# Enclosure 1.0

# ITS Section 3.1
# REACTIVITY CONTROL SYSTEMS

| Enclosure Contents | Enclosed? |
|---|---|
| • Response to NRC questions | Yes |
| • Summary Description of ITS/ITS BASES Changes | Yes |
| • ITS Revised Pages | Yes |
| • ITS BASES Revised Pages | Yes |
| • CTS Mark-up Revised Pages | Yes |
| • Justifications for Changes to CTS (DOCs) Revised Pages | Yes |
| • NUREG-1433 BWR/4 STS Mark-up Revised Pages | Yes |
| • NUREG-1433 BWR/4 STS Bases Mark-up Revised Pages | Yes |
| • Justification for Changes to NUREG-1433 (JDs) Revised Pages | Yes |
| • No Significant Hazards Considerations Revised Pages | Yes |
| • Cross-Reference Matrix Correlating Changes Between the CTS, ITS, and NUREG-1433 | Yes |

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.1
# SHUTDOWN MARGIN (SDM)

Item 3.1.1-1

Justification P2; Required Action modified to insert "with isolation Valve(s)". This change is generic and must be changed accordingly (through TSTF). If there are no isolation valves in the flow path, then it appears that the change is a nonsequitur.

TVA RESPONSE

The decision to insert "with isolation valves" in the original submittal was for clarification purposes. To be consistent with NUREG-1433, in this submittal the insertion of "isolation valves" has been removed from ITS 3.1.1 required actions D.4 and E.5, and also removed from the ITS Bases. The NUREG mark-up has similarly been revised to reflect this change including the deletion of Justifications P2 and P16.

Item 3.1.1-2

LA1; CTS 4.3.A.1 details part of the method to perform the SDM Surveillance and this information is moved to "the procedures". As stated "procedures are controlled by the licensee controlled program. Identify what procedure the details of the SDM Surveillance are moved to and how changes to this procedure are controlled.

TVA RESPONSE

The CTS 4.3.A.1 provisions referenced in LA1 (sufficient control rods shall be withdrawn) is a procedural detail for conducting SDM surveillance tests which inherently must be included in the development of the SDM surveillance procedure. Therefore, this detail need not be in the ITS. The details of the SDM surveillance required by ITS SR 3.1.1.1, including specific details relating to the withdrawal of the control rods for verification of the SDM, will be included in the corresponding surveillance procedure, SR-3.1.1.1, Reactivity Margin Test. Changes to this procedure are controlled in accordance with site administrative procedures which include a review for 10 CFR 50.59 applicability. Additional descriptive information concerning performance of the SDM surveillance is also found in ITS Bases Section for SR 3.1.1.1.

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.2
# REACTIVITY ANOMALIES

Item 3.1.2-1

LA1; CTS 4.3.D details of methods to perform the Reactivity Anomaly Surveillance that are not contained in ITS 3.1.2. These details are moved to the ITS Bases and procedure. What is going where? What is in the Bases? Indicate procedures to which information will go.

TVA RESPONSE

The gist of the CTS 4.3.D details referenced by DOC LA1 is incorporated in the second paragraph of the ITS 3.1.2 APPLICABLE SAFETY ANALYSES Bases. In the Bases, a discussion is provided regarding establishment of a baseline comparison between the measured and predicted core reactivity for use in performing the reactivity anomaly surveillance throughout the cycle. Hence, the CTS details for conducting the SDM SR have been effectively relocated to the ITS Bases as delineated above. Changes to the BASES are controlled by the requirements of ITS 5.5.10 and 10 CFR 50.59 as discussed in ITS 5.5.10.

Specific details for performing the Reactivity Anomaly surveillance, including details for performing the comparison and handling of data, will be in surveillance procedure (SR-3.1.2.1) which will implement the requirements of SR 3.1.2.1. Changes to SRs are controlled in accordance with site administrative procedures which include a review for 10 CFR 50.59 applicability.

Item 3.1.2-2

P46; CTS 4.3.D requires that a reactivity Anomaly comparison will be made at least every full power month. ITS SR 3.1.2.1 requires that this comparison be made each 1000 EFPH during operations in MODE 1. The STS SR 3.1.2.1 requires that this comparison be made each 1000 MWD/T during operations in MODE 1. Either convert the CTS units to those in the ITS or use the CTS units. Is P46 the appropriate reference for the markup?

TVA RESPONSE

Proposed ITS SR 3.1.2.1 has been revised to utilize a frequency of every 1000 MWD/T. This is consistent with NUREG-1433. DOC L2 has been added to justify this change. DOC P46 is no longer required since the ITS matches the NUREG and has been deleted.

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.3
# CONTROL ROD OPERABILITY

Item 3.1.3-1

M1, M3, M5, M6, M9, M10, M11; Provide justification relative to your plant operational constraints, system design.

TVA RESPONSE

M1

ITS 3.1.3 Condition A has a required action A.2 to disarm the associated control rod drive (CRD) within a completion time of 2 hours. CTS has the same action required, but the CTS has no specific completion time stated. The justification for this change can be found in Bases for ITS 3.1.3, Actions A.1, A.2, A.3, and A.4. The allowed completion time of 2 hours is acceptable based on operating experience and provides a reasonable time to perform the required action in a orderly manner. Isolating the control rod also prevents potential damage to the control rod drive mechanism from a scram. We consider the new requirement as a prudent action which can be implemented. Hence, TVA is agreeable to the change. The 2-hour time period is consistent with NUREG-1433.

M3

CTS 4.3.A.2 requires the rod notch surveillance be performed when three or more control rods are inoperable. In ITS, the notch SR is more restrictive since it is required when one control rod is immovable. This new requirement is implementable, is not considered to restrict operating activities, and does not require significant resources. The CRD system does not have to be removed from service to perform the test. Therefore, addition of this requirement is acceptable to BFN.

