01	+.01%
0	0	0	0	-.10	-.09%

* THIS DATA IS SO INCONSISTANT WITH THE REST OF THE DATA THAT IT IS FELT IT IS THE RESULT OF A MISCALIBRATION. THIS IS SUPPORTED BY THE FACT THAT THREE DIFFERENT RELAYS, CALIBRATED BY THE SAME TECHNICIANS, SHOW SUCH SIMILAR VALUES. DUE TO THIS FACT, THESE VALUES WILL NOT BE FURTHER UTILIZED.

REV 0	PREP [illegible]	DATE [illegible]	CHECK TGG	DATE 4/17/87	SHEET 33	C/O 34
REV 1	PREP	DATE	CHECK	DATE	SHEET	C/O
REV 2	PREP	DATE	CHECK	DATE	SHEET	C/O

COMPUTATIONS/ANALYSES

D) ACCURACY CALCULATIONS

BOARD 2A-A

PICK UP DEVIATIONS:

DAT	% of SP	DBT		DCT	
-.43	-.39%	-.33	-.30%	-.45	-.41%
+.47	+.43%	+.43	+.39%	+.26	+.24%
-.10	-.09%	+.10	+.09%	+/- 0	0

DROP OUT DEVIATIONS

DAT	% of SP	DBT		DCT	
-.36	-.33%	-.32	-.29%	-.40	-.37%
+.25	+.23%	+.26	+.24%	+.07	+.06%
-.05	-.05%	+.05	+.05%	-.05	-.05%

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COMPUTATIONS/ANALYSES
D) ACCURACY CALCULATIONS

BOARD 2B-B

PICK UP DEVIATIONS:

DAT	% of SP	DBT		DCT		
+.55	+.5%	+.37	+.34%	+.35	+.32%	
+1.18	+1.07%	+1.25	+1.14%	+1.15	+1.05%	*
+.05	+.05%	-.04	-.04%	-.4	-.36%	
-.10	-.09%	0	0	0	0	

DROP OUT DEVIATIONS:

DAT	% of SP	DBT		DCT		
+.5	+.46%	+0.46	+.42%	+.47	+.43%	
+.96	+.89%	+1.07	+.98%	+1.04	+.95%	*
+.05	+.05%	+.06	+.05%	+.06	+.05%	
0	0	0	0	0	0	

* THIS DATA IS SO INCONSISTENT WITH THE REST OF THE DATA THAT IT IS FELT IT IS THE RESULT OF A MISCALIBRATION. THIS IS SUPPORTED BY THE FACT THAT THREE DIFFERENT RELAYS, CALIBRATED BY THE SAME TECHNICIANS, SHOW SUCH SIMILAR VALUES. DUE TO THIS FACT, THESE VALUES WILL NOT BE FURTHER UTILIZED.

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

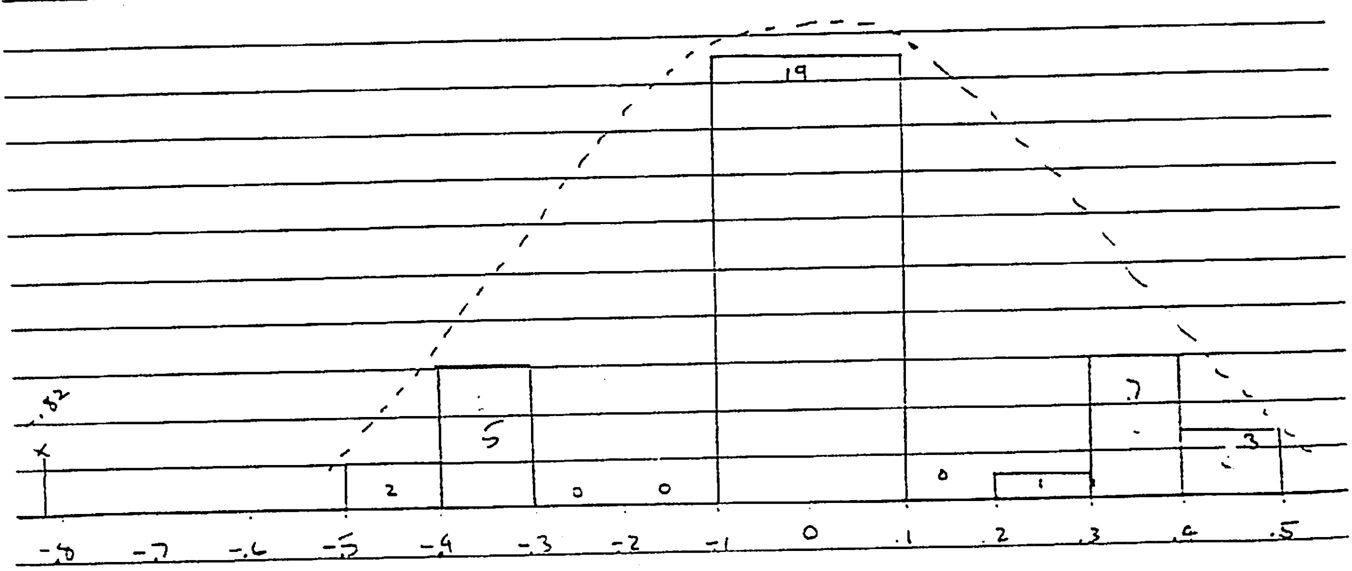
C O M P U T A T I O N S / A N A L Y S E S
D) ACCURACY CALCULATIONS

PICK UP - HISTOGRAM

0 = 5
0 > -.1 = 4
-.1 > -.2 = 0
-.2 > -.3 = 0
-.3 > -.4 = 5
-.4 > -.5 = 2
≥ -.5 = 0

0 < .1 = 10
.1 < .2 = 0
.2 < .3 = 1
.3 < .4 = 7
.4 < .5 = 3
≥ .5 = 1

-.82 = 1



FROM THE HISTOGRAM IT IS SEEN THAT THE -.82 VALUE IS AN ANOMALY AND THEREFORE THERE IS A CASE FOR CONSIDERING IT STATISTICALLY INVALID. ALSO, IT IS SEEN THAT THE HISTOGRAM EXHIBITS A GAUSIAN DISTRIBUTION, WITH LIMITS ≤ |5|, AND A MEAN OF 0.

REV	0	PREP	[illegible]	DATE	[illegible]	CHECK	[illegible]	DATE	4/17/87	SHEET 36	C/O 37
REV	1	PREP		DATE		CHECK		DATE		SHEET	C/O
REV	2	PREP		DATE		CHECK		DATE		SHEET	C/O

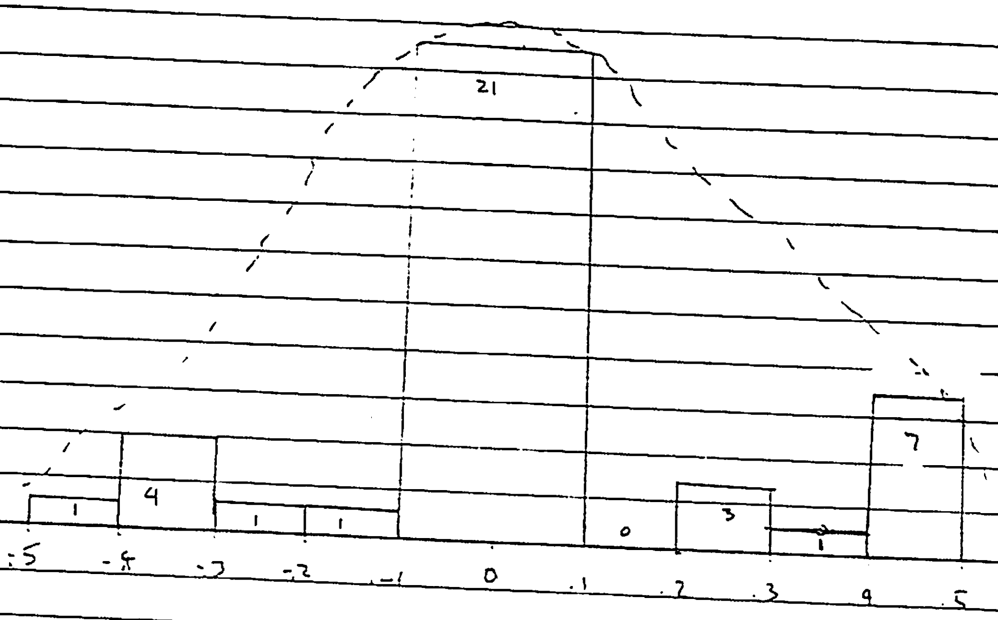
BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

COMPUTATIONS/ANALYSES

D) ACCURACY CALCULATIONS

DROP OUT - HISTOGRAM

0 = 5	
0 > -.1 = 2	0 < .1 = 9
-.1 > -.2 = 1	.1 < .2 = 0
-.2 > -.3 = 1	.2 < .3 = 3
-.3 > -.4 = 4	.3 < .4 = 1
-.4 > -.5 = 1	.4 < .5 = 7
< -.5 = 0	> .5 = 0



THE DISTRIBUTION HAS LIMITS ≤ .48 AND EXHIBITS A GAUSSIAN SHAPE

REV 0	PREP ?C	DATE 4-17-87	CHECK WG	DATE 4/17/87	SHEET 37	C/O 38
REV 1	PREP	DATE	CHECK	DATE	SHEET	C/O
REV 2	PREP	DATE	CHECK	DATE	SHEET	C/O

COMPUTATIONS/ANALYSES
D) ACCURACY CALCULATIONS

DRIFT – CONCLUSION:

FROM THE PRECEEDING PAGES, DATA FROM THE PLANT FOR THE SPECIFIC RELAYS ADDRESSED BY THIS CALCULATION WAS EXAMINED TO DETERMINE THE NATURE AND MAGNITUDE OF DRIFT FOR THE UNDERVOLTAGE RELAYS. THE SIX MONTH INTERVALS FROM 1984 TO 1986 EXAMINED INDICATE THAT THE DRIFT IS RANDOM ABOUT A MEAN OF ZERO WITH LIMITS OF -.5 TO +.5 VOLTS PER 6 MONTHS.

In addition, field data on drift from 1986 to 1992/1993 taken on approximately 18 months intervals demonstrates that drift is not time dependent. Reference attachment number 8. Therefore the calibration frequency shall be 22.5 months or less. The calculated drift values in attachment number 8 are bounded by the previous drift analysis values. In the calculation the more conservative values of ±.5 will continued to be used. R1

COMPUTATIONS / ANALYSES
D) ACCURACY CALCULATIONS

D. RCP UNDER VOLTAGE RELAY (271A, 271B, 272A, 272B)
From Section A.I. An = As = ±1.4% of Setpoint An = As = Anf

I. Under voltage Relay, An = As

A). Pick up

An = As = ±Setpoint x Error
= ±5076 x 0.014
= ±71.06 VAC for Primary or ±71.06 / 60 = ±1.184 VAC for Secondary.

B). Drop out

An = As = ±Setpoint x Error
= ±5022 x 0.014
= ±70.31 VAC for Primary or ±70.31 / 60 = ±1.172 VAC for Secondary.

From Section A.I. Afc = ±0.57% of Setpoint
Afc = ±Setpoint x Error
= ±5022 x 0.0057
= ±28.62 VAC for Primary or ±28.62 / 60 = ±0.47 VAC for Secondary. R9

II. PT Errors

A). Pick up

An = As = ±Setpoint x Error
= ±5076 x 0.003
= ±15.23 VAC for Primary or ±15.23 / 60 = ±0.254 VAC for Secondary.

B). Drop out

An = As = ±Setpoint x Error
= ±5022 x 0.003
= ±15.07 VAC for Primary or ±15.07 / 60 = ±0.251 VAC for Secondary.

III. Under voltage transfer: Total Errors
$LAn = Las = \pm((An/As)^2 relay + PT^2 errors)^{1/2}$

A). Pick up

$LAn = LAs = \pm(71.06^2 + 15.23^2)^{1/2}$
LAn = LAs = ±72.68 VAC for Primary or ±72.68 / 60 = ±1.211 VAC for Secondary

A). Drop out

$LAn = LAs = \pm(70.31^2 + 15.07^2)^{1/2}$
LAn = LAs = ±71.90 VAC for Primary or ±71.90 / 60 = ±1.198 VAC for Secondary

COMPUTATIONS / ANALYSIS
D. ACCURACY CALCULATION

IV. Allowable Values

Note: Since the PT device is not measured, it will be treated as "unmeasurable". R3

271A, 271B, 272A ,272B

A. Pickup ~~+Av = limit - (LAn Anf...)~~

N/A ~~= 6600 - (43.85 - 41.12)~~
~~+Av = 6597.27 VAC for Primary, or 6597.27/60~~
~~= 109.95 VAC for Secondary~~

B. Dropout

The Tech Spec allowable value (Av) is defined by the Westinghouse Setpoint Methodology (Ref. 22) as;

T_1 = (RCA + RD + RMTE + RCSA)

converted to TVA Methodology
T_1 = (Re + De + ICTe +Ab)

T_1 = (.2 + .5 + .2 + .5)
= (1.4)
= 1.4 % of Setpoint
= .014 x 5022 = 70.3 VAC for Primary

$T_2 = TA - \{PMA^2 + PEA^2 + (SCA+SMTE+SD)^2 + SPE^2 + STE^2 + RTE^2\}^{1/2} - EA$
TA=Total Allowance=Setpoint-Reactor Trip Safety Limit =5022-4692=330 volts. This loop involves the relay and a potential transformer. The above error terms are evaluated for applicability. Of the error terms defined in the equation for the process error and sensor, the PEA term is applicable to the transformer. The transformer directly monitors the RCP voltage and is not calibrated, the other process and sensor error terms are not applicable. The relay is not required for accident mitigation and is located in an auxiliary building area not subjected to harsh environmental parameters of radiation and temperature from a design bases accident. Therefore the EA term is not applicable and leaves only PEA and RTE terms in the equation. From page 39 Section II.B, Primary Element Accuracy (from Transformer), PEA is 15.07 VAC. RTE = The = 0.2% of setpoint, 0.002 x 5022 = 10.04 VAC.

