Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

August 16, 2004

TVA-TS-447

10 CFR 50.90

U.S. Nuclear Regulatory Commission
Mail Stop: OFWN P1-35
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Gentlemen:

In the Matter of	)	Docket Nos.	50-259
Tennessee Valley Authority	)		50-260
			50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - UNITS 1, 2, AND 3 - TECHNICAL SPECIFICATIONS (TS) CHANGE TS-447 - EXTENSION OF CHANNEL CALIBRATION SURVEILLANCE REQUIREMENT PERFORMANCE FREQUENCY AND ALLOWABLE VALUE REVISION

Pursuant to 10 CFR 50.90, TVA is submitting a request for a TS change (TS-447) to licenses DPR-33, DPR-52, and DPR-68 for BFN. The proposed TS change will extend the calibration surveillance frequency for the high pressure coolant injection (HPCI) system, reactor core isolation cooling (RCIC) system, and reactor water clean-up (RWCU) system high area temperature isolation instrument channels. The TS currently require performance of these calibration activities on a more frequent interval than is technically necessary, and continuing the performance of these calibrations on the current frequency is contrary to both ALARA principles and good industrial safety practices. Additionally, the high area temperature isolation allowable value trip setpoints for three sets of the temperature switches in the RCIC area and for two sets of instruments in the Unit 1 RWCU area will be adjusted in concert with the above change.

A001

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the TS change qualifies for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosures to the Alabama State Department of Public Health.

Because approval of this TS change will result in both ALARA and industrial safety work environment enhancements for plant personnel, TVA requests NRC approval by June 2005 to minimize the number of additional times plant personnel must perform these calibration surveillances at the current frequency. TVA also requests that the implementation of the revised TS be within 60 days of NRC approval.

There are no regulatory commitments associated with this submittal. If you have any questions about this change, please contact me at (256)729-2636 or Paul Heck at (256)729-3624.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 16th day of August, 2004.

Sincerely,

T. E. Abney
Manager, Site Licensing
and Industry Affairs

Enclosures:

1. TVA Evaluation of the Proposed Changes
2. Proposed Technical Specifications Changes (mark-up)

cc: See page 3

Enclosures
cc (Enclosures):
State Health Officer
Alabama Dept. of Public Health
RSA Tower - Administration
Suite 1552
P.O. Box 303017
Montgomery, Alabama 36130-3017

Enclosure 1

TVA EVALUATION OF PROPOSED CHANGE

Subject: Technical Specifications (TS) Change TS-447 - Extension Of Channel Calibration Surveillance Requirement (SR) Performance Frequency And Allowable Value Revision (TS Section 3.3.6.1)

1.0 DESCRIPTION

This letter is a request to amend Operating Licenses DPR-33, DPR-52, and DPR-68 for Browns Ferry Nuclear Plant (BFN) Units 1, 2, and 3, respectively. The proposed changes would revise the operating licenses to extend the performance frequency of required calibration surveillance testing on instrumentation channels associated with high area temperature system isolation of the high pressure coolant injection (HPCI), reactor core isolation cooling (RCIC), and reactor water clean-up (RWCU) systems. Allowable values for the trip setpoints for some of these channels will also be revised. The TS currently require performance of these calibration activities on a more frequent interval than is technically necessary, and the performance of these calibrations on the current frequency is contrary to both ALARA principles and good industrial safety practices.

2.0 PROPOSED CHANGE

The proposed TS change revises the performance frequency of the associated calibration surveillance requirement (SR) and the trip setpoint allowable values for Unit 1 TS Table 3.3.6.1-1 functions as summarized below:

U1 TS Table 3.3.6.1-1	Current Calibration SR Reference	Current Allowable Value (if changing)	Revised Calibration SR Reference	Revised Allowable Value
Functions 3.d, 3.e, 3.f, 3.g, and 4.d	SR 3.3.6.1.3	No Changes	SR 3.3.6.1.7(1)	No Changes
Functions 4.e, 4.f, and 4.g	SR 3.3.6.1.3	$\leq$ 155 °F	SR 3.3.6.1.7(1)	$\leq$ 180 °F
Functions 5.a, 5b, 5.c, and 5.d,	SR 3.3.6.1.4	No Changes	SR 3.3.6.1.7(1)	No Changes
Function 5.e	SR 3.3.6.1.4	$\leq$ 143 °F	SR 3.3.6.1.7(1)	$\leq$ 170 °F
Function 5.f	SR 3.3.6.1.4	$\leq$ 170 °F	SR 3.3.6.1.7(1)	$\leq$ 143 °F