M5

ITS SR 3.1.3.1 requires the position of each control rod be verified every 24 hours. CTS does not have a specific requirement for verifying control rod position. The justification for this new requirement is in the ITS Bases for SR 3.1.3.1 which states, "The 24 hour Frequency of this SR is based on operating experience related to expected changes in control rod position and the availability of control rod position indications in the control room." This additional verification of control rod position enhances the safe operation of the CRD system by ensuring the Operator has adequate information on control rod position to determine control rod operability and controlling rod patterns. The performance of this new SR does not require the CRD system to be removed from service. Additionally, the 24-hour frequency does not require significant resources. Therefore, to maintain consistency with NUREG-1433, BFN is agreeable to adoption of ITS SR 3.1.3.1.

M6

Proposed ITS 3.1.3 Required Actions D.1 and D.2 allow 4 hours to restore compliance with the specification (i.e., restore control rods to operable status or restore compliance with the Banked Position Withdrawal Sequence), else be in MODE 3 in 12 hours. The CTS allowable time to reach a shutdown condition (MODE 3) is 24 hours. Since the total time to reach a shutdown condition has been effectively changed from 24 hours to 16 hours (4 hours for the restoration attempt and 12 hours to reach MODE 3), this change is considered more restrictive. The allowed time of 12 hours to reach MODE 3 from full power is reasonable based on operating experience. This new requirement is implementable and is not considered to unduly restrict operating activities. Therefore, addition of this new requirement is acceptable to BFN. This change also makes BFN ITS consistent with NUREG-1433.

M9

ITS SR 3.1.3.5 requires verifying rod coupling each time a rod is withdrawn to the full-out position. CTS requires this verification only after each refueling outage. The new SR provides a more frequent assurance that the rod is coupled to the control rod drive mechanism and, thus, further supports safe plant operation. This new SR is implementable and consistent with normal operating practices for CRD withdrawal. The SR does not require removal of the CRD from service.

M10

CTS 3.3.A.2.a requires that inoperable (and stuck) control rods be positioned such that SDM requirements are maintained. ITS prescribes several added Actions be taken. Specifically, Required Action A4 requires that with one stuck rod, shutdown margin be verified within 72 hours. Required Action B2 requires that with more than one stuck rod, the reactor be in Hot Shutdown within 12 hours. Required Action C1 requires that with one or more insertable inoperable rods, that each be fully inserted. By only allowing one stuck rod and by requiring that all insertable inoperable control rods be fully inserted, the proposed Required Actions provide greater assurance that SDM is maintained. Therefore, it can be stated that this requirement promotes the safe operation of the plant and supports the nuclear safety functions of the CRDS. Therefore, BFN is agreeable to this change. This change also makes BFN ITS consistent with NUREG-1433.

M11

The CTS 3.3.A.2.a allowable time to reach a nonapplicable condition has been reduced from 24 hours to reach Cold Shutdown (MODE 4) to 12 hours to reach MODE 3 in ITS. This change is more restrictive because all rods must be fully inserted in 12 hours instead of the currently required 24 hours. Placing the reactor in the Hot Shutdown MODE decreases the possibility of an insertion of positive reactivity. Therefore, this more restrictive change will enhance plant operation and is considered safe from a nuclear safety standpoint. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems. This change is consistent with NUREG-1433.

Item 3.1.3-2

The discussion for A.7 states "This requirement duplicates an identical and more appropriately placed requirement in existing specification 3.10.A.6. Therefore, deletion of this requirement is not considered administrative." This statement is inaccurate because CTS 3.3.B.1 and CTS 3.10.A.6 are not identical. CTS 3.3.B.1 states "This requirement does not apply in the SHUTDOWN CONDITION when the reactor is vented. Two control rod drives may be removed as long as 3.3.B.1 shutdown margin (SDM) is met." CTS 3.10.A.6 refers to withdrawing control rods during refueling but makes no mention of SDM requirements. It is physically correct that a control rod must be withdrawn in order to remove the drive mechanism but the SDM requirement is not contained in CTS 3.10.A.6 and CTS 3.10 does not apply to the plant described in CTS 3.3.B.1 but only refueling. Provide discussion and justification for deleting the portion of CTS 3.3.B.1 identified as A.7.

TVA RESPONSE

CTS 3.3.B.1 and CTS 3.10.A.6 were incorrectly stated as being duplicated requirements and more appropriately placed in existing section 3.10.A.6. The statements are not identical since one requirement is performed with the reactor in a Shutdown condition while the other with the reactor in the Refueling MODE.

CTS 3.3.B.1 allows two control rods to be withdrawn for maintenance purposes when the reactor is in the Shutdown condition and the reactor is vented provided SDM requirements are met. This exception is not being specifically carried forward in ITS. Hence, we are recategorizing the elimination of this provision as a more restrictive change and a new DOC M12 added to explain the change. DOC A7 is deleted.

This change is acceptable because the proposed ITS 3.10 provides alternate specifications which allow CRD removal during outages and shutdown conditions. Specifically, ITS 3.10.5 allows single control rod drive removal during refueling provided certain restrictions are met. This specification is similar to CTS 3.3.B.1 except that only a single rod can be removed (in refueling). ITS 3.10.6 allows multiple control rod drive removal provided the specified restrictions are met. ITS 3.10.3 allows a single CRD to be removed in cold shutdown provided the accompanying restrictions are met. We consider that these ITS specifications provide sufficient operating flexibility to perform all necessary CRD maintenance activities.

Item 3.1.3-3

The requirements of CTS 3.3.B.2 and 4.3.B.2 concerning the CRD housing support requirements are moved to plant procedures and not relocated as stated. This change to CTS requirements is a Less restrictive Administrative change and not a Relocation. For R1 provide discussion and justification for a Less Restrictive Administrative change rather than a Relocation. For all, are they being moved to the bases, FSAR or plant procedures. Specify and indicate how changes to these procedures are controlled.