$T_2 = 330 - (15.07^2 + 10.04^2)^{1/2}$ = 311.76 VAC for Primary

The lowest of T_1 and T_2 will be used. Therefore, the Allowable value (-Av = Setpoint - T_1) is 5022 - 70.3 = 4951.7 VAC for Primary; or 4951.7/60 = 82.5 VAC for Secondary. R3

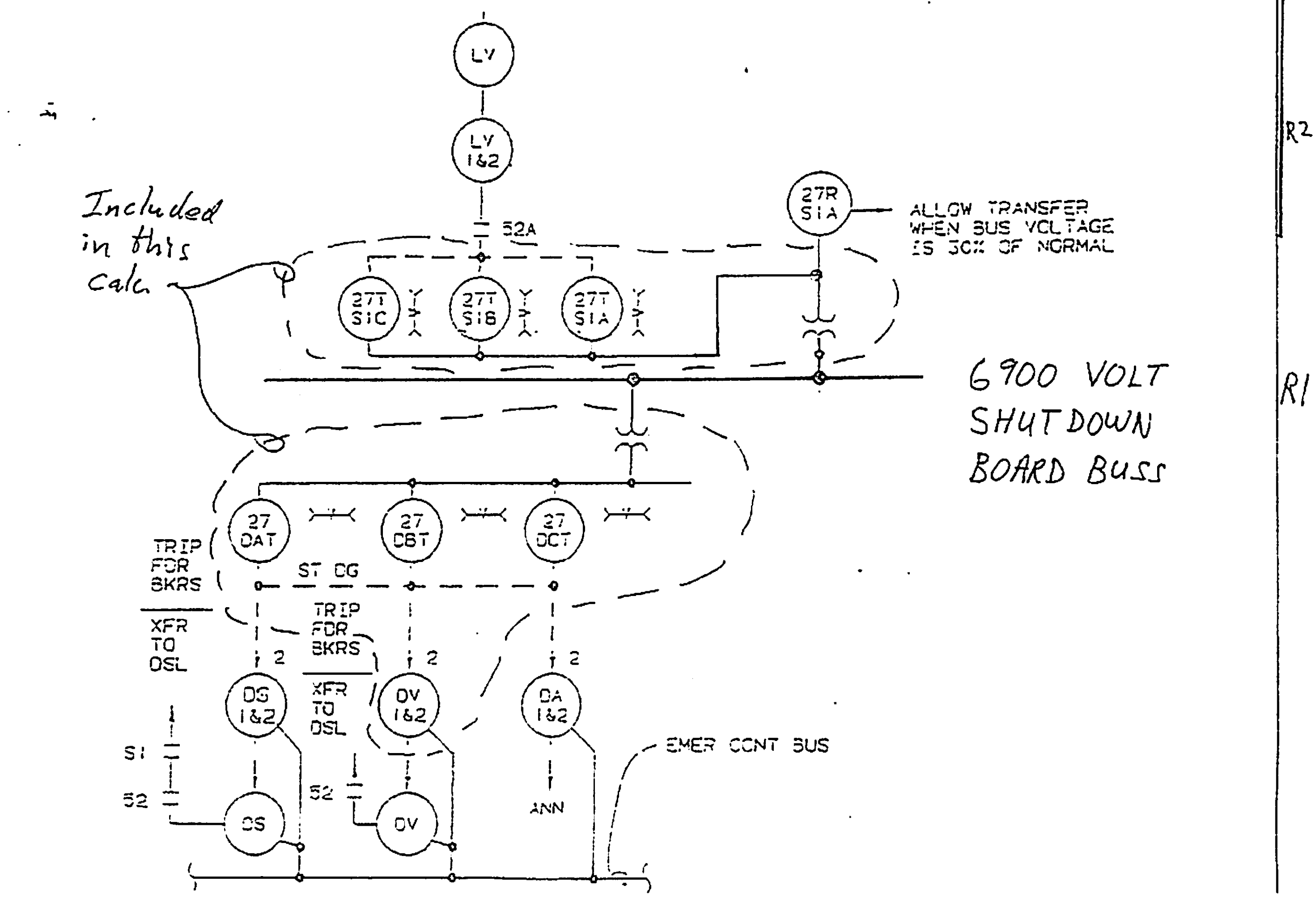
Tech Spec Allowable value is 4952 VAC for Primary

S U P P O R T I N G   G R A P H I C S

A) LOOP DIAGRAM

✓ APPLICABLE TO ALL LOOPS LISTED ON SHEET 6.

___ APPLICABLE ONLY TO LOOPS: ____________________



BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

S U M M A R Y   O F   R E S U L T S (BISTABLE - DECREASING SETPOINT)

___ APPLICABLE TO ALL LOOPS LISTED ON SHEET ___.

X APPLICABLE ONLY TO LOOPS: 27DAT
27DBT
27DCT

DROP OUT

ANALYTICAL UPPER LIMIT	6526	(108.77 relay voltage)
		MARGIN 14.2 (.237 relay voltage)
SP + Aa	NA	
SP + As	6511.8	(108.53 relay voltage)
SP + An	6511.8	(108.53 relay voltage)
SETPOINT (SP)	6456	(107.6 relay voltage)
SP - An	6400.234	(106.67 relay voltage)
SP - As	6400.234	(106.67 relay voltage)
SP - Aa	NA	
		MARGIN .234 (.0039 relay voltage)
SAFETY LIMIT	6400	(106.67 relay voltage)

R5

ALL VALUES SHOWN ARE Volts AC

(REFER TO ACCURACY DISCUSSION, SHEET 26-26A FOR CLARIFICATION OF ABOVE)

+ AV 6522.5 (108.71 relay voltage) + Aas NA

- AV 6403.5 (106.73 relay voltage) - Aas NA

R5

REV 1 PREP GGM DATE 4/07/93 CHECK LMB DATE 5-4-93 SHEET 44 C/O 45
REV 4 PREP GGM DATE 7/18/00 CHECK LMB DATE 7-20-02 SHEET 44 C/O 45
REV 5 PREP GGM DATE 9/13/02 CHECK [illegible] DATE 9-24-02 SHEET 44 C/O 45

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

SUMMARY OF RESULTS (BISTABLE - DECREASING SETPOINT)

___ APPLICABLE TO ALL LOOPS LISTED ON SHEET ___.

X APPLICABLE ONLY TO LOOPS: 27DAT
27DBT
27DCT

PICK UP

ANALYTICAL UPPER LIMIT 6558.8 (109.31 relay voltage)

MARGIN 14.3 (.238 relay voltage) R5

SP + Aa	NA	
SP + As	6544.5	(109.08 relay voltage)
SP + An	6544.5	(109.08 relay voltage)
SETPOINT (SP)	6488.4	(108.1 relay voltage)
SP - An	6432.4	(107.21 relay voltage)
SP - As	6432.4	(107.21 relay voltage)
SP - Aa	NA	

MARGIN NA

SAFETY LIMIT NA

ALL VALUES SHOWN ARE Volts AC

(REFER TO ACCURACY DISCUSSION, SHEET 26 FOR CLARIFICATION OF ABOVE)

+ AV NA   + Aas NA   R5

- AV NA   - Aas NA

REV 0	PREP FC	DATE 4/17/87	CHECK CG	DATE 4/17/87	SHEET 45	C/O 46
REV 1	PREP GGM	DATE 4/07/93	CHECK LME	DATE 5-04-93	SHEET 45	C/O 46
REV 5	PREP GGM	DATE 9/13/02	CHECK [illegible]	DATE 9-23-02	SHEET 45	C/O 46

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

S U M M A R Y   O F   R E S U L T S (BISTABLE - INCREASING SETPOINT)

___ APPLICABLE TO ALL LOOPS LISTED ON SHEET ___.

___ APPLICABLE ONLY TO LOOPS: DV1
DV2

TIME DELAY RELAY

OPERATIONAL LIMIT	370	MARGIN	4.9
SP + Aa	NA		
SP + As	365.1		
SP + An	365.1		
SETPOINT (SP)	300		
SP - An	234.9		
SP - As	234.9		
SP - Aa	NA	MARGIN	NA
OPERATIONAL LIMIT	NA		

R8

ALL VALUES SHOWN ARE SECONDS

(REFER TO ACCURACY DISCUSSION, SHEET 27, 27A FOR CLARIFICATION OF ABOVE)

+ Av 370 - Av 218.6

REV	PREP	DATE	CHECK	DATE	SHEET	C/O
0	FC	4/17/87	CG	4/17/87	46	47
1	GGM	4/07/93	LMB	5-04-93	46	47
2	GGM	9/05/95	LMB	10/17/95	46	47
4	GGM	6/22/00	LMB	7/20/00	46	47
4	GGM	4/23/13	ASJ	5/2/13	46	47

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

SUMMARY 0F RESULTS (BISTABLE - DECREASING SETPOINT)

___ APPLICABLE TO ALL LOOPS LISTED ON SHEET ____.

x APPLICABLE ONLY TO LOOPS: 27TS1A
27TS1B
27TS1C

DROP OUT

ANALYTICAL UPPER LIMIT 5700 (95 relay voltage)

MARGIN 20.55
(0.3425 relay voltage)

SP + Aa NA

SP + As 5679.45 (94.66 relay voltage)

SP + An 5679.45 (94.66 relay voltage)

SETPOINT (SP) 5520 (92 relay voltage)

SP - An 5360.55 (89.34 relay voltage)

SP - As 5360.55 (89.34 relay voltage)

SP - Aa NA

MARGIN 60.55
(1.01 relay voltage)

SAFETY LIMIT 5300 (88.33 relay voltage)

ALL VALUES SHOWN ARE Volts AC

(REFER TO ACCURACY DISCUSSION, SHEET 26 - 26B FOR CLARIFICATION OF ABOVE)

+Av 5688
(94.8 relay voltage)

+Aas NA

-Av 5331
(88.85 relay voltage)

-Aas NA

AS FOUND AND AS LEFT TOLERANCE FOR COMPLIANCE WITH TSTF-493:

Ab = ±27.6
(±0.46 relay voltage)

Afc = ±106.31
(±1.77 relay voltage)

R9

REV	9	**PREP**	DAW	**DATE**	8/21/14	**CHECK**	KRM	**DATE**	8/21/14	**SHEET**	47	**C/O**	48
REV		**PREP**		**DATE**		**CHECK**		**DATE**		**SHEET**		**C/O**	
REV		**PREP**		**DATE**		**CHECK**		**DATE**		**SHEET**		**C/O**	

BRANCH/PROJECT IDENTIFIER 27DAT

DEMONSTRATED ACCURACY CALCULATION

SUMMARY OF RESULTS (BISTABLE - INCREASING SETPOINT)

___ APPLICABLE TO ALL LOOPS LISTED ON SHEET ___.

✓ APPLICABLE ONLY TO LOOPS: 27TS1A
27TS1B
27TS1C

PICK UP

OPERATIONAL LIMIT	NA		
			MARGIN NA
SP + Aa	NA		
SP + As	5849.84	(97.5 relay voltage)	
SP + An	5849.84	(97.5 relay voltage)	
SETPOINT (SP)	5685.6	(94.76 relay voltage)	
SP - An	5521.36	(92.02 relay voltage)	
SP - As	5521.36	(92.02 relay voltage)	
SP - Aa	NA		
			MARGIN NA
OPERATIONAL LIMIT	NA		

ALL VALUES SHOWN ARE Volts AC

(REFER TO ACCURACY DISCUSSION, SHEET 26 FOR CLARIFICATION OF ABOVE) R2

+ AV NA   + Aas NA

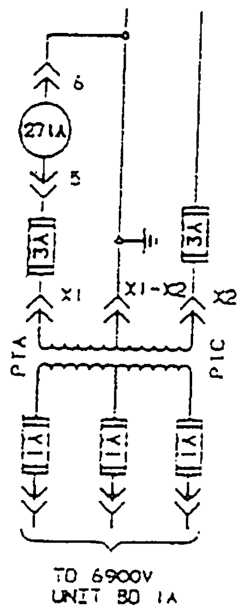
REV 0	PREP FC	DATE 4/17/87	CHECK CG	DATE 4/17/87	SHEET 48	C/O 49
REV 1	PREP GGM	DATE 4/07/93	CHECK LMB	DATE 5-03-93	SHEET 48	C/O 49
REV 2	PREP GGM	DATE 9/01/95	CHECK 2MV	DATE 11-3-95	SHEET 48	C/O 49A

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

S U P P O R T I N G   G R A P H I C S
A) LOOP DIAGRAM

___ APPLICABLE TO ALL LOOPS LISTED ON SHEET __.

✓ APPLICABLE ONLY TO LOOPS: 271A
271B
272A
272B



R1

REV 1	PREP JJM	DATE 5-27-93	CHECK JMP	DATE 6-8-93	SHEET 49A	C/O 49B
REV ___	PREP ___	DATE ___	CHECK ___	DATE ___	SHEET ___	C/O ___
REV ___	PREP ___	DATE ___	CHECK ___	DATE ___	SHEET ___	C/O ___

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

SUMMARY 0F RESULTS (BISTABLE - DECREASING SETPOINT)

___ APPLICABLE TO ALL LOOPS LISTED ON SHEET ____.

x APPLICABLE ONLY TO LOOPS: 271A
271B
272A
272B

DROP OUT

OPERATIONAL LIMIT	NA		
			MARGIN NA
SP + Aa	NA		
SP + As	5093.9	(84.898 relay voltage)	
SP + An	5093.9	(84.898 relay voltage)	
SETPOINT (SP)	5022	(83.7 relay voltage)	
SP - An	4950.1	(82.502 relay voltage)	
SP - As	4950.1	(82.502 relay voltage)	
SP - Aa	NA		
			MARGIN 258.1 (4.302 relay voltage)
SAFETY LIMIT	4692	(78.2 relay voltage)	

ALL VALUES SHOWN ARE Volts AC

(REFER TO ACCURACY DISCUSSION, SHEET 39 FOR CLARIFICATION OF ABOVE)

-Av 4952
(82.53 relay voltage)

-Aas NA

AS FOUND AND AS LEFT TOLERANCE FOR COMPLIANCE WITH TSTF-493: R9

Ab = ±10.04
(±0.167 relay voltage)

Afc = ±28.62
(±0.477 relay voltage)

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

S U M M A R Y   O F   R E S U L T S (BISTABLE - INCREASING SETPOINT)

___ APPLICABLE TO ALL LOOPS LISTED ON SHEET ___.

___ APPLICABLE ONLY TO LOOPS: 271A
271B
272A
272B

PICK UP

OPERATIONAL LIMIT	NA		MARGIN NA
SP + Aa	NA		
SP + As	5148.68	(85.811 relay voltage)	
SP + An	5148.68	(85.811 relay voltage)	
SETPOINT (SP)	5076	(84.6 relay voltage)	R3
SP - An	5003.32	(83.389 relay voltage)	
SP - As	5003.32	(83.389 relay voltage)	
SP - Aa	NA		MARGIN NA
OPERATIONAL LIMIT	NA		

ALL VALUES SHOWN ARE Volts AC

(REFER TO ACCURACY DISCUSSION, SHEET 39 FOR CLARIFICATION OF ABOVE)

+ AV NA   + Aas NA

REV 0 PREP GGM DATE 6/11/93 CHECK LMB DATE 6/11/93 SHEET 49C C/O 50
REV 1 PREP GGM DATE 10/6/95 CHECK LMB DATE 10/17/95 SHEET 49C C/O 50
REV 3 PREP GGM DATE 10/30/98 CHECK JMO DATE 11/5/98 SHEET 49C C/O 50

BRANCH/PROJECT IDENTIFIER 27DAT
DEMONSTRATED ACCURACY CALCULATION

CONCLUSIONS

___ APPLICABLE TO ALL LOOPS LISTED ON SHEET ___.

X APPLICABLE ONLY TO LOOPS: 27DAT
27DBT
27DCT

The dropout values range from 6400.234 TO 6511.8 VAC and is above the safety limit of 6400 VAC. The pick up values range from 6432.4 to 6544.5 VAC. Based on the calculated values, the undervoltage relays are acceptable for the intended safety function.

R5

REV 1 PREP GGM DATE 4/15/93 CHECK LMB DATE 5-03-93 SHEET 50 C/O 51
REV 2 PREP GGM DATE 9/06/95 CHECK LMB DATE 10-27-95 SHEET 50 C/O 51
REV 5 PREP GGM DATE 8/07/02 CHECK JMV DATE 9-23-02 SHEET 50 C/O 51

BRANCH/PROJECT IDENTIFIER ________27DAT________
DEMONSTRATED ACCURACY CALCULATION

C O N C L U S I O N S

___ APPLICABLE TO ALL LOOPS LISTED ON SHEET ___.

_X_ APPLICABLE ONLY TO LOOPS: 27TS1A
27TS1B
27TS1C

The dropout values range from 5360.55 to 5679.45 VAC and is above the safety limit of 5300 VAC and below the operational limit of 5700 VAC. The pick up values range from 5521.36 to 5849.84 VAC. R5

Based on the calculated values, the undervoltage relays are acceptable for the intended function.

REV 1	PREP GGM	DATE 4/15/93	CHECK LMB	DATE 5-03-93	SHEET 51	C/O 52
REV 2	PREP GGM	DATE 9/06/95	CHECK LMB	DATE 10-27-95	SHEET 51	C/O 52
REV 5	PREP GGM	DATE 8/07/02	CHECK lmm	DATE 9-23-02	SHEET 51	C/O 52

C O N C L U S I O N S

___ APPLICABLE TO ALL LOOPS LISTED ON SHEET ___.

X APPLICABLE ONLY TO LOOPS: 271A
271B
272A
272B

The RCP under voltage relays dropout values range from 4950.1 to 5093.9 VAC and is above the safety limit of 4692. R3

Based on the calculated values, the undervoltage relays are acceptable for the intended reactor protection function.

Jim Dunlap
x6590

6,900-V SHUTDOWN BOARD 1A-A

No. 6191 86 Date 9-8-86

Supersedes No. 3017 83 Date 8-25-83

PSO RELAY INFORMATION AND SETTING

LOCATION Sequoyah Nuclear Plant	PREPARED 9/5/86 J. A. Khalifa
LINE OR EQUIPMENT PROTECTED 6,900-V Shutdown Board 1A-A Degraded Voltage Transfer Scheme	CHECKED Andre' Gordon 9-9-86 APPROVED 9/15/86 John D. Finney, Jr. REF. DWG. 45N724-1
BREAKER NO. See Note	REF. RS CALCULATION See Remarks
RELAYS TRIP See Note	APPLIED
	TEST REPORT NO.