(1) See note next page

TVA EVALUATION OF PROPOSED CHANGE
Technical Specifications (TS) Change TS-447 - Extension Of Channel Calibration Surveillance Requirement (SR) Performance Frequency And Allowable Value Revision (TS Section 3.3.6.1)

(1) Unit 2 and Unit 3 currently are operating on a 24-month fuel cycle. Unit 1 will resume operations also on a 24-month cycle, however, the changes to the Unit 1 TS necessary to address the change in cycle length have not yet been completed. In the interim, an additional SR 3.3.6.1.7 with a performance interval of 24 months is being added to the Unit 1 TS by this submittal. As part of the BFN submittal TS-433 (Reference 1) seeking approval for the 24-month fuel cycle for Unit 1, the performance frequency for SR 3.3.6.1.5 will be revised from 18 months to 24 months, the SR reference for the above functions in Table 3.3.6.1-1 will be changed to 3.3.6.1.5, and SR 3.3.6.1.7 will be removed from the TS.

The proposed TS change revises the associated calibration surveillance requirement and the trip setpoint allowable values for the Unit 2 and Unit 3 TS Table 3.3.6.1-1 functions as summarized below:

U2 and U3 TS Table 3.3.6.1-1	Current Calibration SR Reference	Current Allowable Value (if changing)	Revised Calibration SR Reference	Revised Allowable Value
Functions 3.d, 3.e, 3.f, 3.g, and 4.d	SR 3.3.6.1.3	No Changes	SR 3.3.6.1.5	No Changes
Functions 4.e, 4.f, and 4.g	SR 3.3.6.1.3	$\leq$ 155 ^{o}F	SR 3.3.6.1.5	$\leq$ 180 ^{o}F
Functions 5.b, 5.c, 5.d, 5.e, and 5.f	SR 3.3.6.1.4	No Changes	SR 3.3.6.1.5	No Changes
Note: Function 5.a for Units 2 and 3 was revised under BFN TS-417				

Refer to the marked-up Units 1, 2, and 3 TS pages in Enclosure 2 for another depiction of the specific revisions.

The TS change request is based on updates to the scaling and setpoint calculations for the subject instrumentation which utilize extensive Unit 2 and Unit 3 historical operating data for the affected instrument channels. These updated calculations demonstrate the calibration frequency for these instruments can be extended and the new allowable values put in place. No Unit 2 or Unit 3 physical modifications beyond temperature switch recalibration are required in association with this TS change. At this time, Unit 1 is being returned to service from an extended shutdown. As part of this return to service effort, physical plant modifications are being performed to make the Unit 1 design essentially the same as for Unit 2 and Unit 3. Some of these on-going modifications affect the instrumentation being addressed by this submittal. Prior to the restart of Unit 1 from its extended outage, the HPCI, RCIC, and RWCU high area temperature

isolation instrumentation on Unit 1 will be modified to be essentially identical to that installed on Units 2 and 3.

3.0 BACKGROUND

The following BFN plant systems are affected by this proposed amendment:

- HPCI
- RCIC
- RWCU
- Primary Containment Isolation System (PCIS)

The HPCI and RCIC systems provide high pressure make-up water to the reactor during accident or transient conditions. These systems utilize turbine-driven pumps, and the steam lines which supply the turbines originate inside the primary containment and are routed out of the primary containment to the turbine locations in the reactor building. The RWCU system takes water from the reactor and circulates it through demineralizers for the removal of impurities before returning it to the reactor. If a piping rupture external to the drywell should occur in the HPCI or RCIC steam supply lines or RWCU piping, elevated reactor building temperatures would result. Instrumentation is installed in the vicinity of these piping runs, and upon the detection of high area temperature, signals are provided to the PCIS logic.