TVA RESPONSE

The CRD housing support requirements specified in the subject CTS provisions are being relocated to the Technical Requirements Manual (TRM) which is controlled by the 10 CFR 50.59 process. Relocation of these CTS provisions is consistent with the application of 10 CFR 50.36 criteria. DOC R1 has been revised to be more specific on this point.

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.4
# CONTROL ROD SCRAM TIMES

Item 3.1.4-1

SR 3.1.4.1 has a note added that makes exceptions not allowed by STS or CTS. SR 3.1.4.3 also makes an exception not contained in the CTS or the STS. Both of these changes are Beyond the Scope of this review. They are also generic issues that do not only apply to BFN and therefore require TSTF review, approval, and submittal.

TVA RESPONSE

In response to the NRC comment, the subject note and exception have been removed as shown in the attached revised ITS. The proposed BFN ITS are now consistent with NUREG-1433.

Item 3.1.4-2

M2, M3, M4, M6. Each of these needs to be justified relative to BFN and any added operational constraints, and any impact on system design or licensing basis

TVA RESPONSE

M2

The Applicability for ITS LCO 3.1.4 is MODES 1 and 2 which includes power levels ≤ 1% RTP. CTS 3.3.C.1 requirement of "in the reactor power operation condition" is defined as being in STARTUP/HOT STANDBY or RUN MODE with the reactor critical and > 1% rated power. Hence, the ITS are slightly more restrictive in that the LCO is applied at power levels less than 1% compared to CTS. This small increase in power level applicability does not affect plant operations or testing requirements.

M3

BFN has chosen to adopt the second frequency specified in NUREG-1433 SR 3.4.1 to ensure that, if the reactor remains shutdown ≥ 120 days, all control rods will be scram time tested. CTS 4.3.C.1 requires this testing only be performed after a refueling outage. Adding this requirement ensures that control rods will be tested on a periodic frequency even if the unit is shutdown for a long period without conducting refueling activities. Thus, this addition is more restrictive.

As noted above, the ITS will require additional testing following prolonged (non-refueling) outages. Shutdowns of this nature are rare, hence, in practice, it is not likely that the additional testing will be necessary. Furthermore, BFN considers that it prudent practice to scram time the control rods following extended outages to verify proper system operation. Performance of this type testing does not require removal of the CRD system from service. Therefore, this change is acceptable to BFN.

M4

BFN has chosen to adopt the STS requirement (SR 3.1.4.4) as specified in NUREG-1433 that requires a scram time test after work on a control rod or CRD that could affect the scram time. CTS does not have an explicit requirement that scram timing be performed following work on the control rod. The adoption of this SR promotes scram reliability and enhances the nuclear safety function of the Control Rod Drive System. This type of testing is consistent with current Post Maintenance Testing practices and, therefore, does not require additional resources.

M6

ITS SR 3.1.4.3 has been added which requires a scram test after maintenance has been performed on a control rod or CRD that could have affected the scram time prior to declaring the control rod OPERABLE with reactor steam dome at any pressure (see revised ITS). CTS does not have an explicit requirement to perform scram testing following maintenance. This more restrictive action demonstrates control rod scram reliability and supports the nuclear safety function of the control rods and the Control Rod Drive System. This SR provides additional assurances of proper scram performance. The testing does not require the CRD system to be removed from operation for testing purposes.

Item 3.1.4-3

A2; CTS 3.3.C.1; CTS 3.3.C.1 and 3.3.C.2 specify control rod position in terms of % from Fully Withdrawn for scram time testing limits. ITS Table 3.1.4.1 specifies rod position in terms of "Notch Position" for time testing limits. The discussion states that these positions are equivalent to the next nearest measured notch position. Provide information that clearly shows the equivalency of the percentages shown in the CTS compared with the notch position shown in the ITS. Comment B2 does not appear to apply here except as its applies to the brackets.

TVA RESPONSE

The following table compares the CTS control rod positions with those provided in the BFN ITS Table 3.1.4-1.

| CTS Rod Position % Insertion | Equivalent Notch Position | Control Rod Position BFN ITS Table 3.1.4-1 | Actual % Insertion |
|---|---|---|---|
| 5 | 46 | 46 | 4.2 |
| 20 | 38 | 36 | 25 |
| 50 | 24 | 26 | 46 |
| 90 | 04 | 06 | 87.5 |

As can be seen in these comparisons, the notch positions are within a notch of the closest equivalent notch position A single notch corresponds to a 4.2% difference in control rod insertion.

The notch positions provided in BFN ITS Table 3.1.4-1 correspond to the suggested values listed in the NUREG brackets and are the customary notch positions used in ITS as evidenced by their use by several other utilities. The appropriate allowable scram times have been supplied for these positions.

The purpose of this table is to ensure that the plant operates within the analyzed basis. The scram time values supplied in Table 3.1.4-1 have been supplied by the vendor (General Electric) and correspond to the values used in the reload analyses. The actual technical specification limits supplied in Table 3.1.4-1 also include adjustments to the analytical values to account for the specified number of slow control rods. Both operating units at Browns Ferry are currently analyzed for these scram times.

DOC A1 has been revised to be more clear on the above points.

Item 3.1.4-4

LA1, LA2, LA3; Where are these details going? To the FSAR or Bases. Some of this detail needs to be in one of the above. Identify what will go to plant procedures and what goes to FSAR or Bases Indicate control mechanism.

TVA RESPONSE

LA1

The CTS 4.3.C.1 details referenced in LA1 which specify that only rods in those sequences which were fully withdrawn in the region from 100% rod density to 50% rod density can be scram time tested when below 10% power have been relocated to the surveillance test for SR 3.1.4.1. Surveillance test procedures are controlled by site administrative procedures which include a review for 10 CFR 50.59 applicability.