PANEL NO. 12

RELAY DATA

Service	Range	Make	Type	Style Number	Device No.
3 - Undervoltage Relays	60-110V	ITE	27N	211T0175 ✓PB	27DAT,DBT,&DCT
2 - Timers	1.5-15 Sec.	Agastat	-	E7012FC002	DS1-2
2 - Timers	1-300 Sec.	Agastat	-	E7012PK002	DV1-2
2 - Timers	5-50 Sec.	Agastat	-	E7012PD002	DA1-2
3 - Overvoltage Relays	100-150V	ITE	59H	211C0175	59DAT,DBT,&DCT

INSTRUMENT TRANSFORMER DATA

Location and Circuit Voltage	Make and Available Ratios	Ratio and Conn. Used	Type	Effective Ratio
3 - PT's on 6,900-V Bus	7,200-120 V	7,200-120	WT	60/1

RELAY SETTINGS

Relay Function	Setting Sec.	Setting Pri.	Time	Test Values and Time in Cycles 150%	200%	300%	500%	1000%
Undervoltage Relays P.U.	110 V	6600 V	-					
Device (27) D.O.	109.3 V	6560 V	Set dropout on 99% and adjust for desired setting.					
Timer (DS1-2)			10 sec.					
Timer (DV1-2)			300 sec.					
Timer (DA1-2)			30 sec.					
Overvoltage Relays (59)	121 V	7260 V		Use 120V tap and adjust for desired setting.				

NOTE: Dev. 27, in a 2/3 logic starts timers DS1-2, DV1-2 & DA1-2. DS1-2 initiates load shedding & transfer upon a SIS. DV1-2 initiates transfer to diesel generator if degraded voltage condition has not been corrected. Device DA1-2 annunciates Dev. 59 annunciates an overvoltage condition.

Remarks Corrected number of PT's from 2 to 3. No change in settings and no calculation document required.

Attachment No. 1 Sheet 1 of 1
27 DAT

Brown Boveri

ales Division

BBC
BROWN BOVERI

B43 '87 0326 005

BBC Brown Boveri, Inc.
District Office
Two Northgate Park, Suite 315
P.O. Box 789
Chattanooga, TN 37343
Phone (615) 877-0481

QA Record

March 24, 1987

Tennessee Valley Authority
400 Summit Hills Drive
W8C126-C-K
Knoxville, TN 37902

cc: Lee Gossage, TVA

ATTENTION: Mr. W. S. Raughley
Electrical Engineering Branch Chief

SUBJECT: BBC Brown Boveri's Solid State Protective Relays
ITE-27N Under Voltage Relay

Dear Mr. Raughley,

Your engineering people have some questions concerning the performance of this relay and we refer you to Instruction Bulletin 7.4.1.7-7, Issue C, Page 5 which shows tolerances for pickup and dropout settings with a repeatability over DC control power range of 100-140 volts, plus or minus 0.2%. There is a note that the three tolerances shown should be considered independent and may be cumulative. Tolerances assume pure sine wave input signal. This information is consistent in our instruction book, whether it is issue A, B, or C, or in our published data that we have on the descriptive flyer attached.

ELEC ENGR BRANCH

MAR 26 '87

We trust that this clears up any questions you have concerning the performance of this relay.

Please advise if you have any further questions.

Sincerely,

BBC BROWN BOVERI, INC.

Matthew J. Colosino
District Manager

MJC/ea

Attachments

3/26/87 - WSR:DEC
cc: RIMS, SL 26 C-K, w/attachments

Attachment No. 2 Sheet 1 of 12
Identifier 27DAT

BBC
BROWN BOVERI

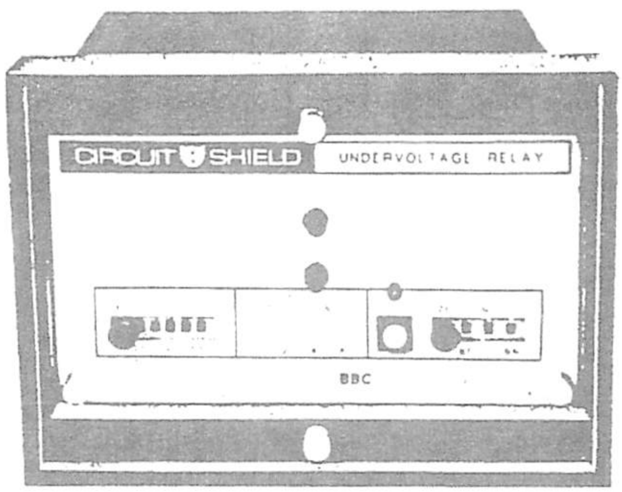
IB 7.4.1.7-7
Issue C

INSTRUCTIONS

Single Phase Voltage Relays

ITE-27N UNDERVOLTAGE RELAY
ITE-59N OVERVOLTAGE RELAY

Definite Time or High Speed



Attachment No. 2 Sheet 2 of 12
Loop #/Identifier 27DAT

BBC Brown Boveri, Inc.

TABLE OF CONTENTS

INTRODUCTION

These instructions contain the information required to properly install, operate, and test I-T-E solid-state single phase voltage relays, ITE-27N and ITE-59N.

The I-T-E voltage relay is housed in a semi-flush drawout relay case suitable for conventional panel mounting.

All connections to the relay are made at terminals located on the rear of the case and clearly numbered.

Voltage and time dial settings are located on the front panel behind a removable clear cover. Provisions for a meter seal are included.

A target indicator is also mounted on the front panel. The target is reset by means of a pushbutton extending through the relay cover.

An LED indicator is provided for convenience in testing and calibrating the pickup and dropout settings.

PRECAUTIONS

The following precautions should be taken when applying these relays.

1. Incorrect wiring may result in damage. Be sure wiring agrees with the connection diagram for the particular relay before the relay is energized. Be sure control power is applied in the correct polarity before applying control power.

2. Apply only the rated control voltage marked on the front panel.

For relays with dual rated control voltage, withdraw the relay from the case and check that the movable link on the circuit board is in the correct position for the system control voltage.

3. Do not attempt to manually operate target vanes on these relays. Although the targets return their indication under shock, they can be damaged by manual operation with a pencil or pointed object.

4. Do not apply high voltage tests to solid-state relays. If a control wiring test is required, partially withdraw the circuit board from the case to break the connections before applying the test voltage.

5. The entire circuit assembly of the voltage relay is removable. This board should insert smoothly. Do not use force.

6. Note that removal of the tap block pin is equivalent to setting the lowest tap.

7. Follow test instructions to verify that the relay is in proper working order. If a relay is found to be defective we suggest that it be returned to the factory for repair. Immediate replacement of the removable element can be made from the factory; identify by catalog number. We suggest that a complete spare relay be ordered as a replacement, and the inoperative unit be repaired and retained as a spare. By specifying the relay catalog number, a schematic and circuit description may be obtained from your sales engineer should you desire to repair or recalibrate the relay. CAUTION: Since troubleshooting entails working with energized equipment, caution should be taken to avoid personal shock. Only competent technicians familiar with good safety practices should service these devices.

PLACING THE RELAY INTO SERVICE

1. RECEIVING, HANDLING, STORAGE

Upon receipt of the relay (when not included as part of a switchboard) examine for shipping damage. If damage or loss is evident, file a claim at once and promptly notify the nearest Brown Boveri Electric Sales Office. Keep the relay clean and dry and use normal care in handling to avoid mechanical damage.

2. INSTALLATION

Mounting

The outline dimensions and panel drilling and cutout information is given in Figure 1.

Connections

All I-T-E Protective Relays have metal front panels which are connected through printed circuit board runs and connector wiring to a terminal at the rear of the relay case. The terminal is marked "G". In all applications this terminal should be wired to ground.

Special care must be taken to connect control power in the proper polarity.

Internal and external connections are shown in the APPLICATION section, page 7.

For relays with dual rated control voltage, before energizing the relay, the relay element should be withdrawn from its case, and a visual check be made to insure that the movable control voltage selection link has been placed on the correct terminal for the system control voltage. The location of this link is shown in Figure 5.

3. SETTINGS

PICKUP

The pickup taps are identified by the actual value of voltage which will cause the output contacts to transfer.

DROPOUT

Dropout taps are identified as a percentage of the pickup voltage. Taps are provided for 70%, 80%, 90% and 99% of pickup, OR 30%, 40%, 50%, 60% of pickup.

TIME DIAL

The time dial taps are identified as 1,2,3,4,5, and 6. Refer to the time-voltage characteristic curves in the APPLICATION section of this manual. Time dial selection is not provided on relays with the high speed characteristic.

SPECIAL NOTE

Pickup and dropout voltages may be adjusted to values other than those provided by the fixed taps, by means of internal calibration potentiometers. See section on TESTING for procedures.

On units with a time dial, the operating time may also be adjusted to any specific value between those provided by the fixed taps.

APPLICATION DATA

I-T-E Single Phase Voltage Relays provide a wide range of protective functions, including undervoltage protection of motors and automatic bus transfer. Inherently high seismic and transient immunity allow the use of these relays in generating stations or substations where the performance of electromechanical relays would be marginal.

The unique design of the output circuit does not require seal-in contacts allowing simplification of bus-transfer schemes. Operation indicators are provided as standard features on all types.

The ITE-27N and ITE-59N are designed for those applications where exceptional accuracy, repeatability, and long term stability are required.

Harmonic distortion in the AC waveform can have a noticible effect on the relay operating point and on measuring instruments used to set the relay. See discussion in the TESTING section of this book. An internal harmonic filter module will be available at a later date for those applications where waveform distortion is a factor.

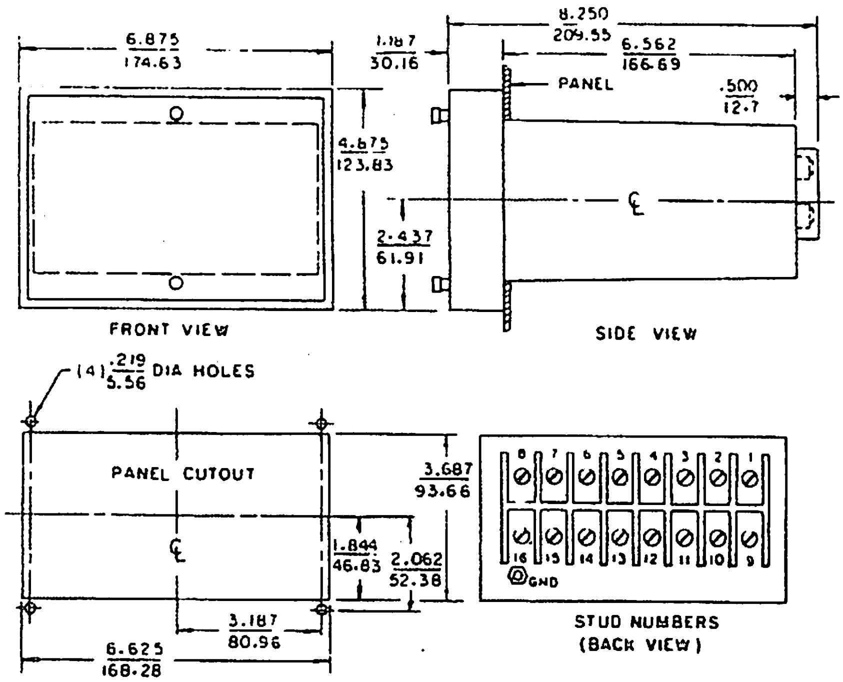


Figure 1

Relay Outline

Dimensions are INCH / MM

Characteristics of Common Units

Type	Pickup Range	Dropout Range	Time Delay Pickup	Time Delay Dropout	Control Voltage	Catalog Number
ITE-27N	60 - 110 V	70% - 99%	Inst	1-10 sec	48/125 Vdc	211T4175
	60 - 110 V	70% - 99%	Inst	0.1-1 sec	48/125 Vdc	211T6175
	60 - 110 V	70% - 99%	Inst	Inst	48/125 Vdc	211T0175
	70 - 120 V	70% - 99%	Inst	Inst	48/125 Vdc	211T0375
	60 - 110 V	30% - 60%	Inst	1-10 sec	48/125 Vdc	211T4275
	60 - 110 V	30% - 60%	Inst	0.1-1 sec	48/125 Vdc	211T6275
	60 - 110 V	30% - 60%	Inst	Inst	48/125 Vdc	211T0275
ITE-59N	100 - 150 V	70% - 99%	1-10 sec	Inst	48/125 Vdc	211U4175
	100 - 150 V	70% - 99%	0.1-1 sec	Inst	48/125 Vdc	211U6175
	100 - 150 V	70% - 99%	Inst	Inst	48/125 Vdc	211U0175

Attachment No. 2 Sheet 5 of 12
Loop #/Identifier 27DAT

RATINGS

Input Circuit Rating :	ITE-27N 150 Vac Maximum Continuous ITE-59N 160 Vac Maximum Continuous
Burden :	Less than 1 VA at 120 Vac
Frequency :	50/60 Hz
Output Circuit :	Each contact at 125 Vdc: 30A tripping duty 5A continuous 1A break, resistive 0.3A break, inductive
Control Power :	Rated 48/125 Vdc at 0.05 ampere max. (must operate 34- 60 Vdc for 48V nominal) (must operate 70-142 Vdc for 125V nominal)
Temperature :	ANSI range -20°C to +55°C Must operate -30°C to +70°C
Tolerances (Without harmonic filter module, after 10 minute warm-up.) :	Pickup and dropout settings with respect to printed dial markings (factory calibration) = +/- 2%. Pickup and dropout settings, repeatability at constant temperature and constant control voltage = +/- 0.2%. (See Note) Pickup and dropout settings, repeatability over dc control power range of 100-140 Volts (38-57V) = +/- 0.2%. (See Note) Pickup and dropout settings, repeatability over temperature range: -20 to +55°C +/- 0.4% 0 to +40°C +/- 0.2% (See Note)
Tolerances :	Time Delay Instantaneous model ≤ 3 cycles operating time. Definite Time models (see appropriate curve), ±10% or ±20 milliseconds, whichever is greater.
Reset Time :	Less than 2 cycles. (ITE-27N resets when input voltage goes above pickup setting.) (ITE-59N resets when input voltage goes below dropout setting.)
Dielectric :	2000 Vac RMS, 1 Minute, all circuits to ground.

NOTE: The three tolerances shown should be considered independent and may be cumulative. Tolerances assume pure sine wave input signal.

Harmonic Filter (Preliminary Data) OPTIONAL

The harmonic filter module attenuates all harmonics of the 50/60Hz input. Therefore, the relay then operates basically on the fundamental component of the input voltage signal. See figure on page 6 for typical filter response curve.