A discussion of the PCIS, which includes the pipe break detection high area temperature monitoring instrumentation and logic, is provided in Section 7.3 of the Updated Final Safety Analysis Report (UFSAR). PCIS mechanical logic diagrams are provided in the UFSAR Chapter 7.3 figures. The plant areas of interest in this submittal are the HPCI and RCIC steam supply line spaces in the torus room, the HPCI pump room, the RCIC pump spaces, the RWCU pump rooms, the RWCU heat exchanger room, and the RWCU pipe trench area. While some differences currently exist between the shutdown Unit 1 configuration and the configuration of the operating Unit 2 and Unit 3, the Unit 1 instrumentation configuration will be modified to be essentially identical to that installed on Unit 2 and Unit 3 prior to restart of Unit 1.

Temperature instruments for detecting breaks in the HPCI steam supply piping are installed in the areas listed in TS Table 3.3.6.1-1 as Functions 3.d-3.g. The temperature instruments for detecting such breaks in the RCIC supply piping are installed in the areas listed in this table as Functions 4.d-4.g. The temperature instruments for detecting breaks in the RWCU piping impacted by this TS change request are installed in the areas listed in TS Table 3.3.6.1-1 as Functions 5.a-5.f. Note that Function 5.a is only impacted for the Unit 1 TS change, because this function was previously addressed for Units 2 and 3 by BFN TS-417. No changes are being made to the PCIS logic or to the types of area temperature instrumentation which input to the logic on Unit 2 or Unit 3. Prior to restart of

Unit 1, the necessary modifications will be completed to make the Unit 1 hardware configuration essentially identical to that on Unit 2 and Unit 3.

Design analyses have been completed which demonstrate that the current calibration frequency intervals (92 days for the HPCI and RCIC isolation circuits and 122 days for the RWCU isolation circuits) are unnecessarily short, and that a calibration frequency of 24 months can be established while maintaining necessary analytical margins. These margins provide assurance that successful HPCI, RCIC, or RWCU isolation would be achieved following a high-energy line break (HELB), and also that unnecessary (i.e., spurious) HPCI or RCIC isolation would not result from area temperatures which are elevated but remain within the normal operating temperature band. Unnecessary RWCU system isolations are not expected to result from these changes either, though spurious isolation of this system, which has no accident or event mitigation functions, would have no safety significance.

In order to accomplish the required TS calibration function for the HPCI and RCIC area temperature instrumentation, personnel must access plant locations which involve fall hazards, high ambient temperatures, and radiation dose rates which are elevated relative to the general plant areas. Performing such work more frequently than is technically necessary is contrary to both ALARA principles and good industrial safety practices.

The calibration work on the RWCU area temperature instrumentation, which utilizes resistance temperature detector (RTD) loops rather than temperature switches, does not require access to remote plant areas[1]. However, it does require work internal to auxiliary instrument room cabinets containing reactor protection system (RPS) and PCIS circuitry. The RWCU area temperature instrument calibration work therefore unavoidably carries a small, but finite, possibility of inducing inadvertent logic system actuations.

(1) The current Unit 1 design accomplishes the RWCU area high temperature isolation function through the use of temperature switches. Prior to restart of Unit 1, this instrumentation will be replaced by RTD-based loops similar to those installed on Unit 2 and Unit 3.

4.0 TECHNICAL ANALYSIS

Sensing of high area temperature to accomplish the HPCI and RCIC steam line isolation function is performed by bimetallic temperature switches. The scaling and setpoint calculations for TS Table 3.3.6.1-1, Functions 3.d-3.g (HPCI System Isolation), and Functions 4.d-4.g (RCIC System Isolation), were based, in part, on a 92-day channel calibration frequency. This surveillance requirement is currently referenced in the TS as SR 3.3.6.1.3. To support this TS change, the scaling and setpoint calculations were revised using a 24 month SR frequency for the temperature switches located in the HPCI and RCIC steam supply line spaces in the torus room, the HPCI pump

room, and the RCIC pump spaces. The evaluation was performed assuming a frequency of 30 months (24 months + 25%) to account for the maximum SR frequency extension allowed by TS SR 3.0.2.

The scaling and setpoint recalculation was performed in accordance with established TVA engineering methods for instrumentation setpoint analyses which are based on Method 3 of ISA S67.04. The revised calculation used both historical plant data and vendor information in considering the effects of extending the calibration frequency. A statistical analysis of the historical data showed there was no time dependent variation of the instrument measurable uncertainties. The results of the evaluation indicated that the projected maximum 30 month calibration interval is consistent with the setpoint calculation for the instruments for the HPCI or RCIC isolation function, and is, therefore, acceptable.