LA2

The CTS SR 4.3.C.2 details referenced by LA2 specify that 10% of operable control rods be tested every 120 days. This detail is relocated to the Bases for ITS SR 3.1.4.2 which likewise prescribes a 10% sample and provides additional clarifications regarding other sampling aspects. The surveillance procedure for ITS SR 3.1.4.2 will likewise include instructions for testing the sample. The Bases are controlled in accordance with ITS 5.5.10 which includes a 10 CFR 50.59 review. Surveillance test procedures are controlled by site administrative procedures which include a review for 10 CFR 50.59 applicability.

LA3

The CTS 4.3.C.2 details prescribed by LA3 provide that whenever scram time testing is performed, an evaluation be made to provide reasonable assurance that proper control rod drive maintenance is being performed. Requirements for scram time testing are specified in several ITS 3.1.4 SR specifications. Each of these surveillance tests include an evaluation of the scram times to verify proper CRD performance. This ensures that proper rod maintenance is being performed. Failure to meet test criteria will result in entering ITS 3.1.4 Action statements, and a detailed evaluation of the reasons for failing to meet the surveillance criteria using the site corrective actions program. Therefore, although the CTS provision is not explicitly

stated in the Bases, execution of the ITS SR and accompanying surveillance instructions accomplishs the same objective.

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.5
# CONTROL ROD SCRAM ACCUMULATORS

Item 3.1.5-1

CTS 4.3.A.2.d requires that control rod accumulators be determined OPERABLE by verifying that the pressure and level detectors are not in the alarmed condition each 7 days. Should some of this information go to the Bases or FSAR.

TVA RESPONSE

ITS SR 3.1.5.1 Bases discuss that an automatic accumulator monitor may be used to continuously satisfy the SR for ensuring accumulator operability. This monitor is the same system of pressure and level detectors referred to in CTS 4.3.A.2.d referenced by LA3. This monitor system is a design feature of the CRD system and is described in UFSAR Section 3.4.5.3.2. UFSAR and system design changes are also reviewed using 10 CFR 50.59. Changes to the ITS Bases are controlled in accordance with ITS section 5.5.10 which includes a 10 CFR 50.59 review.

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.7
# STANDBY LIQUID CONTROL (SLC) SYSTEM

Item 3.1.7

DOC (all); CTS/STS/LCO=(all); There are so many changes that differ from the STS and all of the other BWRs that have been reviewed that this complete specification is being considered as Beyond Scope and technical staff review is requested.

TVA RESPONSE

This ITS section was discussed with NRC staff via a teleconference. TVA indicated that the differences in ITS 3.1.7 from NUREG-1433 were the result of retention of BFN specific CTS requirements. It was also discussed that the BFN proposed ITS were similar to those previously approved for other Boiling Water Reactors with similar boron enrichment and design features. As a result of this teleconference, it is our understanding that the staff concerns were resolved. Also, to promote consistency with NUREG-1433, TVA agreed to incorporate NUREG-1433 SR 3.1.7.6 into BFN ITS. It is added as SR 3.1.7.10 in the attached revised BFN ITS.

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.8
# SCRAM DISCHARGE VOLUME (SDV)
# VENT AND DRAIN VALVES

Item 3.1.8

M1, M2, M3; Provide justification relative to your plant based on impact on plant design, licensing basis, and operational constraints.

TVA RESPONSE

M1

CTS 3.3.F.2 allows continued reactor operation with any SDV drain and vent valve inoperable provided that the redundant drain or vent valve is demonstrated operable. Proposed ITS allows 7 days to restore any SDV vent or drain valve to operable status at which time a reactor shutdown is required. This new ITS requirement has the potential to cause reactor shutdowns if malfunction of the scram discharge volume drain and vent valves occur that would not be required by CTS. The subject valves are reliable and the ITS 7-day allowance provides sufficient time to repair valve problems discovered while operating. Therefore, BFN is agreeable to this change.

M2

CTS 3.3.F.3 requires the reactor to be in a Hot Standby condition (equivalent to MODE 2 at $\leq$1% rated thermal power) within 24 hours of redundant drain or vent valves becoming inoperable. ITS 3.1.8 Required Action C is more restrictive since it requires the reactor be placed in MODE 3 within 12 hours. Operating experience indicates that 12 hours is a reasonable time period to shutdown the reactor in an orderly manner. Therefore, BFN is agreeable to this change.

M3

DOC M3 discusses the addition of ITS SR 3.1.8.3, an integrated test of the SDV vent and drain valves to verify total system performance. This new SR provides additional assurance of the proper performance of these valves and likewise promotes reliability of the CRDS. The 18-month SR accommodates performance of the new SR during refueling outages which minimizes impact on CRD system operation.

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.1
# SHUTDOWN MARGIN (SDM)

Item 3.1.1-1

Justification P2; Required Action modified to insert "with isolation Valve(s)". This change is generic and must be changed accordingly (through TSTF). If there are no isolation valves in the flow path, then it appears that the change is a nonsequitur.

TVA RESPONSE

The decision to insert "with isolation valves" in the original submittal was for clarification purposes. To be consistent with NUREG-1433, in this submittal the insertion of "isolation valves" has been removed from ITS 3.1.1 required actions D.4 and E.5, and also removed from the ITS Bases. The NUREG mark-up has similarly been revised to reflect this change including the deletion of Justifications P2 and P16.

Item 3.1.1-2

LA1; CTS 4.3.A.1 details part of the method to perform the SDM Surveillance and this information is moved to "the procedures". As stated "procedures are controlled by the licensee controlled program. Identify what procedure the details of the SDM Surveillance are moved to and how changes to this procedure are controlled.

TVA RESPONSE

The CTS 4.3.A.1 provisions referenced in LA1 (sufficient control rods shall be withdrawn) is a procedural detail for conducting SDM surveillance tests which inherently must be included in the development of the SDM surveillance procedure. Therefore, this detail need not be in the ITS. The details of the SDM surveillance required by ITS SR 3.1.1.1, including specific details relating to the withdrawal of the control rods for verification of the SDM, will be included in the corresponding surveillance procedure, SR-3.1.1.1, Reactivity Margin Test. Changes to this procedure are controlled in accordance with site administrative procedures which include a review for 10 CFR 50.59 applicability. Additional descriptive information concerning performance of the SDM surveillance is also found in ITS Bases Section for SR 3.1.1.1.