Ratings are the same as shown above except:

Pickup and dropout settings, repeatability over temperature range:

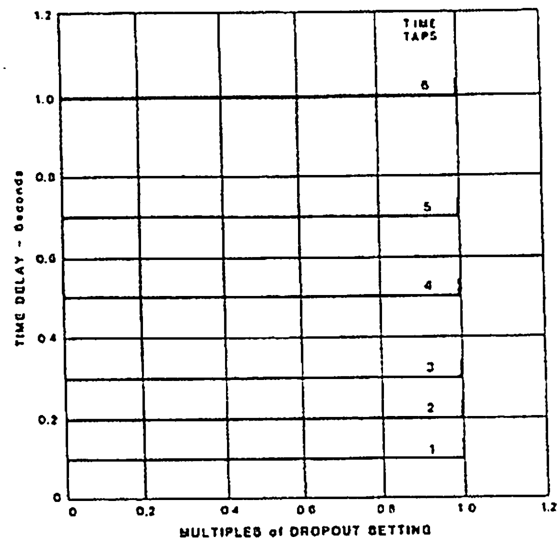
-20 to +55°C +/- 1.5%
0 to +40°C +/- 0.4%

Attachment No. 2 Sheet 6 of 12
Loop #/Identifier 27 DAT

Time Delay
Instantaneous model < 4 cycles operating time

Reset Time
Less than 3 cycles

TIME VOLTAGE CHARACTERISTICS



ITE-27N UNDERVOLTAGE RELAY

DEFINITE MEDIUM TIME (Cat. 211T6xxx)

Multiply Time by 10 for LONG TIME (cat. 211T4xxx)

March 10, 1984

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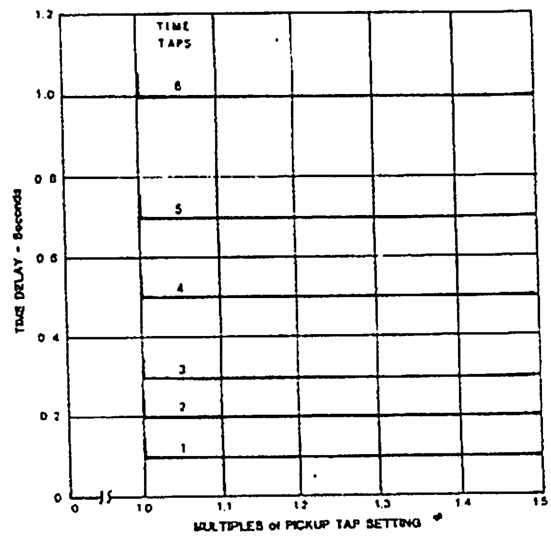
TVC 005830

TIME VOLTAGE CHARACTERISTICS



ITE-59N OVERVOLTAGE RELAY

DEFINITE TIME (MEDIUM Cat. 211U6xxx)

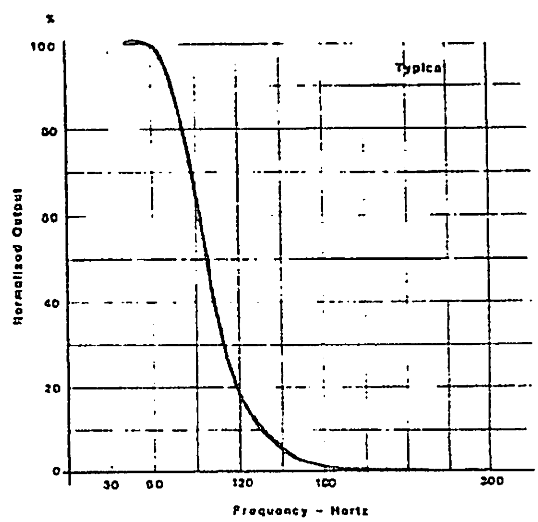
Multiply Time by 10 for LONG TIME (cat. 211U4xxx)

March 10, 1984

BBC Brown Boveri, Inc.

TVC 005829

* NOT TO EXCEED INPUT RATING



FREQUENCY RESPONSE - OPTIONAL HARMONIC FILTER

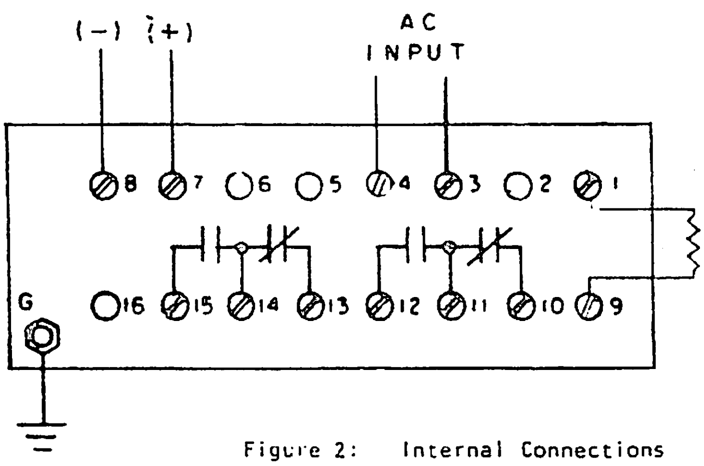
Attachment No. 2 Sheet 7 of 12
Loop/Identifier 27DAT

CONNECTION DIAGRAMS

OUTPUT CONTACT LOGIC

The following tables define the output contact states in various conditions of the measured input voltage and the control power supply. AS SHOWN means the contacts are in the state shown on the internal connection diagram for the relay being considered. TRANSFERRED means the contacts are in the opposite state to that shown on the internal connection diagram.

CONDITION	CONTACT LOGIC	
	ITE-27N	ITE-59N
Normal Control Power Input voltage below dropout setting	Transferred	As Shown
Normal Control Power Input voltage above pickup setting	As Shown	Transferred
No Control Power	As Shown	As Shown



Note: External resistor must be connected for relay to operate. Resistor is shipped mounted on the relay.

Figure 2: Internal Connections

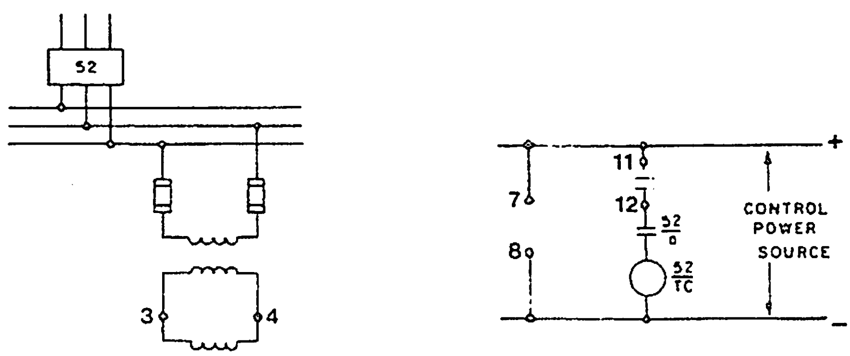


Figure 3: Typical External Connections

Attachment No. 3 Sheet 8 of 12
Loop #/Identifier 27DAT

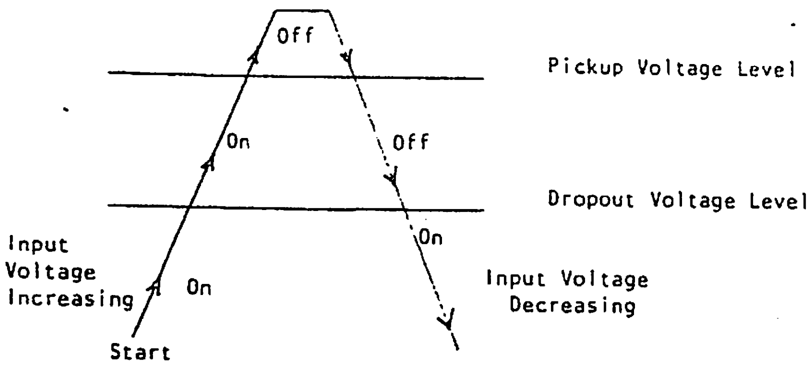


Figure 4a: ITE-27N Operation of Dropout Indicating Light

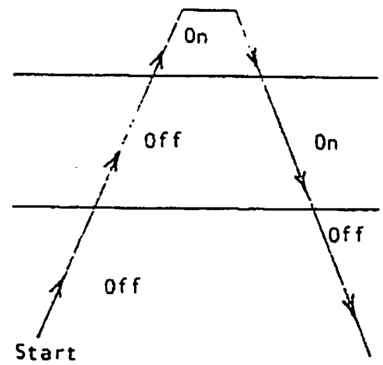


Figure 4b: ITE-59N Operation of Pickup Indicating Light

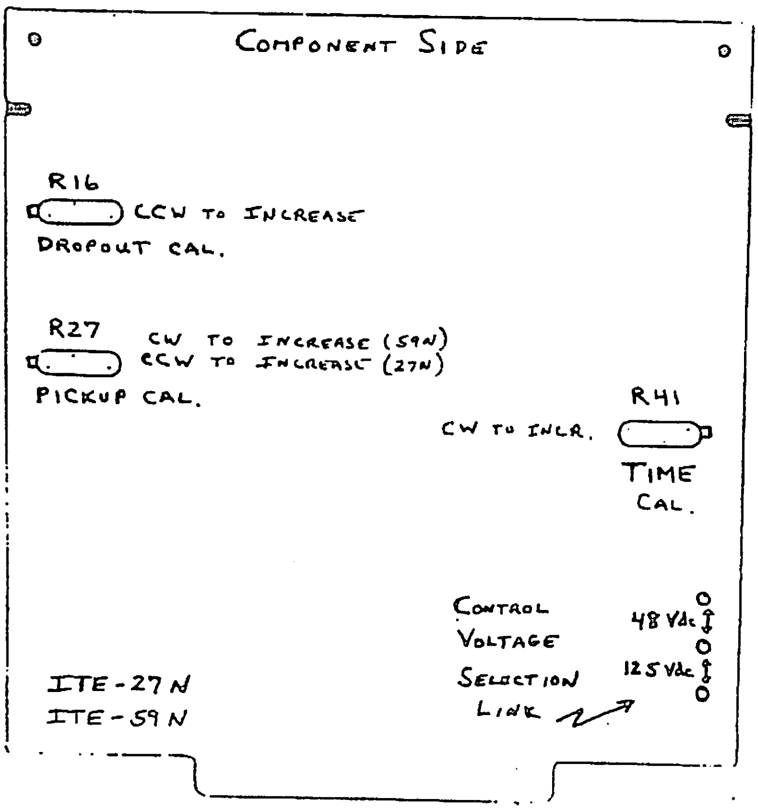


Figure 5: Circuit Board Locations of Key Components

Attachment No. 2 Sheet 9 of 12
Loop ... 27DAT

TESTING

1. MAINTENANCE AND RENEWAL PARTS

No routine maintenance is required on these relays. Follow test instructions to verify that the relay is in proper working order. We recommend that an inoperative relay be returned to the factory for repair; however, a circuit description and/or a schematic diagram are available for those who wish to attempt repairs. Contact your local sales engineer or contact the factory. These relays have a control relay as the output stage. This output relay may be ordered from the factory. Replacement target head assembly may be ordered should the target be mechanically damaged. (See page 11)

Also available from the factory are circuit card extenders which are recommended for use when calibrating the relays. All these relays use the 18 point extender, catalog 200X0018.

DRAWOUT ELEMENT

Drawout circuit boards of the same catalog number are interchangeable. The board is removed by using the metal pull knobs on the front panel. The circuit board is identified by the catalog number on the front panel and a serial number stamped on the under side of the circuit board.

<u>CAUTION</u>

Since troubleshooting entails working with energized equipment, caution should be taken to avoid personal shock. Only competent technicians familiar with good safety practices should service these devices.

2. HIGH POTENTIAL TESTS

Do not apply high potential tests to solid state relay circuits. If a control wiring insulation test is required, withdraw the circuit board from the case before applying the test voltage. Partial withdrawal to disconnect circuit board from connector in rear of case is adequate.

3. ACCEPTANCE TESTS

Follow calibration procedures under paragraph 4. Select Time Dial #3. For ITE-27N, Check timing by dropping voltage to 50% of pickup. For ITE-59N, by increasing voltage to 110 percent of pickup. Tolerances should be within those listed on page 5. Calibration may be trimmed or adjusted to the final settings required for the application at this time.

4. CALIBRATION TESTS

Connect the relay to the proper source of control voltage (to match the relay nameplate rating). For relays with dual rating, be sure the movable link on the circuit board is in the correct position. Connect the relay to the AC test source and to a timer. Typical test circuits are shown in figure 6. If very accurate settings are required for a particular application, say within ±3% of a given voltage, a stable, harmonic free test source is required. We recommend a "line corrector" type device be used in these cases. See figure 7 for the recommended AC test source circuit. The line corrector typically has less than 0.3% harmonic distortion.

A light emitting diode indicator is provided on the front panel for convenience in testing. Its action is instantaneous, thereby removing the uncertainty caused by the time delay before the output contacts transfer. The action of the indicator depends on the voltage level and the direction of voltage change and is best explained by referring to figure 4.

Pickup may be varied between the fixed taps by adjusting the pickup calibration potentiometer R27. Pickup should be set first, with the dropout tap set at 99%, and the pickup tap set at the nearest value to the desired setting. Decrease the voltage until dropout occurs, then recheck pickup by increasing the voltage. Readjust until pickup occurs at precisely the desired voltage.

Attach[illegible] 2 [illegible] 10 [illegible] 12
Loop [illegible] 27DAT

Potentiometer R16 is provided to adjust dropout. Set the dropout tap to the next lower p to the desired value. Increase the input voltage to above pickup and then lower until dropout occurs. Readjust R16 and repeat until the required setting has been made.

Similarly, the time delay may be adjusted higher or lower than the values shown on the time-voltage curves by means of the time delay calibration potentiometer R41. Time delay is initiated when the voltage falls from above pickup to below the dropout setting.

If the voltage does not return to above the pickup setting by the end of the time delay period, the output contacts will transfer.

The locations of the calibration potentiometers are shown in figure 5. The potentiometers are multi-turn types for excellent resolution and ease of setting.

BUILT-IN TEST FUNCTION

A built-in test function is provided for convenience in functionally testing the relay and associated devices. CAUTION: tests should be made with the main circuit de-energized. If tests are to be made on an energized circuit, take all necessary precautions. The test button is labelled TRIP. For the ITE-27N, when the button is depressed, an undervoltage condition is simulated, and the relay will operate. For the ITE-59N, an overvoltage condition is simulated. For relays with time delay function, you must hold the button in for as long as the set time delay to get an operation.

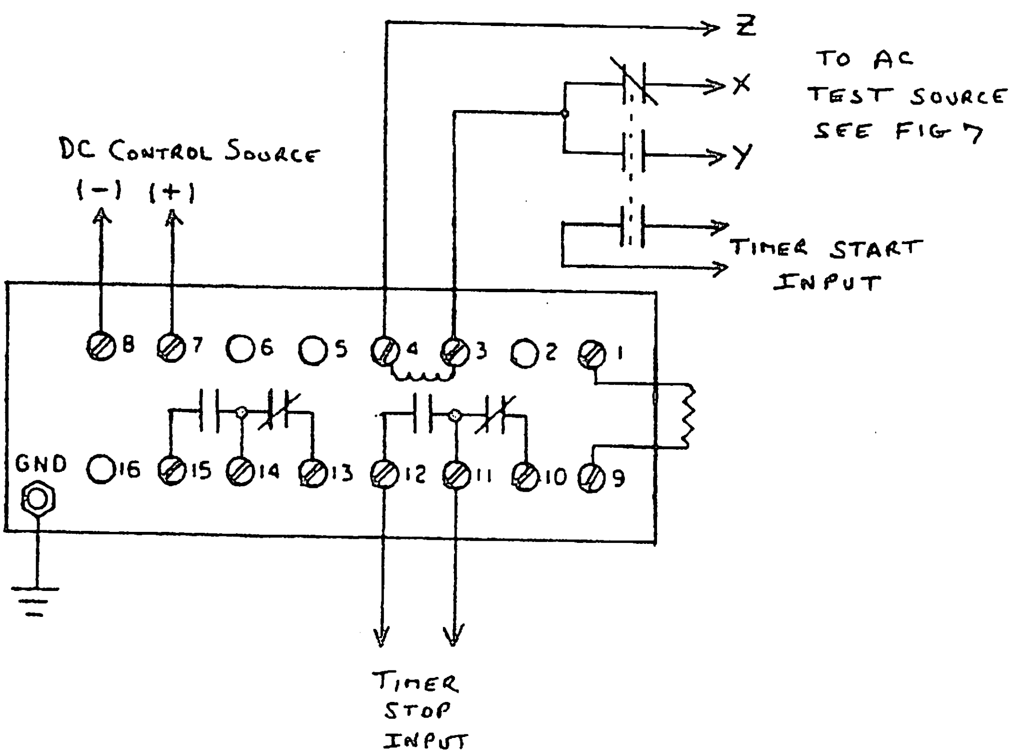


Figure 6: Typical Test Circuit Connections

Attachment No. 2 Sheet 11 of 12
Loop 27 DAT

The following AC test source arrangement is suggested when pickup or drop-out settings must be made and verified to accuracies better than ±3 percent of the set point. The line corrector stabilizes the line voltage and has low harmonic content. Ferroresonant regulators are not acceptable due to high harmonic content of the output waveform. Two variable transformers provide coarse and fine voltage adjustments. The voltmeter accuracy must be sufficient for the setting being made: ±1/4 percent is recommended. The relay should be energized for 10 to 15 minutes before settings are made, to allow the circuits to stabilize.