The HELB calculations for the Unit 1, Unit 2, and Unit 3 HPCI and RCIC steam supply line spaces in the torus room, the HPCI pump room, and the RCIC pump spaces have also been reviewed. These reviews confirm that the physical location and response time of the bimetallic temperature switches are satisfactory to detect high temperature in these spaces. As a result of this review, some of the RCIC TS trip setpoint allowable values are being revised. The switches will reliably provide the required isolation function for high temperature in these spaces within the requested TS Allowable Values for instruments performing the HPCI and RCIC steam line isolation function.

Revised scaling and setpoint calculations regarding the extension of the calibration surveillance frequency for the RWCU area high temperature instrumentation were also performed. Analysis of the historical Unit 2 and Unit 3 operating data, taken together with the other instrument attributes that must be considered (e.g., setting accuracy, test equipment accuracy, seismic sensitivity, repeatability, etc.) showed that an extension of the calibration surveillance interval from the current 122 days to an interval of 24 months is acceptable. Prior to its restart, instrumentation essentially identical to that on Unit 2 and Unit 3 will be installed on Unit 1 to accomplish the RWCU high area temperature isolation function.

TVA's methods for performing scaling and setpoint calculations meet the guidance documented in NRC Generic Letter (GL) 91-04 (Reference 2). This methodology has been reviewed by the NRC and is consistent with NRC Regulatory Guide 1.105 (Reference 3). Additional detail on TVA's scaling and setpoint calculation approach was provided in TVA's April 14, 1998, submittal in support of TS change 390S1, which is the TS change for the transition to the 24 month operating cycle now in place on BFN Unit 2 and Unit 3 (Reference 4). In TS-390S1, a large number of instrument calibration surveillance frequencies were extended to 24 months. NRC approved these extensions in the Safety Evaluation Report (SER) dated November 30, 1998, which also concluded that

TVA's scaling and setpoint methodology was consistent with regulatory guidance provided in GL 91-04 and was, therefore, acceptable (Reference 5). BFN TS-417 for Unit 2 and Unit 3 extended the calibration surveillance performance frequency for a portion of the RWCU high area temperature isolation instrumentation. This calibration surveillance interval extension was approved by NRC in an SER dated November 26, 2002 (Reference 6). The same calculation approach used in BFN's TS-390S1 and TS-417 submittals was used in justifying the SR frequency extension and allowable values revision requested herein. Additionally, TVA has more recently (Reference 7) provided information to NRC regarding instrument setpoint methodology which documents previous NRC approval of these methods.

In summary, TVA scaling and setpoint calculations:

- justify the extension of the calibration frequency from 92 days to 24 months for the bimetallic temperature switches in the HPCI and RCIC steam supply line spaces in the torus room, the HPCI pump room, and the RCIC pump spaces
- justify the extension of the calibration frequency from 122 days to 24 months for the RTD-based temperature measurement channels for the RWCU pump rooms, heat exchanger room, and pipe trench area. RTD-based instrumentation will be installed on Unit 1 prior to its restart.
- verify the existing allowable values and justify the revisions associated with the affected HPCI, RCIC, and RWCU high area temperature isolation functions in TS Table 3.3.6.1-1

Therefore, the proposed TS changes are acceptable.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

TVA has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed changes extend the channel calibration surveillance frequency of instrumentation used for the high area temperature isolation of the high pressure coolant injection (HPCI), reactor core isolation cooling (RCIC), and the reactor water clean-up (RWCU) systems. The allowable trip point value for three sets of RCIC instruments on each unit and for two sets of RWCU instruments on Unit 1 are also revised. The calibration surveillance frequency is extended to 24 months from 92 days (for the