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.2
# REACTIVITY ANOMALIES

Item 3.1.2-1

LA1; CTS 4.3.D details of methods to perform the Reactivity Anomaly Surveillance that are not contained in ITS 3.1.2. These details are moved to the ITS Bases and procedure. What is going where? What is in the Bases? Indicate procedures to which information will go.

TVA RESPONSE

The gist of the CTS 4.3.D details referenced by DOC LA1 is incorporated in the second paragraph of the ITS 3.1.2 APPLICABLE SAFETY ANALYSES Bases. In the Bases, a discussion is provided regarding establishment of a baseline comparison between the measured and predicted core reactivity for use in performing the reactivity anomaly surveillance throughout the cycle. Hence, the CTS details for conducting the SDM SR have been effectively relocated to the ITS Bases as delineated above. Changes to the BASES are controlled by the requirements of ITS 5.5.10 and 10 CFR 50.59 as discussed in ITS 5.5.10.

Specific details for performing the Reactivity Anomaly surveillance, including details for performing the comparison and handling of data, will be in surveillance procedure (SR-3.1.2.1) which will implement the requirements of SR 3.1.2.1. Changes to SRs are controlled in accordance with site administrative procedures which include a review for 10 CFR 50.59 applicability.

Item 3.1.2-2

P46; CTS 4.3.D requires that a reactivity Anomaly comparison will be made at least every full power month. ITS SR 3.1.2.1 requires that this comparison be made each 1000 EFPH during operations in MODE 1. The STS SR 3.1.2.1 requires that this comparison be made each 1000 MWD/T during operations in MODE 1. Either convert the CTS units to those in the ITS or use the CTS units. Is P46 the appropriate reference for the markup?

TVA RESPONSE

Proposed ITS SR 3.1.2.1 has been revised to utilize a frequency of every 1000 MWD/T. This is consistent with NUREG-1433. DOC L2 has been added to justify this change. DOC P46 is no longer required since the ITS matches the NUREG and has been deleted.

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.3
# CONTROL ROD OPERABILITY

Item 3.1.3-1

M1, M3, M5, M6, M9, M10, M11; Provide justification relative to your plant operational constraints, system design.

TVA RESPONSE

M1

ITS 3.1.3 Condition A has a required action A.2 to disarm the associated control rod drive (CRD) within a completion time of 2 hours. CTS has the same action required, but the CTS has no specific completion time stated. The justification for this change can be found in Bases for ITS 3.1.3, Actions A.1, A.2, A.3, and A.4. The allowed completion time of 2 hours is acceptable based on operating experience and provides a reasonable time to perform the required action in a orderly manner. Isolating the control rod also prevents potential damage to the control rod drive mechanism from a scram. We consider the new requirement as a prudent action which can be implemented. Hence, TVA is agreeable to the change. The 2-hour time period is consistent with NUREG-1433.

M3

CTS 4.3.A.2 requires the rod notch surveillance be performed when three or more control rods are inoperable. In ITS, the notch SR is more restrictive since it is required when one control rod is immovable. This new requirement is implementable, is not considered to restrict operating activities, and does not require significant resources. The CRD system does not have to be removed from service to perform the test. Therefore, addition of this requirement is acceptable to BFN.

M5

ITS SR 3.1.3.1 requires the position of each control rod be verified every 24 hours. CTS does not have a specific requirement for verifying control rod position. The justification for this new requirement is in the ITS Bases for SR 3.1.3.1 which states, "The 24 hour Frequency of this SR is based on operating experience related to expected changes in control rod position and the availability of control rod position indications in the control room." This additional verification of control rod position enhances the safe operation of the CRD system by ensuring the Operator has adequate information on control rod position to determine control rod operability and controlling rod patterns. The performance of this new SR does not require the CRD system to be removed from service. Additionally, the 24-hour frequency does not require significant resources. Therefore, to maintain consistency with NUREG-1433, BFN is agreeable to adoption of ITS SR 3.1.3.1.

M6

Proposed ITS 3.1.3 Required Actions D.1 and D.2 allow 4 hours to restore compliance with the specification (i.e., restore control rods to operable status or restore compliance with the Banked Position Withdrawal Sequence), else be in MODE 3 in 12 hours. The CTS allowable time to reach a shutdown condition (MODE 3) is 24 hours. Since the total time to reach a shutdown condition has been effectively changed from 24 hours to 16 hours (4 hours for the restoration attempt and 12 hours to reach MODE 3), this change is considered more restrictive. The allowed time of 12 hours to reach MODE 3 from full power is reasonable based on operating experience. This new requirement is implementable and is not considered to unduly restrict operating activities. Therefore, addition of this new requirement is acceptable to BFN. This change also makes BFN ITS consistent with NUREG-1433.

M9

ITS SR 3.1.3.5 requires verifying rod coupling each time a rod is withdrawn to the full-out position. CTS requires this verification only after each refueling outage. The new SR provides a more frequent assurance that the rod is coupled to the control rod drive mechanism and, thus, further supports safe plant operation. This new SR is implementable and consistent with normal operating practices for CRD withdrawal. The SR does not require removal of the CRD from service.

M10

CTS 3.3.A.2.a requires that inoperable (and stuck) control rods be positioned such that SDM requirements are maintained. ITS prescribes several added Actions be taken. Specifically, Required Action A4 requires that with one stuck rod, shutdown margin be verified within 72 hours. Required Action B2 requires that with more than one stuck rod, the reactor be in Hot Shutdown within 12 hours. Required Action C1 requires that with one or more insertable inoperable rods, that each be fully inserted. By only allowing one stuck rod and by requiring that all insertable inoperable control rods be fully inserted, the proposed Required Actions provide greater assurance that SDM is maintained. Therefore, it can be stated that this requirement promotes the safe operation of the plant and supports the nuclear safety functions of the CRDS. Therefore, BFN is agreeable to this change. This change also makes BFN ITS consistent with NUREG-1433.