T1, T2	Variable Autotransformers	(1.5 amp rating)
T3	Filiment Transformer	(1 amp secondary)
V	AC Voltmeter	

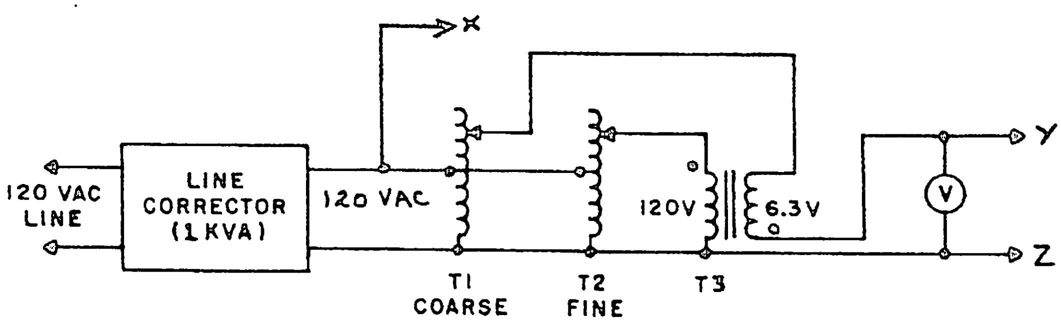


Figure 7. Suggested AC Test Source Arrangement

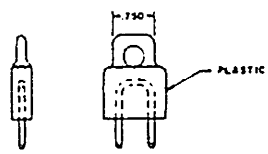
If desired, calibration potentiometers can be resealed with a drop of nail polish at completion of calibration procedures.

In Case of Difficulty

1. Check wiring to the relay.
2. Be sure control power is applied and in correct polarity.
3. Check that the control power selection link on the circuit board is in the correct position for the system control voltage.

4. Check AC input voltage to relay and relay settings.

Control power selection for dual rated units is accomplished by changing a wire on a 2 position terminal block on the circuit board or by moving a link. The link is red and looks like:



Replacement of Target Head Assembly

The relay target is an electrically operated, magnetically held device.

Should the orange/black target disk be damaged, it can easily be replaced. Order target head assembly part 609283-102 from the factory.

Replacement procedure:

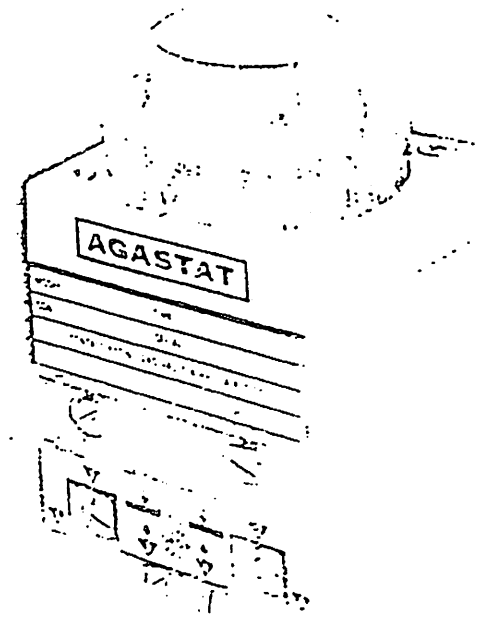
1. From the front of the relay, pull the existing plastic holder straight off using needle nose pliers.
2. Carefully place the new target assembly on the pole pieces with disk end closest to you.
3. With control power and normal AC voltage applied, press the target reset button. If the target shows orange, remove the assembly, rotate 180 degrees, and reinstall. Actuate target reset. Target should turn to black.

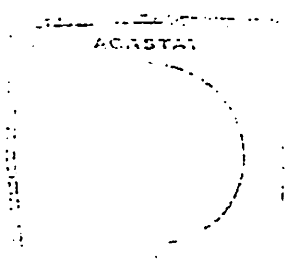
SR-3.

AGASTAT®

timing relays 7000 series

dated 3/75/-





Attachment No. 3	Sheet 1 of 4
Loop #/Identifier 270AT	

Agastat timing relays 7000 series

Specifications (All values shown are at nominal operating voltage and 77°F unless otherwis

Linear Timing Ranges

Time Range Code	Models 7012, 7022, 7024	Models 7014, 7032
A	.1 to 1 Sec.	.2 to 2 Sec.
B	.5 to 5 Sec.	.7 to 7 Sec.
C	1.5 to 15 Sec.	2 to 20 Sec.
D	5 to 50 Sec.	10 to 100 Sec.
E	20 to 200 Sec.	30 to 300 Sec.
F	1 to 10 Min.	1.5 to 15 Min.
H	3 to 30 Min.	3 to 30 Min.
I	6 to 60 Min.	Not avail.
J	3 to 120 Cyc.	Not avail.
K	1 to 300 Sec.	Not avail.

Basic models are furnished with dials calibrated in linear increments covering the range selected. In addition, time-calibrated ranges B through K provide non-linear adjustment from .2 second to the beginning of the linear zone. For easiest adjustment and lowest cost, the shortest time range suitable for the application should be selected.

* Models 7014 and 7032 are available with letter-calibrated dials only. The upper end of the time ranges in these models may be twice the values shown.

Contact Ratings

Contact Capacity in Amperes (Resistive Loads)

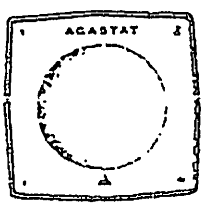
Contact Voltage	Min. 100,000 Operations	Min. 1,000,000 Operations
30 vdc	15.0	7.0
110 vdc	1.0	0.5
120 v 60 Hz	20.0	15.0
240 v 60 Hz	20.0	15.0
480 v 60 Hz	12.0	10.0

Contact Ratings as listed under the UL Component Recognition Program:

120/240 VAC	¼ H.P.
120/240 VAC	10 A. RES.
600 VAC	5 A. General Purpose
30 VDC	15 A. General Purpose

Inductive and capacitive loads should not have inrush currents that exceed five times normal operating load.

All specifications listed here are for reference only, and are subject to continuing revision. Verified drawings are available on request. If your requirements cannot be met by the standard production units described here, they may be filled by one of the many non-standard models not shown here. Many of these unusual configurations are available on a shorter-delivery, lower-cost basis than a purely custom model. We welcome your inquiry.



Panelmount Style

Coil Data

Coil Part Number	Code Letter	Rated Voltage	Operating Voltage Range @ 60 Hz	Rated Voltage	Operating Voltage Range @ 50 Hz
7000	A	120	102-132	110	93.5-121
	B	240	204-264	220	187-242
	C	480	408-528		
	D	550	468-605		
	E	24	20.5-26.5		
AC	F			127	108-140
	G			240	204-264
	H	12	10.2-13.2		
	I	6	5.1-6.6		
	J	208	178-229		
	K	Dual Voltage Coil (Combines A&B)			
	L	Special AC Coils (L1, L2, etc.)			
7010	M	28	22.5-33.5		
	N	48	38.5-57.5		
	O	24	19.2-28.8		
	P	120	96-144		
	Q	12	9.6-14.4		
DC	R	60	48-74		
	S	250	200-300		
	T	550	440-660		
	U	16	12.8-19.2		
	V	32	25.6-38.4		
	W	96	76.8-115		
	Y	6	4.8-7.2		
	Z	220	176-264		
	X	Special DC Coils (X1, X2, etc.)			

All units draw approximately 8 watts power at rated voltage. Minimum operating voltages are based on vertically mounted 7012 units. 7012 horizontally mounted or 7022 vertically or horizontally mounted units will operate satisfactorily at minimum voltages approximately 5% lower than those listed.

AC units drop out at approximately 50% of rated voltage. DC units drop out at approximately 10% of rated voltage.

All units may be operated on intermittent duty cycles at voltages 10% above the listed maximums. (Intermittent duty = maximum 50% duty cycle and 30 minutes "on" time.)

Repeat Accuracy

Repeat accuracy is defined as: the maximum deviation from the average of three consecutive time delays at any fixed temperature within the operating temperature range.

For delays of 200 seconds or less:

7012*, 7022, 7024	±5%
7014*	±10%
7032	±15%

For delays greater than 200 seconds:

7012*, 7022, 7014*, 7024	±10%
7032	±15%

*The first time delay afforded by Model 7012 with H (3 to 30 min.) and I (6 to 60 min.) time ranges or Model 7014 with H time range will be approximately 15% longer than subsequent delays due to coil temperature rise.

Attachment No. 3 Sheet 2 of 4
Loop #/Identifier 27DAT

Temperature Range

Operating temperature range is −20°F to 165°F. The maximum shift in the average of three consecutive time delays at 77°F is −20% at −20°F; +20% at 165°F.

The storage temperature range is −67°F to 165°F.

Dielectric

Withstands 1500 volts RMS 60 Hz between terminals and ground; 1,000 volts RMS 60 Hz between non-connected terminals.

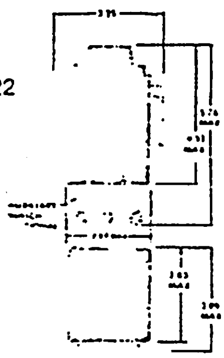
For dielectric specifications on hermetically sealed models, consult factory.

Insulation Resistance

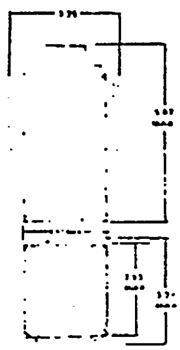
500 Megohms with 500 VDC applied.

Dimensions

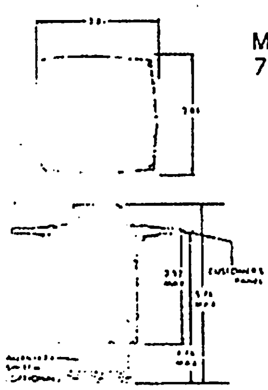
Basic Models 7012, 7022

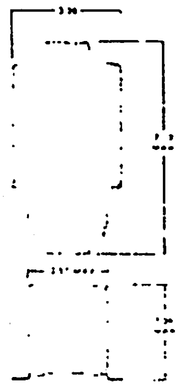


Models 7014, 7024



Model 7032





UL Listed, CSA Certified, FM Approved

Model 7012 and 7022 AGASTAT Timing Relays are recognized under the Component Recognition Program of Underwriters Laboratories, Inc. They are also CSA certified, and FM approved. Request data on approval details.

Approximate Weights

Models 7012, 7022	1 lb.	13 ozs.
7014, 7024	1 lb.	15 ozs.
7032	3 lbs.	5 ozs.

Weight may vary slightly with coil voltage.

Auxiliary Switch Options

To increase the versatility of the basic timer models, auxiliary switches may be added to either on-delay or off-delay types. They switch additional circuits, provide two-step timing action, or furnish electrical interlock for sustained coil energization from a momentary impluse, depending on the type selected and its adjustment. Because of their simple attachment and adjustment features, they can be installed at the factory or in the field, by any competent mechanic. All auxiliary switches are SPDT with UL listings of 10A @125, 250, or 480 VAC. A maximum of one Code T or two Code L auxiliary switches may be added to each relay.

For On-Delay Models

Instant Transfer (Auxiliary Switch Code L, maximum of 2 per relay)

1. Energizing coil begins time delay and instantly transfers auxiliary switch.
2. Main switch transfers after total preset delay.
3. Deenergizing coil resets both switches instantly.

Auxiliary switch is non-adjustable.

Two-Step Timing (Auxiliary Switch Code T, maximum of 1 per relay)

1. Energizing coil begins time delay.
2. After first delay auxiliary switch transfers.
3. Main switch transfers after total preset delay.
4. Deenergizing coil resets both switches instantly.

First delay is independently adjustable, up to 30% of overall delay. (Recommended maximum 100 seconds)

For Off-Delay Models

In these models the same auxiliary switch provides either two step timing or instant transfer action, depending on the adjustment of the actuator.

Two-Step Timing (Auxiliary Switch Code T, maximum of 1 per relay)

1. Energizing coil transfers main and auxiliary switches instantly.
2. Deenergizing coil begins time delay.
3. After first delay auxiliary switch transfers.
4. Main switch transfers after total preset delay.

First delay is independently adjustable, up to 30% of overall delay. (Recommended maximum 100 seconds).

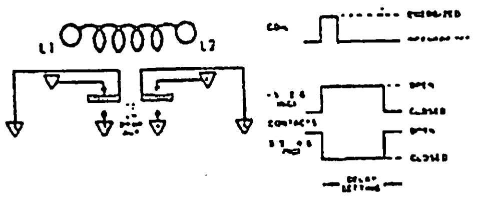
Instant Transfer (Auxiliary Switch Code T, maximum of 1 per relay)

1. Energizing coil transfers main and auxiliary switches instantly.
2. Deenergizing coil instantly resets auxiliary switch and begins time delay.
3. Main switch transfers after total preset delay.

Auxiliary switch is factory adjusted to give instant transfer operation, but may be easily adjusted in the field to provide two-step timing.

Attachment No. 3 Sheet 3 of 4
Loop #/Identifier 27DAT

Off-Delay Models (Delay on drop-out)

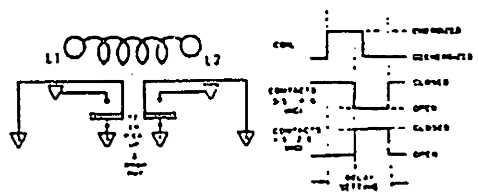


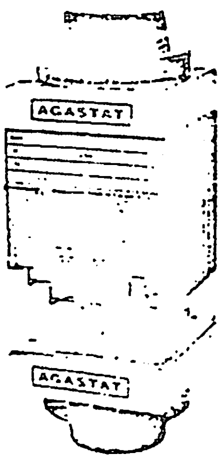
Applying voltage to the coil (for at least .050 second in AC units, .100 second in DC units for accuracy of timing) will instantaneously transfer the switch, breaking the normally closed contacts (1-5 and 2-6), and making the normally open contacts (3-5 and 4-6). Contacts remain in this transferred position as long as the coil is energized. The time delay begins immediately upon deenergization. At the end of the delay period the switch returns to its normal position.

Re-energizing the coil during the delay period will immediately return the timing mechanism to a point where it will provide a full delay period upon subsequent deenergization. The switch remains in the transferred position.

On-Delay, Off-Delay Models

(Double Head)





The Double Head model provides delayed switch transfer on energization of its coil, followed by delayed resetting upon coil deenergization. Each delay period is independently adjustable.

In new circuit designs or the improvement of existing controls now using two or more conventional timers, the Double Head unit offers distinct advantages.

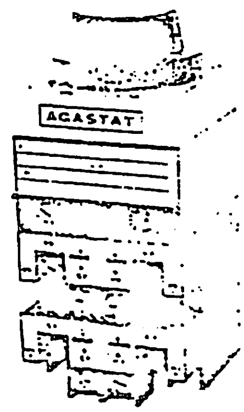
Its compact design saves precious panel space, while the simplified wiring reduces costly interconnections.

Four Pole Models

With the addition of an extra switch block at the bottom of the basic unit, this version of the 7000 Series offers four pole switch capacity with simultaneous timing or two-step timing. The two-step operation is achieved by factory adjustment to your specifications.

For two-step operation, a maximum timing ratio between upper and lower switches of 3:2 is recommended. Once adjusted at the factory, this ratio remains constant regardless of changes in dial settings. (Ex: if upper switch transfer is set on dial at 60 sec., minimum time on lower switch should be 40 sec.)

This 7000 Series unit offers many of the performance features found in basic models in the series—voltage ranges, timing and switch capacities are virtually identical.



Four pole models add approximately 1¼" to the maximum height of the basic model, approximately ⅛" to the depth. They are designed for vertical operation only.

Timing Adjustment

The AGASTAT 7000 Series is the first electropneumatic timer to offer the ease of adjustment and resetting of a calibrated dial head. Discrete ranges covering a total span from .1 second to 60 minutes are available, as well as a cycle-calibrated range. (See table on page 4.) Each has its own calibrated, clearly identified dial. Timing is set by simply turning the dial (in either direction) to the desired time value. In the zone of approximately 25° separating the high and low ends of timing ranges A, D, E, and K, instantaneous operation (no time delay) will occur. All other ranges produce an infinite time delay when the dial is set in this zone.