HPCI and RCIC high area temperature instrumentation) and from 122 days (for the RWCU high area temperature instrumentation). Under certain circumstances, Technical Specifications (TS) SR 3.0.2 would allow a maximum surveillance interval of 30 months for an SR having a nominal 24 month performance frequency. Instrumentation scaling and setpoint calculations performed in accordance with the guidelines of Generic Letter 91-04 have shown that the reliability of the affected protection instrumentation will be preserved for the maximum allowable calibration surveillance interval. The Unit 1 instrumentation will be physically modified to be essentially identical to that installed on Unit 2 and Unit 3 prior to restart of Unit 1. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed changes extend the channel calibration surveillance frequency of instrumentation used for the high area temperature isolation of the high pressure coolant injection (HPCI), reactor core isolation cooling (RCIC), and the reactor water clean-up (RWCU) systems. The allowable trip point value for three sets of RCIC instruments on each unit and for two sets of RWCU instruments on Unit 1 are also revised. The instrumentation will function in the same way following the amendment as it functions currently. Hence, the changes do not create the possibility of any new failure mechanisms. Note that the Unit 1 instrumentation will be modified to be essentially identical to that installed on Unit 2 and Unit 3 prior to restart of Unit 1. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The proposed changes extend the channel calibration surveillance frequency of instrumentation used for the high area temperature isolation of the high pressure coolant injection (HPCI), reactor core isolation cooling (RCIC), and the reactor water clean-up (RWCU) systems. The allowable trip point value for three sets of RCIC instruments on each unit and for two sets of RWCU instruments on Unit 1 are also revised. Instrumentation scaling and setpoint calculations performed in accordance with the guidelines of Generic Letter 91-04 have shown safety margins are preserved with the extended surveillance frequency and the revised TS

allowable values. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, TVA concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements/Criteria

Scaling and setpoint calculations were performed which demonstrated that the channel calibration frequency may be extended to 24 months and the specified RCIC and RWCU setpoint allowable values revised. These calculations were performed using standard TVA engineering methods which are consistent with the guidance provided in Generic Letter 91-04. The TVA instrument calculation methodology has been previously reviewed by NRC and found acceptable in other TS changes. This same calculation approach was used by this submittal to analyze and technically justify the extension of the surveillance requirement frequency and the changing of the setpoint allowable values. Therefore, it is concluded that the proposed changes meet applicable regulatory requirements.

In conclusion, based on the considerations discussed above, (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 the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 REFERENCES

1. August 16, 2004, Letter from TVA to NRC transmitting Technical Specifications Change TS-433 – 24 Month Fuel Cycle
2. Generic Letter 91-04, Changes in Technical Specification Surveillance Intervals to Accommodate a 24 Month Fuel Cycle, April 1991
3. Regulatory Guide 1.105, Instrument Setpoints for Safety-Related Systems, Revision 2, February 1986
4. April 14, 1998, Letter from TVA to NRC transmitting Technical Specifications Change TS-390 Supplement 1 - Request for License Amendment to Support 24 Month Fuel Cycles
5. November 30, 1998, NRC Safety Evaluation Report for TS-390 (TAC Nos. MA2081, MA2082, and MA2083)
6. November 26, 2002, NRC Safety Evaluation Report for TS-417 (TAC Nos. MB6196 and MB6197)
7. May 6, 2004, Letter from TVA to NRC transmitting response to NRC Request for Additional Information on BFN TS-437 (TAC MC1427)

TVA Evaluation of Proposed Change
Technical Specifications (TS) Change TS-447 - Extension Of Channel Calibration Surveillance Requirement (SR) Performance Frequency And Allowable Value Revision (TS Section 3.3.6.1)

Enclosure 2

Proposed Technical Specifications Changes (mark-up)

SURVEILLANCE REQUIREMENTS

----------NOTES----------

1. Refer to Table 3.3.6.1-1 to determine which SRs apply for each Primary Containment Isolation Function.

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains isolation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.6.1.1	Perform CHANNEL CHECK.	24 hours
SR 3.3.6.1.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.6.1.3	Perform CHANNEL CALIBRATION.	92 days
SR 3.3.6.1.4	Perform CHANNEL CALIBRATION.	122 days
SR 3.3.6.1.5	Perform CHANNEL CALIBRATION.	18 months
SR 3.3.6.1.6	Perform LOGIC SYSTEM FUNCTIONAL TEST.	18 months
SR 3.3.6.1.7	**Perform CHANNEL CALIBRATION.**	**24 months**