M11

The CTS 3.3.A.2.a allowable time to reach a nonapplicable condition has been reduced from 24 hours to reach Cold Shutdown (MODE 4) to 12 hours to reach MODE 3 in ITS. This change is more restrictive because all rods must be fully inserted in 12 hours instead of the currently required 24 hours. Placing the reactor in the Hot Shutdown MODE decreases the possibility of an insertion of positive reactivity. Therefore, this more restrictive change will enhance plant operation and is considered safe from a nuclear safety standpoint. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems. This change is consistent with NUREG-1433.

Item 3.1.3-2

The discussion for A.7 states "This requirement duplicates an identical and more appropriately placed requirement in existing specification 3.10.A.6. Therefore, deletion of this requirement is not considered administrative." This statement is inaccurate because CTS 3.3.B.1 and CTS 3.10.A.6 are not identical. CTS 3.3.B.1 states "This requirement does not apply in the SHUTDOWN CONDITION when the reactor is vented. Two control rod drives may be removed as long as 3.3.B.1 shutdown margin (SDM) is met." CTS 3.10.A.6 refers to withdrawing control rods during refueling but makes no mention of SDM requirements. It is physically correct that a control rod must be withdrawn in order to remove the drive mechanism but the SDM requirement is not contained in CTS 3.10.A.6 and CTS 3.10 does not apply to the plant described in CTS 3.3.B.1 but only refueling. Provide discussion and justification for deleting the portion of CTS 3.3.B.1 identified as A.7.

TVA RESPONSE

CTS 3.3.B.1 and CTS 3.10.A.6 were incorrectly stated as being duplicated requirements and more appropriately placed in existing section 3.10.A.6. The statements are not identical since one requirement is performed with the reactor in a Shutdown condition while the other with the reactor in the Refueling MODE.

CTS 3.3.B.1 allows two control rods to be withdrawn for maintenance purposes when the reactor is in the Shutdown condition and the reactor is vented provided SDM requirements are met. This exception is not being specifically carried forward in ITS. Hence, we are recategorizing the elimination of this provision as a more restrictive change and a new DOC M12 added to explain the change. DOC A7 is deleted.

This change is acceptable because the proposed ITS 3.10 provides alternate specifications which allow CRD removal during outages and shutdown conditions. Specifically, ITS 3.10.5 allows single control rod drive removal during refueling provided certain restrictions are met. This specification is similar to CTS 3.3.B.1 except that only a single rod can be removed (in refueling). ITS 3.10.6 allows multiple control rod drive removal provided the specified restrictions are met. ITS 3.10.3 allows a single CRD to be removed in cold shutdown provided the accompanying restrictions are met. We consider that these ITS specifications provide sufficient operating flexibility to perform all necessary CRD maintenance activities.

Item 3.1.3-3

The requirements of CTS 3.3.B.2 and 4.3.B.2 concerning the CRD housing support requirements are moved to plant procedures and not relocated as stated. This change to CTS requirements is a Less restrictive Administrative change and not a Relocation. For R1 provide discussion and justification for a Less Restrictive Administrative change rather than a Relocation. For all, are they being moved to the bases, FSAR or plant procedures. Specify and indicate how changes to these procedures are controlled.

TVA RESPONSE

The CRD housing support requirements specified in the subject CTS provisions are being relocated to the Technical Requirements Manual (TRM) which is controlled by the 10 CFR 50.59 process. Relocation of these CTS provisions is consistent with the application of 10 CFR 50.36 criteria. DOC R1 has been revised to be more specific on this point.

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.4
# CONTROL ROD SCRAM TIMES

Item 3.1.4-1

SR 3.1.4.1 has a note added that makes exceptions not allowed by STS or CTS. SR 3.1.4.3 also makes an exception not contained in the CTS or the STS. Both of these changes are Beyond the Scope of this review. They are also generic issues that do not only apply to BFN and therefore require TSTF review, approval, and submittal.

TVA RESPONSE

In response to the NRC comment, the subject note and exception have been removed as shown in the attached revised ITS. The proposed BFN ITS are now consistent with NUREG-1433.

Item 3.1.4-2

M2, M3, M4, M6. Each of these needs to be justified relative to BFN and any added operational constraints, and any impact-on system design or licensing basis

TVA RESPONSE

M2

The Applicability for ITS LCO 3.1.4 is MODES 1 and 2 which includes power levels ≤ 1% RTP. CTS 3.3.C.1 requirement of "in the reactor power operation condition" is defined as being in STARTUP/HOT STANDBY or RUN MODE with the reactor critical and > 1% rated power. Hence, the ITS are slightly more restrictive in that the LCO is applied at power levels less than 1% compared to CTS. This small increase in power level applicability does not affect plant operations or testing requirements.

M3

BFN has chosen to adopt the second frequency specified in NUREG-1433 SR 3.4.1 to ensure that, if the reactor remains shutdown ≥ 120 days, all control rods will be scram time tested. CTS 4.3.C.1 requires this testing only be performed after a refueling outage. Adding this requirement ensures that control rods will be tested on a periodic frequency even if the unit is shutdown for a long period without conducting refueling activities. Thus, this addition is more restrictive.

As noted above, the ITS will require additional testing following prolonged (non-refueling) outages. Shutdowns of this nature are rare, hence, in practice, it is not likely that the additional testing will be necessary. Furthermore, BFN considers that it prudent practice to scram time the control rods following extended outages to verify proper system operation. Performance of this type testing does not require removal of the CRD system from service. Therefore, this change is acceptable to BFN.