Mounting/Terminals

Normal mounting of the basic unit is in a vertical position, from the back of the panel. Four tapped holes are provided in the back plate of the unit, making it interchangeable with earlier AGASTAT timer models. A front mounting bracket is also supplied with each basic unit, for installation from the front of the panel. All units are calibrated for vertical operation. Basic models (7012, 7022) may also be horizontally mounted, and will be adjusted accordingly *when Accessory Y1 is specified in your order.*

Standard screw terminals (8-32 truss head screws supplied) are located on the front of the unit, with permanent schematic markings. Barrier isolation is designed to accommodate spade or ring tongue terminals, with spacing to meet all industrial control specifications.

The basic 7000 Series may also be panel-mounted, with the addition of a panelmount kit that includes all necessary hardware and faceplate. This offers the convenience of "out-front" adjustment, with large calibrated dial skirt knob. The modern faceplate and knob blend with advanced equipment and console designs, while the body of the unit and its wiring are protected behind the panel.

Other mounting options include plug-in styles and special configurations to meet unusual installation requirements. Your inquiries are invited.

Attachment No. 3 Sheet 4 of 4
Loop #/Identifier 27DAT

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FILE

EQUIPMENT

BBC BROWN BOVERI, INC.

REPORT NUMBER 33-03363-SSA

EEB 84 0521 008
6900-V Subd -5449
5-17-84
5-815

ADDENDUM TO

SEISMIC CERTIFICATION REPORT

33-47035

FOR

CLASS 1E ELECTRICAL EQUIPMENT

PREPARED FOR

TENNESSEE VALLEY AUTHORITY

APPROVED
This approval does not relieve the Contractor from any part of his responsibility for the correctness of design, details and dimensions.
Date MAY 29 1984
TENNESSEE VALLEY AUTHORITY
F. W. CHANDLER

FOR

SEQUOYAH NUCLEAR PLANT
71C2 - 54499
UNITS 1 AND 2

NUCLEAR SAFETY RELATED

PREPARED BY

BBC BROWN BOVERI, INC.

SWITCHGEAR PRODUCTS DIVISION

PRODUCT ANALYSIS & QUALIFICATION

REVISION 0 - MAY 11, 1984

Attachment 4 Sheet 1 of 10
Loop #/Identifier 27DAT

BBC Brown Boveri

SWITCHGEAR PRODUCTS DIVISION

SEISMIC CERTIFICATION
REPORT NO. 33-03363-SSA

Addendum to 33-47035

PROJECT IDENTIFICATION

FOR

FIELD MODIFICATIONS

Customer	:	Tennessee Valley Authority	
Customer's Purchase Order	:	71C2-54499-C.O.#35	
BBC Brown Boveri, Inc. Sales Order Number	:	33-03363	
Generating Station Name	:	Sequoyah Nuclear Plant Units 1 & 2	
Purpose of Modification	:	Field Additions	
Original BBC Brown Boveri, Inc. Sales Order Number	:	33-47035	
Equipment Modified	:	Customer Ident.	Brown Boveri Ident.
		Shutdown Board 1A	Item A
		Shutdown Board 1B	Item B
		Shutdown Board 2A	Item C
		Shutdown Board 2B	Item D

SEISMIC CERTIFICATION
REPORT NO. 33-03363-SSA

BBC Brown Boveri

SWITCHGEAR PRODUCTS DIVISION

COMPOSITE SEISMIC CERTIFICATION

FOR

CLASS 1E ELECTRIC COMPONENTS

Customer	:	Tennessee Valley Authority
Customer's Purchase Order No.	:	71C2-54499-C.O.#35
Generating Station Name	:	Sequoyah Nuclear Plant Units 1 & 2
BBC Brown Boveri, Inc. Sales Order Number	:	33-03363

A. ORIGINAL SWITCHGEAR REFERENCE IDENTIFICATION

BBC Brown Boveri, Inc. Shop Order Number	:	33-47035
Equipment Type	:	17.5HK Metal-Clad Switchgear
BBC Brown Boveri, Inc. Item Number	:	A, B, C & D
BBC Brown Boveri, Inc. Drawing Number	:	807032, 807033, 807034 & 807035

B. COMPONENT'S INSTALLED LOCATION

BBC Brown Boveri, Inc. Frame Number	:	Item A - 10, Item B - 12, Item C - 12, and Item D - 11
Customer Cubicle Number	:	Item A - 12, Item B - 12, Item C - 12, and Item D - 12
Number of Components Installed	:	(3) 27N Undervoltage Relays and (4) PK-2 Mounting Brackets per each frame.

C. COMPONENT CERTIFICATION REQUIREMENTS

Mechanical withstandability and functional operability of the component in the seismic environment generated at the above described mounting location as a result of the customer furnished RRS provided for the Original Switchgear Reference Identification as applied to the base of the Switchgear.

BBC Brown Boveri

SWITCHGEAR PRODUCTS DIVISION

D. COMPONENT CERTIFICATION REFERENCE

Item	Description	Catalog Number	Reference Test Program
A	PK-2 Mounting Bracket	33-03363-H21A	-
A1	3/8 - 16 x 1 1/4 long RD HD SQ NK Bolt with Flatwasher, Lockwasher and Nut	54396-D5	-
B	Undervoltage Relay Type 27N	211T0175	RC-5539

As long as the mounting brackets are properly secured and maintained, they will not become a missile hazard and therefore will not reduce the reliability of the Class 1E function of the system.

The Type 27N Undervoltage Relay was tested on Test Program No. RC-5539 and did not experience any abnormal conditions which would compromise its Class 1E operation.

The TRS of figures 1 and 2 represent the levels to which the component is qualified when tested in accordance with ANSI C37.98-1978. Relays tested to this document are mounted on a rigid test fixture.

Since the response at the component location will most likely deviate from the input acceleration at the base of the switchgear, a method is required in which the customer's RRS input at the base of the switchgear and the resultant amplification at the component location are both considered.

Switchgear Test Program No. 43547-1 was analyzed to determine a reference accelerometer that best represents the component's mounting location. The ratio of the output accelerometer at the component location to the input control accelerometers at the base of the switchgear was calculated at each 1/3 octave frequencies for a resultant Multifrequency Amplification Factor (MAF) for both the horizontal and vertical direction. The customer's composite RRS was then multiplied by the MAF to calculate the Modified Panel Response Spectra (MPRS). The MPRS represents the required acceleration level to be met and takes into consideration the customer's RRS at the base of the switchgear and the resultant amplification factors at the component location.

Figures 1 and 2 compare the customer's RRS for Sequoyah Station to the TRS of Test Program No. RC-5539.

BBC Brown Boveri

SWITCHGEAR PRODUCTS DIVISION

SEISMIC CERTIFICATION
REPORT NO. 33-03363-SSA

Addendum to 33-47035

E. CONDITIONS OF CERTIFICATIONS

It is understood that the field modifications pertaining to the physical installation and electrical conditions for these components will be in accordance with standards and practices established by industry.

This document certifies that the above described components, without exceptions, meet the Class 1E seismic requirements herein, i.e., they will function in accordance with their design requirements. Field installation of these components will not compromise the seismic certification of the original switchgear.

BBC BROWN BOVERI, INC.
Switchgear Products Division

Prepared By: F. J. Wuzzardo 5-14-84
F. J. WUZZARDO Date

Reviewed By: C. E. Kunkel 5-14-84
C. E. KUNKEL Date

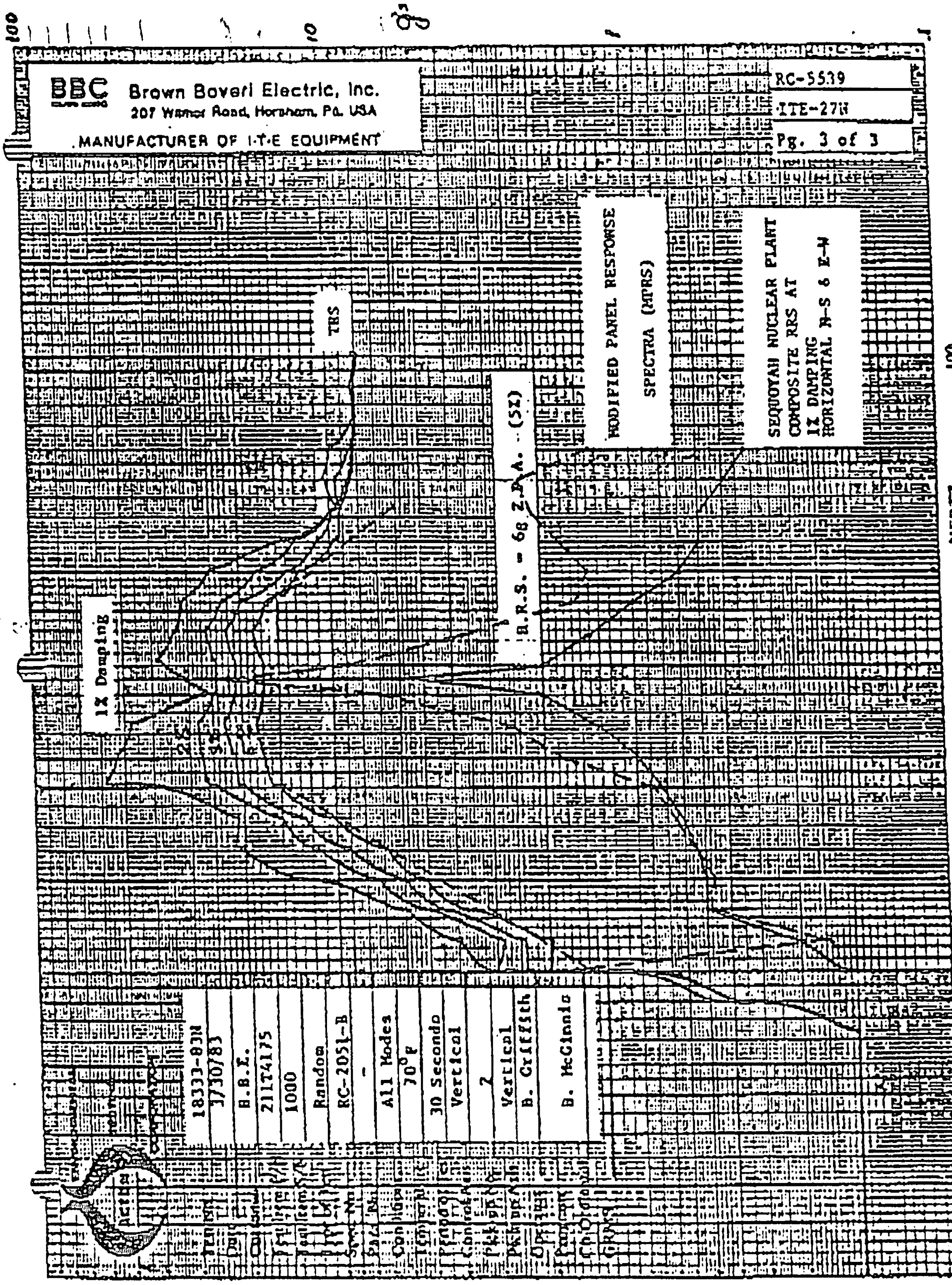
Approved By: W. E. Laubach 5/14/84
W. E. LAUBACH Date
Director of Engineering

Attachment 4 Sheet 5
Loop 22 DAT

BBC Brown Boveri

SWITCHGEAR PRODUCTS DIVISION

Addendum to 33-47035
Page 5 of 6

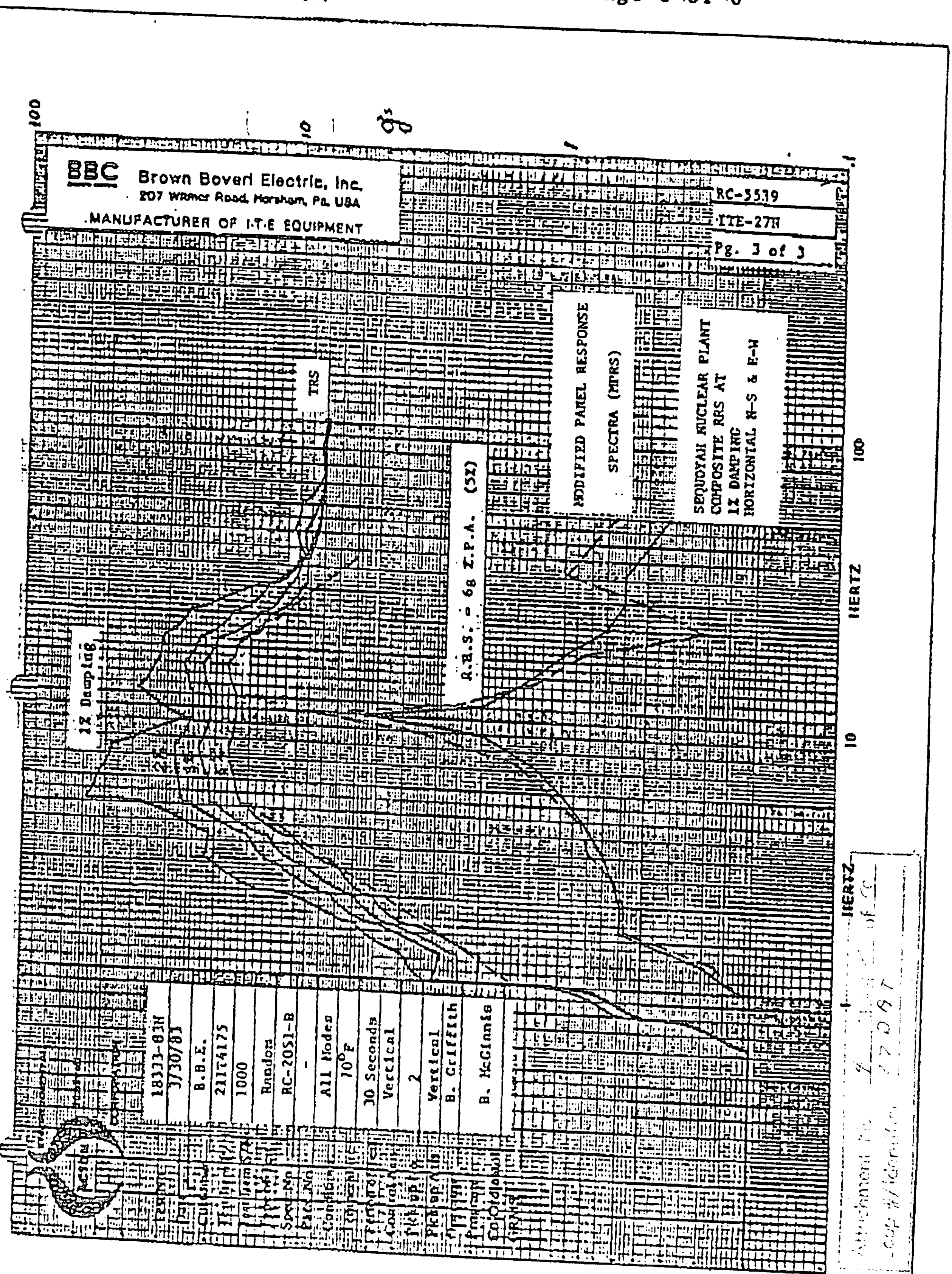


BBC Brown Boveri

SWITCHGEAR PRODUCTS DIVISION

SEISMIC CERTIFICATION
REPORT NO. 33-03363-SSA

Addendum to 33-47035



SWITCHGEAR PRODUCTS ...

APPENDIX I
TO
SEISMIC CERTIFICATION REPORT
FOR
CLASS 1E ELECTRICAL EQUIPMENT

BBC BROWN BOVERI, INC.