New SR added to allow for 24 month calibration interval within the U1 TS

Table 3.3.6.1-1 (page 2 of 3)
Primary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. HPCI System Isolation (continued)					
d. HPCI Steam Line Space HPCI Pump Room Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.7 SR 3.3.6.1.6	≤ 200°F
e. HPCI Steam Line Space Torus Area (Exit) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.7 SR 3.3.6.1.6	≤ 180°F
f. HPCI Steam Line Space Torus Area (Midway) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.7 SR 3.3.6.1.6	≤ 180°F
g. HPCI Steam Line Space Torus Area (Entry) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.7 SR 3.3.6.1.6	≤ 180°F
4. Reactor Core Isolation Cooling (RCIC) System Isolation					
a. RCIC Steam Line Flow - High	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 450" H_2O
b. RCIC Steam Supply Line Pressure - Low	1,2,3	3	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≥ 50 psig
c. RCIC Turbine Exhaust Diaphragm Pressure - High	1,2,3	3	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 20 psig
d. RCIC Steam Line Space RCIC Pump Room Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.7 SR 3.3.6.1.6	≤ 180°F
e. RCIC Steam Line Space Torus Area (Exit) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.7 SR 3.3.6.1.6	~~≤ 155°F~~ ≤ 180°F
f. RCIC Steam Line Space Torus Area (Midway) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.7 SR 3.3.6.1.6	~~≤ 155°F~~ ≤ 180°F
g. RCIC Steam Line Space Torus Area (Entry) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.7 SR 3.3.6.1.6	~~≤ 155°F~~ ≤ 180°F

(continued)

Table 3.3.6.1-1 (page 3 of 3)
Primary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. Reactor Water Cleanup (RWCU) System Isolation					
a. Main Steam Valve Vault Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4 .7 SR 3.3.6.1.6	≤ 201°F
b. Pipe Trench Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4 .7 SR 3.3.6.1.6	≤ 135°F
c. Pump Room A Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4 .7 SR 3.3.6.1.6	≤ 152°F
d. Pump Room B Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4 .7 SR 3.3.6.1.6	≤ 152°F
e. Heat Exchanger Room Area (West Wall) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4 .7 SR 3.3.6.1.6	≤ ~~143~~ 170°F
f. Heat Exchanger Room Area (East Wall) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4 .7 SR 3.3.6.1.6	≤ ~~170~~ 143°F
g. SLC System Initiation	1,2	1(a)	H	SR 3.3.6.1.6	NA
h. Reactor Vessel Water Level - Low, Level 3	1,2,3	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≥ 538 inches above vessel zero
6. Shutdown Cooling System Isolation					
a. Reactor Steam Dome Pressure - High	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 115 psig
b. Reactor Vessel Water Level - Low, Level 3	3,4,5	2(b)	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≥ 538 inches above vessel zero
c. Drywell Pressure - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 2.5 psig

(a) One SLC System Initiation signal provides logic input to close both RWCU valves.

(b) Only one channel per trip system required in MODES 4 and 5 when RHR Shutdown Cooling System integrity maintained.

Table 3.3.6.1-1 (page 2 of 3)
Primary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. HPCI System Isolation (continued)					
d. HPCI Steam Line Space HPCI Pump Room Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~ .5 SR 3.3.6.1.6	≤ 200°F
e. HPCI Steam Line Space Torus Area (Exit) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~ .5 SR 3.3.6.1.6	≤ 180°F
f. HPCI Steam Line Space Torus Area (Midway) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~ .5 SR 3.3.6.1.6	≤ 180°F
g. HPCI Steam Line Space Torus Area (Entry) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~ .5 SR 3.3.6.1.6	≤ 180°F
4. Reactor Core Isolation Cooling (RCIC) System Isolation					
a. RCIC Steam Line Flow - High	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 450" H_2O
b. RCIC Steam Supply Line Pressure - Low	1,2,3	3	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≥ 50 psig
c. RCIC Turbine Exhaust Diaphragm Pressure - High	1,2,3	3	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 20 psig
d. RCIC Steam Line Space RCIC Pump Room Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~ .5 SR 3.3.6.1.6	≤ 180°F
e. RCIC Steam Line Space Torus Area (Exit) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~ .5 SR 3.3.6.1.6	~~≤ 155°F~~ ≤ 180°F
f. RCIC Steam Line Space Torus Area (Midway) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~ .5 SR 3.3.6.1.6	~~≤ 155°F~~ ≤ 180°F
g. RCIC Steam Line Space Torus Area (Entry) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~ .5 SR 3.3.6.1.6	~~≤ 155°F~~ ≤ 180°F

(continued)