M4

BFN has chosen to adopt the STS requirement (SR 3.1.4.4) as specified in NUREG-1433 that requires a scram time test after work on a control rod or CRD that could affect the scram time. CTS does not have an explicit requirement that scram timing be performed following work on the control rod. The adoption of this SR promotes scram reliability and enhances the nuclear safety function of the Control Rod Drive System. This type of testing is consistent with current Post Maintenance Testing practices and, therefore, does not require additional resources.

M6

ITS SR 3.1.4.3 has been added which requires a scram test after maintenance has been performed on a control rod or CRD that could have affected the scram time prior to declaring the control rod OPERABLE with reactor steam dome at any pressure (see revised ITS). CTS does not have an explicit requirement to perform scram testing following maintenance. This more restrictive action demonstrates control rod scram reliability and supports the nuclear safety function of the control rods and the Control Rod Drive System. This SR provides additional assurances of proper scram performance. The testing does not require the CRD system to be removed from operation for testing purposes.

Item 3.1.4-3

A2; CTS 3.3.C.1; CTS 3.3.C.1 and 3.3.C.2 specify control rod position in terms of % from Fully Withdrawn for scram time testing limits. ITS Table 3.1.4.1 specifies rod position in terms of "Notch Position" for time testing limits. The discussion states that these positions are equivalent to the next nearest measured notch position. Provide information that clearly shows the equivalency of the percentages shown in the CTS compared with the notch position shown in the ITS. Comment B2 does not appear to apply here except as its applies to the brackets.

TVA RESPONSE

The following table compares the CTS control rod positions with those provided in the BFN ITS Table 3.1.4-1.

| CTS Rod Position % Insertion | Equivalent Notch Position | Control Rod Position BFN ITS Table 3.1.4-1 | Actual % Insertion |
|---|---|---|---|
| 5 | 46 | 46 | 4.2 |
| 20 | 38 | 36 | 25 |
| 50 | 24 | 26 | 46 |
| 90 | 04 | 06 | 87.5 |

As can be seen in these comparisons, the notch positions are within a notch of the closest equivalent notch position A single notch corresponds to a 4.2% difference in control rod insertion.

The notch positions provided in BFN ITS Table 3.1.4-1 correspond to the suggested values listed in the NUREG brackets and are the customary notch positions used in ITS as evidenced by their use by several other utilities. The appropriate allowable scram times have been supplied for these positions.

The purpose of this table is to ensure that the plant operates within the analyzed basis. The scram time values supplied in Table 3.1.4-1 have been supplied by the vendor (General Electric) and correspond to the values used in the reload analyses. The actual technical specification limits supplied in Table 3.1.4-1 also include adjustments to the analytical values to account for the specified number of slow control rods. Both operating units at Browns Ferry are currently analyzed for these scram times.

DOC A1 has been revised to be more clear on the above points.

Item 3.1.4-4

LA1, LA2, LA3; Where are these details going? To the FSAR or Bases. Some of this detail needs to be in one of the above. Identify what will go to plant procedures and what goes to FSAR or Bases Indicate control mechanism.

TVA RESPONSE

LA1

The CTS 4.3.C.1 details referenced in LA1 which specify that only rods in those sequences which were fully withdrawn in the region from 100% rod density to 50% rod density can be scram time tested when below 10% power have been relocated to the surveillance test for SR 3.1.4.1. Surveillance test procedures are controlled by site administrative procedures which include a review for 10 CFR 50.59 applicability.

LA2

The CTS SR 4.3.C.2 details referenced by LA2 specify that 10% of operable control rods be tested every 120 days. This detail is relocated to the Bases for ITS SR 3.1.4.2 which likewise prescribes a 10% sample and provides additional clarifications regarding other sampling aspects. The surveillance procedure for ITS SR 3.1.4.2 will likewise include instructions for testing the sample. The Bases are controlled in accordance with ITS 5.5.10 which includes a 10 CFR 50.59 review. Surveillance test procedures are controlled by site administrative procedures which include a review for 10 CFR 50.59 applicability.

LA3

The CTS 4.3.C.2 details prescribed by LA3 provide that whenever scram time testing is performed, an evaluation be made to provide reasonable assurance that proper control rod drive maintenance is being performed. Requirements for scram time testing are specified in several ITS 3.1.4 SR specifications. Each of these surveillance tests include an evaluation of the scram times to verify proper CRD performance. This ensures that proper rod maintenance is being performed. Failure to meet test criteria will result in entering ITS 3.1.4 Action statements, and a detailed evaluation of the reasons for failing to meet the surveillance criteria using the site corrective actions program. Therefore, although the CTS provision is not explicitly

stated in the Bases, execution of the ITS SR and accompanying surveillance instructions accomplishes the same objective.

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.5
# CONTROL ROD SCRAM ACCUMULATORS

Item 3.1.5-1

CTS 4.3.A.2.d requires that control rod accumulators be determined OPERABLE by verifying that the pressure and level detectors are not in the alarmed condition each 7 days. Should some of this information go to the Bases or FSAR.

TVA RESPONSE

ITS SR 3.1.5.1 Bases discuss that an automatic accumulator monitor may be used to continuously satisfy the SR for ensuring accumulator operability. This monitor is the same system of pressure and level detectors referred to in CTS 4.3.A.2.d referenced by LA3. This monitor system is a design feature of the CRD system and is described in UFSAR Section 3.4.5.3.2. UFSAR and system design changes are also reviewed using 10 CFR 50.59. Changes to the ITS Bases are controlled in accordance with ITS section 5.5.10 which includes a 10 CFR 50.59 review.

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.7
# STANDBY LIQUID CONTROL (SLC) SYSTEM

Item 3.1.7

DOC (all); CTS/STS/LCO=(all); There are so many changes that differ from the STS and all of the other BWRs that have been reviewed that this complete specification is being considered as Beyond Scope and technical staff review is requested.