REPORT NUMBER 33-03363-SSA

SEISMIC QUALIFICATION OF
27N UNDERVOLTAGE RELAY

No. 4 Sheet

...ifier 27 DAT

BBC Brown Boveri

SWITCHGEAR PRODUCTS DIVISION

BBC Brown Boveri Electric, Inc. 207 Witmer Road, Horsham, Pa. USA MANUFACTURER OF I-T-E EQUIPMENT	IEEE-501 SEISMIC QUALIFICATION	Number: RC-5539 Page: 1 of 3
Title: I-T-E 27N UNDERVOLTAGE RELAY		Issued: 4/6/83 Prep. by: R Conrad

1.0 Specific Model Tested : 211T4175

2.0 Test Procedure : Per BBE Specification RC-2051B to meet the requirements of IEEE-501-1978 (ANSI C37.98).

3.0 Test Facility : Acton Environmental Testing Corporation
533 Main Street, Acton, Mass. 01720

4.0 Documentation : BBE Report R-09406-R
Relay Settings and Status Monitoring (Page 2)
Test Response Spectra (Page 3)

5.0 Testing : Broad-band multi-frequency vibration, 30 seconds duration, for each of 12 tests as follows: Imposed biaxial, 45°, in four orientations:

1) Left-to-right
2) Front-to-back
3) Right-to-left
4) Back-to-front

BBC BROWN
REPORT NUMBER

For each orientation, the relay status is tested and monitored in three states:

1) Non-operating
2) Operating
3) Transitional

6.0 Results : No fragility or mis-operations found within the 6g ZPA limitation of the actuator.

7.0 Notes : The horizontal component of the acceleration is the same as the vertical, yielding a total ZPA of 8.5g at 45°. The TRS shows the vertical component analyzed at 1/3 octave intervals between 1 and 100 Hz. The analysis is shown for 5, 3, 2, and 1%.

8.0 Generic : Other relays qualified by this test series:

All ITE-27N Series Relays

PRQA-10

Attachment No. 4 Sheet 9 of 12
...ntifier 27 DAT

BBC Brown Boveri

SWITCHGEAR PRODUCTS DIVISION

APPENDIX I
Seismic Certification
Report No. 33-03363-SSA

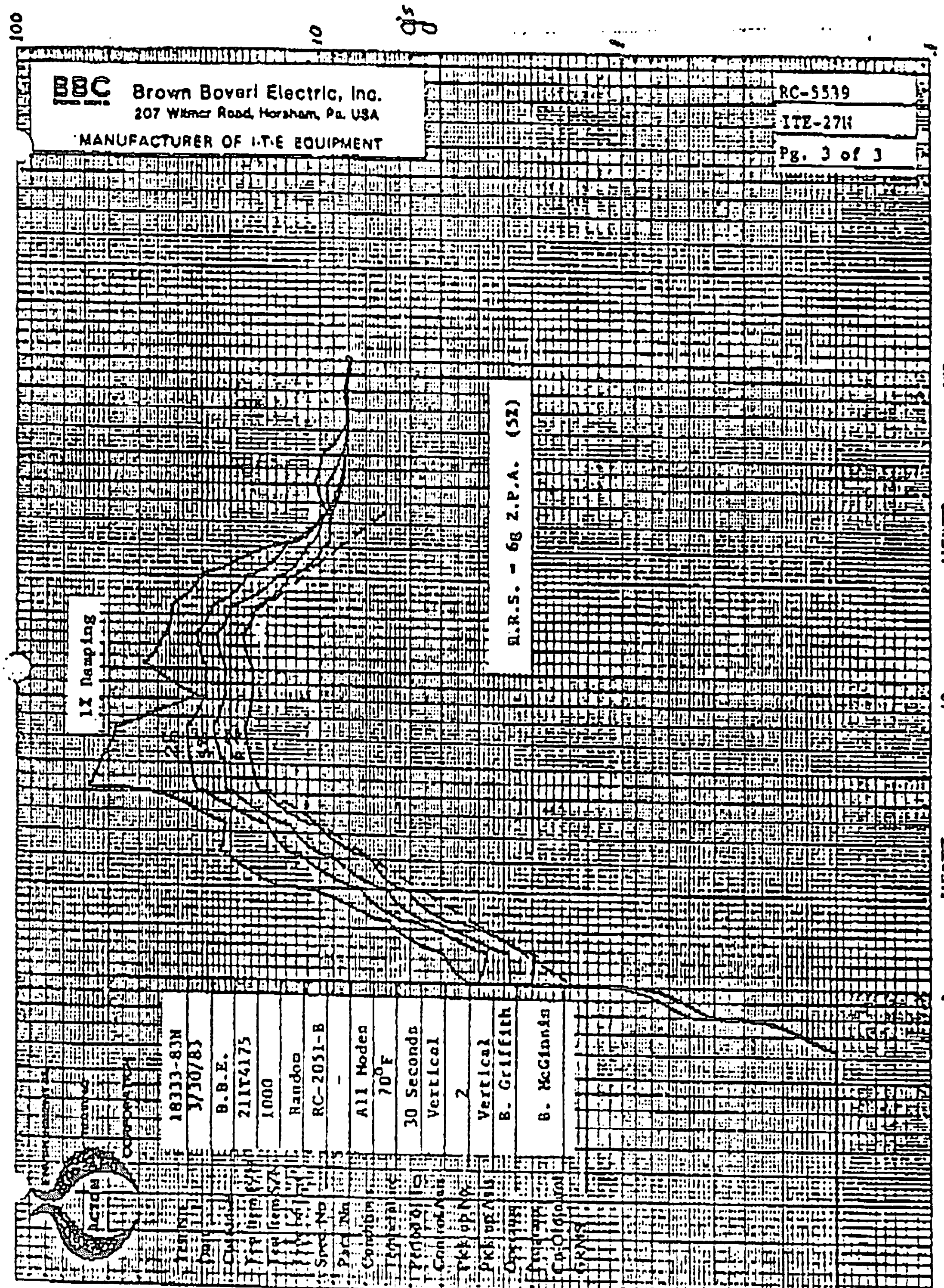


Table 13
Standard Burdens for Potential Transformers

Standard Burdens			Characteristics on 120 Volt Basis			Characteristics on 69.3 Volt Basis		
Designation	Volt-Amperes	Power Factor	Resistance Ohms	Inductance Henrys	Impedance Ohms	Resistance Ohms	Inductance Henrys	Impedance Ohms
W	12.5	0.10	115.2	3.042	1152	38.4	1.014	384
X	25	0.70	403.2	1.092	576	134.4	0.364	192
Y	75	0.85	163.2	0.268	192	54.4	0.0894	64
Z	200	0.85	61.2	0.101	72	20.4	0.0336	24
ZZ	400	0.85	30.6	0.0504	36	10.2	0.0168	12

Table 14
Accuracy Classes and Corresponding Limits of Transformer Correction Factors for Potential Transformers for Metering Service*

Metering Accuracy Classes	Limits of Transformer Correction Factors for Range of 90 to 110 Percent Rated Primary Voltage — Min	Max	Limits of Power Factor (Lag) of Metered Power Load
0.3	0.997	1.003	0.6 - 1.0
0.6	0.994	1.006	0.6 - 1.0
1.2	0.988	1.012	0.6 - 1.0

*See Fig. 8

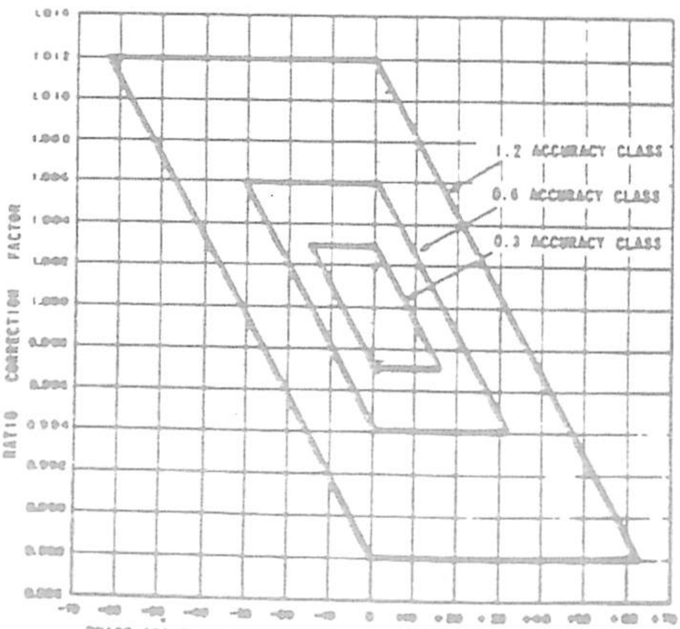


Fig. 8
Limits for Accuracy Classes 0.3, 0.6, and 1.2 for Potential Transformers for Metering Service

TEST RECORD -- GENERAL

SHEET NO.: SI-235

_____ OF _____ SHEETS

LOCATION: SNP

SUBJECT: 6.9 KV SD BD 1A-A VOLTAGE RELAYS

DATE OF TEST: 3/19/86

DATE OF REPORT: 3/19/86

GENERAL DATA:

SETTING SHEET # 3087 DATE OF SETTING SHEET 9-7-83

COPIES SENT TO: UNIT FILE, SI-235 DATA PACKAGE

TESTED BY:	CHECKED BY:	APPROVED BY:
HOOPER & MALONE		

	AΦ	CΦ	* PERCENT OFF SET POINT (AS FOUND)	
DEVICE	AX716	CX716		
SERIAL #	3877	3874		
TARGET	OK	OK		
AS FOUND P.U.	111.9	112.6	AΦ	.1%
AS FOUND D.O.	109.2	109.3	CΦ	0%
AS LEFT P.U.	~~111.9~~ MM 3-19-86 111.9	112.6		
AS LEFT D.O.	109.2	109.3		
TAP	110 V	110 V		

DEVICE - 27RSIA APPLY 115V & REDUCE VOLTAGE TO CLOSE CONTACTS AT 35V = 0%
AS FOUND 35V AS LEFT 35V

EQUIPMENT	TVA #	CALIBRATION DUE DATE
EPOCH I RELAY TEST SET	531815	6-25-86
FLUKE	537774	6-2-86
KD TEST BOX	259411	6-26-86

* FORMULA FOR PERCENT OFF SET POINT

(AS FOUND VALUE) - (SET POINT VALUE) X100 = % OFF SET POINT
~~(AS FOUND VALUE)~~ MM 3-19-86 (SET POINT VALUE)

Attachment No. 6 Sheet 1 of 52
Loop #/Identifier 27DAT

1A-A

TVA 6472 (PO-4-68)

TEST RECORD -- GENERAL

SHEET No.: SI-235

______ OF ______ SHEETS

LOCATION: SNP

SUBJECT: 6.9 KV SD BD 1A-A UNDERVOLTAGE RELAYS

GENERAL DATA:

DATE OF TEST: 3/19/86

DATE OF REPORT: 3/19/86

SETTING SHEET # 3017 DATE OF SETTING SHEET 8-25-83

COPIES SENT TO: UNIT FILE, SI-235 DATA PACKAGE

TESTED BY: HOOPER & MALONE

CHECKED BY:

APPROVED BY:

	AΦ		BΦ		CΦ	*PERCENT OFF SET POINT (AS FOUND)		
DEVICE	27DAT		27DBT		27DCT		P.U.	D.O.
SERIAL #	1029		1034		1036			
TARGET	OK		OK		OK	AΦ	.1%	.1%
AS FOUND P.U.	109.9		110.2		110.0	BΦ	.2%	.1%
AS FOUND D.O.	109.2		109.2		109.2	CΦ	0%	.1%
AS LEFT P.U.	109.9		110.2		110.0			
AS LEFT D.O.	109.2		109.2		109.2			
TAP	99%		99%		99%			

EQUIPMENT	TVA #	CALIBRATION DUE DATE
EPOCH II RELAY TESTSET	531815	6-25-86
FLUKE	537774	6-2-86

* FORMULA FOR PERCENT OFF SET POINT

$$\frac{(\text{AS FOUND VALUE}) - (\text{SET POINT VALUE})}{(\text{SET POINT VALUE})} \times 100 = \% \text{ OFF SET POINT}$$

TVA 6472 (PO-4-68)

TEST RECORD -- GENERAL

SHEET No.: SI-235

____ OF ____ SHEETS

LOCATION: SNP

DATE OF TEST: 3/19/86

SUBJECT: 6.9 KV SD. BD. 1A-A VOLTAGE RELAYS

DATE OF REPORT: 3/19/86

GENERAL DATA:

SETTING SHEET # 3087 DATE OF SETTING SHEET 9-7-83

COPIES SENT TO: UNIT FILE, SI-235 DATA PACKAGE

TESTED BY: HOOPER & MALONE

CHECKED BY:

APPROVED BY:

	AΦ	BΦ	CΦ	* PERCENT OFF SET POINT (AS FOUND)	
DEVICE	27TS1A	27TS1B	27TS1C		
SERIAL #	3886	3872	3869		
TARGET	OK	OK	OK	AΦ	.76%
AS FOUND P.U.	94.9	94.3	94.3	BΦ	.1%
AS FOUND D.O.	92.7	92.1	92.1	CΦ	.1%
AS LEFT P.U.	94.2	94.3	94.3		
AS LEFT D.O.	92	92.1	92.1		
TAP	90V	90V	90V		

EQUIPMENT	TVA #	CALIBRATION DUE DATE
Epoch I Relay Test Set	531815	6-25-86
Fluke	537774	6-2-86

* FORMULA FOR PERCENT OFF SET POINT

$$\frac{(\text{AS FOUND VALUE}) - (\text{SET POINT VALUE})}{(\text{SET POINT VALUE})} \times 100 = \%\ \text{OFF SET POINT}$$

27DAT 1A-A

TVA 6472 (PO-4-68)

TEST RECORD -- GENERAL

REPORT No.: SI-235
SHEET No.: ____ OF ____ SHEETS

LOCATION: SNP
DATE OF TEST: 3/19/86
SUBJECT: 6.9 KV SD.BD 1A-A OVERVOLTAGE RELAY
DATE OF REPORT: 3/19/86

GENERAL DATA:
SETTING SHEET # 3017 DATE OF SETTING SHEET 8-25-83

COPIES SENT TO: UNIT FILE, SI-235 DATA PACKAGE
TESTED BY: HOOPER & MALONE
CHECKED BY:
APPROVED BY:

	AΦ	BΦ	CΦ	* PERCENT OFF SET POINT (AS FOUND)	
DEVICE	59DAT	59DBT	59DCT		
SERIAL #	3184	3189	3183		
TARGET	OK	OK			
AS FOUND P.U.	120.9	121.8	121.2	AΦ	.1%
AS FOUND D.O.	118.0	118.6	117.8	BΦ	.67%
AS LEFT P.U.	120.9	121.2	121.2	CΦ	.2%
AS LEFT D.O.	118.0	118.0	117.8		
TAP	120V	120V	120V		

EQUIPMENT	TVA #	CALIBRATION DUE DATE
EPOCH-II RELAY TEST SET	531815	6-25-86
FLUKE	537774	6-2-86

* FORMULA FOR PERCENT OFF SET POINT

$$\frac{(\text{AS FOUND VALUE}) - (\text{SET POINT VALUE})}{(\text{SET POINT VALUE})} \times 100 = \%\ \text{OFF SET POINT}$$

Attachment No. 6 4 57
Loc... 27DAT 1A-A

TYPE OF RELAYING VOLTAGE VOLTAGE VOLTAGE

PHASE A B C

SI-235

ROUTINE TEST BY DFN MHH DATE 9/27/85 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER							EQUIP	TVA#	DUE DATE	
INST. SETTING	DEVICE	27DAT		27DBT		27DCT	EPOCH-I	53/R15	6/25/86	
CURRENT IN SEC.	TARGET	OK		OK		OK	KEITHLEY	537774	11-18-85	

TEST RECORD		AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME		P.U.	D.O.	P.U.	D.O.	P.U.	D.O.				
200% " "	AS FOUND	110.0	109.35	110.2	109.25	109.95	109.25				
300% " "	AS LEFT	110.0	109.35	110.2	109.25	109.95	109.25				
400% " " " "		± 0.04% ±				±					
500% " " " "		0%	.04%	.18%	.04%	.05%	.04%				
1000% " " " "		± % Percent off Set Point									

ROUTINE TEST BY DATE DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER										
INST. SETTING										
CURRENT IN SEC.										
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME										
200% " " " "										
300% " " " "										
400% " " " "										
500% " " " "										
1000% " " " "										

ROUTINE TEST BY DATE DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER										
INST. SETTING										
CURRENT IN SEC.										
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME										
200% " " " "										
300% " " " "										
400% " " " "										
500% " " " "										
1000% " " " "										