Table 3.3.6.1-1 (page 3 of 3)
Primary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. Reactor Water Cleanup (RWCU) System Isolation					
a. Main Steam Valve Vault Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 188°F
b. Pipe Trench Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4 .5 SR 3.3.6.1.6	≤ 135°F
c. Pump Room A Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4 .5 SR 3.3.6.1.6	≤ 152°F
d. Pump Room B Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4 .5 SR 3.3.6.1.6	≤ 152°F
e. Heat Exchanger Room Area (West Wall) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4 .5 SR 3.3.6.1.6	≤ 143°F
f. Heat Exchanger Room Area (East Wall) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4 .5 SR 3.3.6.1.6	≤ 170°F
g. SLC System Initiation	1,2	1(a)	H	SR 3.3.6.1.6	NA
h. Reactor Vessel Water Level - Low, Level 3	1,2,3	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≥ 528 inches above vessel zero
6. Shutdown Cooling System Isolation					
a. Reactor Steam Dome Pressure - High	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 115 psig
b. Reactor Vessel Water Level - Low, Level 3	3,4,5	2(b)	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≥ 528 inches above vessel zero
c. Drywell Pressure - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 2.5 psig

(a) One SLC System Initiation signal provides logic input to close both RWCU valves.

(b) Only one channel per trip system required in MODES 4 and 5 when RHR Shutdown Cooling System Integrity maintained.

Table 3.3.6.1-1 (page 2 of 3)
Primary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. HPCI System Isolation (continued)					
d. HPCI Steam Line Space HPCI Pump Room Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.5 SR 3.3.6.1.6	≤ 200°F
e. HPCI Steam Line Space Torus Area (Exit) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.5 SR 3.3.6.1.6	≤ 180°F
f. HPCI Steam Line Space Torus Area (Midway) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.5 SR 3.3.6.1.6	≤ 180°F
g. HPCI Steam Line Space Torus Area (Entry) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.5 SR 3.3.6.1.6	≤ 180°F
4. Reactor Core Isolation Cooling (RCIC) System Isolation					
a. RCIC Steam Line Flow - High	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 450" H_2O
b. RCIC Steam Supply Line Pressure - Low	1,2,3	3	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≥ 50 psig
c. RCIC Turbine Exhaust Diaphragm Pressure - High	1,2,3	3	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 20 psig
d. RCIC Steam Line Space RCIC Pump Room Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.5 SR 3.3.6.1.6	≤ 180°F
e. RCIC Steam Line Space Torus Area (Exit) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.5 SR 3.3.6.1.6	~~≤ 155°F~~ ≤ 180°F
f. RCIC Steam Line Space Torus Area (Midway) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.5 SR 3.3.6.1.6	~~≤ 155°F~~ ≤ 180°F
g. RCIC Steam Line Space Torus Area (Entry) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.~~3~~.5 SR 3.3.6.1.6	~~≤ 155°F~~ ≤ 180°F

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Table 3.3.6.1-1 (page 3 of 3)
Primary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. Reactor Water Cleanup (RWCU) System Isolation					
a. Main Steam Valve Vault Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 201°F
b. Pipe Trench Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4-.5 SR 3.3.6.1.6	≤ 135°F
c. Pump Room A Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4-.5 SR 3.3.6.1.6	≤ 152°F
d. Pump Room B Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4-.5 SR 3.3.6.1.6	≤ 152°F
e. Heat Exchanger Room Area (West Wall) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4-.5 SR 3.3.6.1.6	≤ 143°F
f. Heat Exchanger Room Area (East Wall) Temperature - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4-.5 SR 3.3.6.1.6	≤ 170°F
g. SLC System Initiation	1,2	1(a)	H	SR 3.3.6.1.6	NA
h. Reactor Vessel Water Level - Low, Level 3	1,2,3	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≥ 528 inches above vessel zero
6. Shutdown Cooling System Isolation					
a. Reactor Steam Dome Pressure - High	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 115 psig
b. Reactor Vessel Water Level - Low, Level 3	3,4,5	2(b)	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≥ 528 inches above vessel zero
c. Drywell Pressure - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 2.5 psig

(a) One SLC System Initiation signal provides logic input to close both RWCU valves.

(b) Only one channel per trip system required in MODES 4 and 5 when RHR Shutdown Cooling System Integrity maintained.