TVA RESPONSE

This ITS section was discussed with NRC staff via a teleconference. TVA indicated that the differences in ITS 3.1.7 from NUREG-1433 were the result of retention of BFN specific CTS requirements. It was also discussed that the BFN proposed ITS were similar to those previously approved for other Boiling Water Reactors with similar boron enrichment and design features. As a result of this teleconference, it is our understanding that the staff concerns were resolved. Also, to promote consistency with NUREG-1433, TVA agreed to incorporate NUREG-1433 SR 3.1.7.6 into BFN ITS. It is added as SR 3.1.7.10 in the attached revised BFN ITS.

# RESPONSE TO NRC QUESTIONS

# ITS SECTION 3.1.8
# SCRAM DISCHARGE VOLUME (SDV)
# VENT AND DRAIN VALVES

Item 3.1.8

M1, M2, M3; Provide justification relative to your plant based on impact on plant design, licensing basis, and operational constraints.

TVA RESPONSE

M1

CTS 3.3.F.2 allows continued reactor operation with any SDV drain and vent valve inoperable provided that the redundant drain or vent valve is demonstrated operable. Proposed ITS allows 7 days to restore any SDV vent or drain valve to operable status at which time a reactor shutdown is required. This new ITS requirement has the potential to cause reactor shutdowns if malfunction of the scram discharge volume drain and vent valves occur that would not be required by CTS. The subject valves are reliable and the ITS 7-day allowance provides sufficient time to repair valve problems discovered while operating. Therefore, BFN is agreeable to this change.

M2

CTS 3.3.F.3 requires the reactor to be in a Hot Standby condition (equivalent to MODE 2 at $\leq$1% rated thermal power) within 24 hours of redundant drain or vent valves becoming inoperable. ITS 3.1.8 Required Action C is more restrictive since it requires the reactor be placed in MODE 3 within 12 hours. Operating experience indicates that 12 hours is a reasonable time period to shutdown the reactor in an orderly manner. Therefore, BFN is agreeable to this change.

M3

DOC M3 discusses the addition of ITS SR 3.1.8.3, an integrated test of the SDV vent and drain valves to verify total system performance. This new SR provides additional assurance of the proper performance of these valves and likewise promotes reliability of the CRDS. The 18-month SR accommodates performance of the new SR during refueling outages which minimizes impact on CRD system operation.

# SUMMARY DESCRIPTION OF ITS/ITS BASES CHANGES

# PROPOSED TECHNICAL SPECIFICATIONS (TS) - 362 IMPROVED STANDARD TS (ITS) SUPPLEMENT TO ITS SECTION 3.1

TVA is submitting a proposed supplement to TS-362 for ITS Section 3.1, REACTIVITY CONTROL SYSTEMS. This supplement makes several changes associated with NRC comments on Section 3.1 (Reference: NRC Request for Additional Information Regarding Improved Standard Technical Specifications, dated September 29, 1997, TAC NOS. M96431, M96432, M96433), incorporates changes resulting from internal TVA reviews, and adopts Owner's Group Technical Specification Task Force (TSTF) changes to NUREG-1433 approved by NRC subsequent to the submittal of TS-362. A synopsis of the ITS and ITS BASES changes is provided below.

LCO 3.1.1, SR 3.1.1.1, and Associated BASES

The LCO, SR, and Bases have been modified to incorporate an approved Owners Group item, TSTF-9. This change moves the criteria for Shutdown Margin to the Core Operating Limits Report (COLR).

REQUIRED ACTION 3.1.1 D4 and Associated BASES

In response to an NRC comment, removed "with isolation valve(s)" and "damper(s)" to provide consistency with NUREG-1433.

REQUIRED ACTION 3.1.1 E5 and BASES

In response to an NRC comment, removed "with isolation valve(s)" and "damper(s)" to provide consistency with NUREG-1433.

LCO 3.1.2, ACTION B, and Associated BASES

The LCO, Action B, and BASES have been modified to incorporate TSTF-141. This change has the effect of limiting the applicability of Reactivity Anomaly requirements to MODE 1.

SURVEILLANCE REQUIREMENT (SR) 3.1.2.1 Associated BASES

In response to a TVA internal review and an NRC comment, lengthened the frequency for the subject SR from every 1000 Effective Full Power Hours (EFPH) to every 1000 MWD/T of core burn-up. This is consistent with NUREG-1433.

LCO 3.1.3 ACTION B and Associated BASES

ACTION B has been modified to incorporate TSTF-34. The basis for the TSTF change is that the deleted REQUIRED ACTION is already addressed by REQUIRED ACTION A, and is therefore, duplicative.

SR 3.1.4.1 and Associated BASES

In response to an NRC comment, removed the note which specified that only those control rods in cells where fuel movement occurred are required to be tested. This clarification is already stated in the BASES. This change is consistent with NUREG-1433.

SR 3.1.4.3 and BASES

In response to an NRC comment, revised the SR and BASES to require scram time testing of control rods prior to declaring the rod operable, instead of only proving the flow path is open during a scram. This change is consistent with NUREG-1433.

TABLE 3.1.4-1

In response to an NRC comment, inserted NOTE b into the Table for consistency with NUREG-1433.

SR 3.1.7.10 AND BASES

In response to an NRC comment and NRC teleconference, added SR 3.1.7.10 and corresponding Bases for consistency with NUREG-1433. This SR verifies that each valve in the SLC flow path that is not locked or otherwise secured in position is in the correct position, or can be aligned to the correct position.

ITS 3.1.1, 3.1.4, and 3.1.6 BASES REFERENCES

Updated corresponding references from:

NEDE-24011-P-A-11 "General Electric Standard Application for Reactor Fuel," November 1995 to NEDE-24011-P-A-13 "General Electric Standard Application for Reactor Fuel," August 1996.

ITS 3.1.1 BASES REFERENCE 6 (UNIT 3 ONLY)

In response to a TVA internal review, corrected reference 6 from NEDE-24011-P-A-11 "General Electric Standard Application for Reactor Fuel," November 1995, to FSAR, Section 3.6.5.2 to be consistent with the corresponding Units 1 and 2 BASES references.