ROUTINE TEST BY DATE DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER										
INST. SETTING										
CURRENT IN SEC.										
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME										
200% " " " "										
300% " " " "										
400% " " " "										
500% " " " "										
1000% " " " "										

REMARKS

Attachment No. 6 Sheet 5 of 52

27DAT

ROUTINE RELAY TEST RECORD
Electrical Laboratory and Test Branch

LOCATION SEQUOYAH NUCLEAR PLANT
CIRCUIT 6.9 KV SD BD 1AA VOLTAGE RELAY VOLTAGE 6.9 KV
SETTING SHEET NO. 3017 DATED 8-25-83 NORMAL TRIP SUPPLY 125V DC

TYPE OF RELAYING	VOLTAGE		VOLTAGE		VOLTAGE					
PHASE	A		B		C					
TAP D.O	99%		99%		99%					
P.U.	110V		110V		110V					

ROUTINE TEST BY JFN-MHH DATE 3-15-84 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
~~TIME LEVER~~ S/N	1029		1034		1036					
~~INST. SETTING~~ DEVICE	27DAT		27DBT		27DCT					
~~CURRENT IN SEC.~~ TARGET		OK		OK		OK				
TEST RECORD	~~AMPS~~	~~CYCLES~~	~~AMPS~~	~~CYCLES~~	~~AMPS~~	~~CYCLES~~	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O.	P.U.	D.O.	P.U	D.O				
200% " " " " AS FOUND	107.51	108.79	109.58	108.83	109.56	108.87				
300% " " " " AS LEFT	110.03	109.32	109.96	109.30	110.06	109.32				
400% " " " "										
500% " " " "		SI-235								
1000% " " " " *		.192%		.38%		.377%				

* PERCENT OUT OF TOLARANCE (AS FOUND)

ROUTINE TEST BY MHH & BGM DATE 9-21-84 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
~~TIME LEVER~~ S/N	1029									
~~INST. SETTING~~ DEVICE	27DAT									
~~CURRENT IN SEC.~~ TARGET										
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O								
200% " " " " ~~DL~~ AS FOUND		109.68								
300% " " " " AS LEFT										
400% " " " "										
500% " " " "										
1000% " " " "		.27%								

ROUTINE TEST BY MHH & BGM DATE 9-21-84 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
~~TIME LEVER~~ S/N	1029		1034		1036					
~~INST. SETTING~~ DEVICE	27DAT		27DBT		27DCT					
~~CURRENT IN SEC.~~ TARGET		OK		OK		OK				
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O	PU	DO						
200% " " " " AS FOUND	109.68	108.97	109.54	108.88	109.71	108.95				
300% " " " " AS LEFT	110.03	109.32	110.02	109.34	109.98	109.28				
400% " " " "										
500% " " " "		SI-235								
1000% " " " " *	.29	.27%	.42	.38	.26	.32				

* PERCENT OUT OF TOLERANCE (AS FOUND)

ROUTINE TEST BY JFN DATE 3/13/85 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER					SI-235					
INST. SETTING DEVICE	27DAT		27DBT		27DCT					
CURRENT IN SEC.										
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.	EQUIP		TVA #	DATE DUE
200% " " " " AS LEFT	109.96	109.32	110.14	109.24	109.94	109.3	EPCHI		531816	1/17/86
300% " " " " AS FOUND	110.4	109.8	110.5	109.6	110.5	109.3	FLUKE		521962	5/9/85
400% " " " "										
500% " " " "										
1000% " " " " *	.36%	.46%	.45%	.27%	.45%	.46%				

* Percent out of Tolerance as found

TVA 6471A (PO-2-58)

IA-A

ROUTINE RELAY TEST RECORD
Electrical Laboratory and Test Branch

Attachment No. 6 Sheet 7 of 52
Loop/Identifier 27DAT

LOCATION SEQUOYAH NUCEAR PLANT
CIRCUIT 6.9KV SDBD 1AA VOLTAGE RELAY VOLTAGE 6.9 KV
SETTING SHEET NO. 3617 DATED 8-25-83 NORMAL TRIP SUPPLY 125 V DC

TYPE OF RELAYING	VOLTAGE	VOLTAGE	VOLTAGE
PHASE	A	B	C
TAP	120V	120V	120V

ROUTINE TEST BY JFN-MHH DATE 3-15-84 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER										
~~INST. SETTING~~ DEVICE	59DAT		59DBT		59DCT					
~~CURRENT IN SEC.~~ TARGET		OK		OK		OK				
TEST RECORD	~~AMPS~~	~~CYCLES~~	~~AMPS~~	~~CYCLES~~	~~AMPS~~	~~CYCLES~~	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O	P.U.	D.O	P.U.	D.O				
200% " " " " AS FOUND	121.00	118.57	122.50	119.75	122.83	119.87				
300% " " " " AS LEFT	121.00	118.57	121.07	118.26	121.06	118.07				
400% " " " " *		0%		1.2%		1.5%				
500% " " " "			SI-235							
1000% " " " "	~~*~~	~~0%~~		~~1.5%~~		~~1.83%~~	JFN 3/15/84			

* PERCENT OUT OF TOLARANCE (AS FOUND)

ROUTINE TEST BY MHH & BGM DATE 9-21-84 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER										
~~INST. SETTING~~ DEVICE	59DAT		59DBT		59DCT					
~~CURRENT IN SEC.~~ TARGET		OK		OK		OK				
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O	P.U.	D.O.	P.U.	D.O.				
200% " " " " AS FOUND	120.29	117.8	119.49	116.64	119.4	116.33				
300% " " " " AS LEFT	121.0	118.54	121.05	118.25	120.97	117.97	SI-235			
400% " " " "										
500% " " " "										
1000% " " " " *	.59%		1.27		1.3%					

* PERCENT OUT OF TOLERANCE (AS FOUND)

ROUTINE TEST BY JFN JAD DATE 3/13/85 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER							EQUIP	TVA #	DUE DATE	
INST. SETTING DEVICE	59DAT		59DBT		59DCT		EPOCH-I	531816	1/17/86	
CURRENT IN SEC.							FLUKE	521462	5/9/85	
TEST RECORD	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME AS FOUND	122.95	120.06	123.25	120.9	122.95	120.06				
200% " " " " AS LEFT	121.06	118.17	121.0	117.8	121.1	117.6				
300% " " " "										
400% " " " "							SI-235			
500% " " " " *		1.6%		2.35%		1.6%				
1000% " " " "										

* Percent OUT OF Tolerance AS FOUND

ROUTINE TEST BY JFN MHH DATE 9/27/85 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER							EQUIP	TVA #	DUE DATE	
INST. SETTING DEVICE	59DAT		59DBT		59DCT		EPOCH I	531815	6-25-86	
CURRENT IN SEC.							KEITHLEY	537774	11-18-85	
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O	P.U.	D.O.	~~116.75~~	JFN 9/27/85	SI-235			
200% " " AS FOUND	120.6	117.7	119.9	116.75	P.U.	D.O.				
300% " " AS LEFT	120.6	117.7	121.0	117.8	119.8	116.4	AS FOUND			
400% " " " " *		0.37%		0.9%	120.8	117.2	AS LEFT			
500% " " " "					*	0.99%				
1000% " " " "										

* percent off set point

TVA 6471A (PO-2-58)

ROUTINE RELAY TEST RECORD
Electrical Laboratory and Test Branch

Attach... Sheet 8 ... 52
Loop ... 27 DAT

LOCATION SEQUOYAH NUCLEAR PLANT
CIRCUIT 6.9 KV SD BD 1AA VOLTAGE RELAY VOLTAGE 6.9 KV
SETTING SHEET NO. 3022 DATED 9/7/83 NORMAL TRIP SUPPLY 125 V DC

TYPE OF RELAYING	VOLTAGE	VOLTAGE		
PHASE	A	B		
TAP	110V	110V		

ROUTINE TEST BY JFN-MHH DATE 3-15-84 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER										
~~INST. SETTING~~ DEVICE	AX716		CX716		JFN 3/15/84					
~~CURRENT IN SEC.~~ TARGET		OK		OK	~~OK~~					
TEST RECORD	~~AMPS~~	~~CYCLES~~	~~AMPS~~	~~CYCLES~~	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O.	P.U.	D.O.						
200% " " " " AS FOUND	112.33	109.7	113.57	110.28						
300% " " " " AS LEFT	111.91	109.24	112.00	109.26						
400% " " " "										
500% " " " "		SI-235								
1000% " " " " *		.366%		.876%						

* PERCENT OUT OF TOLERANCE (AS FOUND)

ROUTINE TEST BY MHH & BGM DATE 9-21-84 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER										
~~INST. SETTING~~ DEVICE	AX716		CX716							
~~CURRENT IN SEC.~~ TARGET		OK		OK						
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O.	P.U.	D.O.						
200% " " " ~~AS FOUND~~					SI-235					
300% " " " ~~AS LEFT~~		108.8								
400% " " " " AS LEFT	111.64	109.25	112.44	109.32						
500% " " " " AS FOUND	111.25	108.83	112.03	108.83						
1000% " " " " *		.437%		.437%						

* PERCENT OUT OF TOLERANCE (AS FOUND)

ROUTINE TEST BY JFN DATE 3/13/85 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER DEVICE	AX716		CX716		SI-235					
INST. SETTING										
CURRENT IN SEC.										
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O.	P.U.	D.O.	EQUIP		TVA #		DUE DATE	
200% " " " " AS FOUND	113.62	110.53	113.8	110.63	EPOCH-I		531216		1/12/86	
300% " " " " AS LEFT	112.12	109.44	112.81	109.43	FLUKE		521962		5/9/85	
400% " " " "										
500% " " " " *		1.13%		1.22%						
1000% " " " " *	percent out of Tolerance As found									

ROUTINE TEST BY JFN & MHH DATE 9/27/85 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER										
INST. SETTING DEVICE	AX716		CX716		SI-235					
CURRENT IN SEC.										
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME										
200% " " " "	P.U.	D.O.	P.U.	D.O.	EQUIP		TVA #		DUE DATE	
300% " " AS FOUND	111.8	109.0	112.5	109.0	EPOCH I		531815		6/25/86	
400% " " AS LEFT	111.8	109.0	112.5	109.0	KEITHLEY		537774		11/18/85	
500% " " " "	*	0.3%	*	0.3%						
1000% " " " "	* % percent off set point									

1A-A

TVA 6471A (PO-2-58)

ROUTINE RELAY TEST RECORD
Electrical Laboratory and Test Branch

Attachment 6 9 52
Loop #/Relay No. 27DAI

LOCATION SEQUOYAH NUCLEAR PLANT
CIRCUIT 6.9 KV SD BD 1AA VOLTAGE RELAYS VOLTAGE 6.9 KV
SETTING SHEET NO. 3057 DATED 9-7-83 NORMAL TRIP SUPPLY 125 V DC

TYPE OF RELAYING	VOLTAGE		VOLTAGE		VOLTAGE				VOLTAGE	
PHASE	A		B		C				A, B & C	
TAP	90V		90V		90V					

ROUTINE TEST BY JEN-MHH DATE 3-15-84 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER										
~~INST. SETTING~~ DEVICE	27TS1A		27TS1B		27TS1C				27RS1A	
~~CURRENT IN SEC.~~ TARGET		OK		OK		OK				
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.			APPLY 115V	
200% " " " " AS FOUND	95.03	93.12	94.93	92.83	94.50	92.50			REDUCE VOLTAGE	
300% " " " " AS LEFT	94.05	92.05	94.21	92.03	93.96	92.02			& CONTACTS	
400% " " " "									CLOSE @	
500% " " " "			SI-235						35V	
1000% " " " " *	1.2%		.9%		.54%					

* OUT OF TOLERANCE PERCENT (AS FOUND)

ROUTINE TEST BY MHH & BGM DATE 9-21-84 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER				SI-235						
~~INST. SETTING~~ DEVICE	27TS1A		27TS1B		27TS1C				27RS1A	
~~CURRENT IN SEC.~~ TARGET		OK		OK		OK				
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.			APPLY 115V	
200% " " " MHH 9-21-84 ~~AS FOUND~~		~~92.02~~							REDUCE VOLTAGE	
300% " " " ~~AS LEFT~~	~~93.7~~	~~91.57~~							& CONTACTS	
400% " " " " AS LEFT	94.22	92.02	94.15	92.03	94.19	92.00			CLOSE @	
500% " " " " AS FOUND	93.7	91.57	93.65	91.48	93.79	91.55			35V	
1000% " " " " *		.47%		.56%		.49%				

* OUT OF TOLERANCE PERCENT (AS FOUND)

ROUTINE TEST BY JEN DATE 3/13/85 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER				SI-235	EQUIP	TVA#	DUE DATE		27RS1A	
INST. SETTING DEVICE	27TS1A		27TS1B		EPOCH-I	531816	1/17/86			
CURRENT IN SEC.					FLUKE	526115	5/14/85			
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.			APPLY 115V	
200% " " " AS FOUND	95.9	93.8	95.7	93.3	95.6	93.4			& Reduce	
300% " " " AS LEFT	94.3	92.1	94.3	91.9	94.2	91.9			VOLTAGE	
400% " " " "									& Close @	
500% " " " " *		1.96%		1.41%		1.52%			35V	
1000% " " " "										

* % OUT OF TOLERANCE AS FOUND

ROUTINE TEST BY JEN MHH DATE 9/27/85 DATE TRIP TEST

SETTING RECORD	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
TIME LEVER		SI-235								
INST. SETTING DEVICE	27TS1A		27TS1B		27TS1C				27RS1A	
CURRENT IN SEC.	*	0.7%	*	0-54% *		0.9% *% OFF SET POINT				
TEST RECORD	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES	AMPS	CYCLES
150% SET TAP SET TIME	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.			APPLY 115V &	
200% " " AS FOUND	93.5	91.4	93.8	91.5	93.5	91.2			Reduce Voltage	
300% " " AS LEFT	94.4	92.2	94.3	92.0	94.3	92.0			Contact Closes	
400% " " " "	EQUIP		TVA #		DUE DATE				AT 35 VOLTS	
500% " " " "	EPOCH-I		531815		6/25/86					
1000% " " " "	KEITHLEY		537774		11-18-85					
	KD BOX		259411		6-26-86					

TVA 6471A (PO-2-58) IIA-H

TEST RECORD -- GENERAL

REPORT No.: CA-1149

SHEET No: 11 of 12 SHEETS

LOCATION: [illegible] PLANT

DATE OF TEST: 9-23-83

SUBJECT: [illegible] - VOLTAGE RELAYS

DATE OF REPORT: 9-30-83

GENERAL DATA: [illegible] - BROWN BOVERI, ITE 27N, CAT. 211T0175
59DAT, DBT, DCT - BROWN BOVERI, ITE 59H, CAT 211C0175
27TS1A, 1B, 1C AND AX, CX - BROWN BOVERI, ITE 27H, CAT 211B0175

COPIES SENT TO: EBA, FL[illegible], W[illegible]M, WAD, CCM

TESTED BY: M. CALLAHAM

CHECKED BY: MRK

APPROVED BY: MRK.

S.S. 2990 & 3017
8-17-83 & 8-25-83

DEVICE NO.	S/N	P.U.	D.O.	TARGET
DEGRADED VOLTAGE (BUS)				
27DAT	1029	110.0	109.3	OK
27DBT	1034	110.0	109.3	OK
27DCT	1036	110.0	109.3	OK
LOSS OF VOLTAGE (ALT. FDR.)				
AX716	3877	111.9	109.3	OK
CX716	3874	112.8	109.3	OK
LOSS OF VOLTAGE (NOR. FDR.)				
27TS1A	3886	93.6	92.0	OK
27TS1B	3872	94.5	92.0	OK
27TS1C	3869	94.1	92.0	OK
OVER VOLTAGE (BUS)				
59DAT	3184	121.0	119.2	OK
59DBT	3189	121.0	119.2	OK
59DCT	3143	121.0	118.9	OK

TEST EQUIP.	TVA #	DUE DATE
FLUKE 8600 A	486433	2-16-84
DOBLE F-3C TEST SET	512761	7-14-84

Attachment [illegible] 52
27DAT