TVA

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

April 29, 2013

10 CFR 50.59(d)(2)

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 1
Facility Operating License No. NPF-90
NRC Docket No. 50-390

Subject: **10 CFR 50.59 Summary Report**

Pursuant to 10 CFR 50.59(d)(2), TVA is submitting a summary report of the changes, tests, and experiments implemented at Watts Bar Nuclear Plant (WBN), Unit 1 since November 21, 2011. The enclosed evaluations demonstrate that the described changes do not meet the criteria for license amendments as defined by 10 CFR 50.59(c)(2).

There are no regulatory commitments in this letter. Should you have any questions regarding this submittal, please contact Donna Guinn, Site Licensing Manager, at (423) 365-1589.

Respectfully,

for

J. W. Shea
Vice President, Nuclear Licensing

Enclosure:
10 CFR 50.59 Summary Report - WBN, Unit 1

cc (Enclosure):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Watts Bar Nuclear Plant

IE47
NRR

Enclosure

10 CFR 50.59 Summary Report - WBN, Unit 1

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1. EVALUATION NUMBER: DCN 52853B - MFW

DCN 52583B replaced a portion of existing analog control systems for WBN Unit 1. This DCN installed new digital controls for the Steam Generator Level Control System (SGLCS). The new Distributed Control System (DCS) is manufactured by INVENSYS, a division of Foxboro. The new system is built with redundant fault tolerant processors, redundant input process signals, redundant power supplies (both sources and DC supplies), redundant switched control networks, and redundant operator video display units (VDUs). The old analog equipment in the Auxiliary Instrument Room (AIR) racks was replaced with the INVENSYS DCS components: FCPs (Field Control Processors), FBMs (Fieldbus Modules), FCMs (Fieldbus Communications Modules), base plates, and cables. A new EWS (Engineering Work Station) rack and Master DCS Rack will be installed containing CPUs, monitor, printer, keyboard, trackball, and keyboard-video-mouse (KVM) switches.

New cabinets were installed in the cable spreading room that will provide an interface between equipment located in the AIR and Main Control Room (MCR) as well as connect into various field devices. In the MCR, new operator VDUs were installed on rigid stanchions at M-19A and M-19B. There are a total of four new DCS VDUs installed under this DCN - two located at M-19A and two at M-19B. On each stanchion, one VDU faces the MCR panels and the other faces the 'barge' (seated area). Only the VDUs facing the MCR panels have the capability to access the DCS and perform any control, tracking or reset function. A keyboard and trackball is rigidly mounted on each stanchion and secured so that only the operator 'at the board' can access the DCS. The two VDUs facing the 'barge' only show what is displayed on the 'at the board' VDUs on the opposite side of the stanchions. These 'barge' VDUs are not able to control, trend or reset any function.

In addition to the DCS VDUs, four new ICS VDUs were installed under DCN 56904 - two on each stanchion. There is a shared keyboard and mouse for ICS functions allowing both operators to access and interface ICS. Numerous existing manual/auto control handstations were replaced. These include handstations for: a) MFW regulating valves and bypass regulating valves; and b) MFP speed and MFP recirc. New alarms that alert the operator to DCS status were added to the annunciator panel on 1-M-4.

This modification replaces numerous old analog components. It directly affects the following for SGLCS; electronic controls for MFPs; electronic controls for Main Feedwater (MFW) regulating and bypass regulating valves; and replacement of hardware-based median signal selectors (MSS) with software-based (MSS).

The MFW system's primary functions are to supply a sufficient quantity of feedwater (FW) to the secondary side inlet of the steam generators (SG) during all normal operating conditions, and to ensure that feedwater will not be delivered from the main feed system to the SG when feedwater isolation is required. The safety function of the FW system is complete isolation of FW to all SGs upon receipt of any of the following signals from the reactor protection system (RPS): Hi-Hi SG level in any SG (1/3 channels to alarm, 2/3 channels to trip), safety injection signal, reactor trip coincident with reactor coolant low average temperature (Tavg), and Hi-Hi water level in either the South or North Main Steam Valve Vault rooms.

The safety-related portion of the MFW bypass lines shall be an integral part of the Auxiliary FW system and shall perform a primary safety function in that FW flow to the steam generators must be interrupted upon initiation of a FW isolation signal.

1. EVALUATION NUMBER: DCN 52853B - MFW (continued)

Secondary functions of the MFW system include the following:

A. Preheating the FW to approximately 440°F at 100% load prior to entering the secondary side of the SG (for optimum cycle efficiency).
B. Providing condensate and FW de-aeration during startup by recirculating FW from a point upstream of the main FW isolation valves back to the main condenser hotwell, utilizing an internal (condenser) diffuser and separate scavenging steam sparger for de-aeration.
C. Providing minimum flow recirculation as required for system pump protection. In addition to normal modes, of operation, the MFW system is designed to maintain an adequate supply of FW flow to the SG during step changes in load, to prevent a reactor trip on low water level, and to rapidly isolate main and bypass FW supply headers upon receipt of a FW isolation signal.

A normal function of the FW injection water system is to provide an adequate supply of clean seal water to the secondary system pumps' (condensate booster pumps, heater drain pumps, and main feed pumps) mechanical seals during all modes of plant operation.

The FW control system serves to maintain a programmed water level in the shell side of the SG during steady-state operation and to limit the water level shrink and swell in the SG during normal plant transients, thus preventing an undesirable reactor trip.

The credible failure modes identified in the screening review to be discussed and evaluated are:

- CP01, 2, 3 or 4 fails HIGH - causes the associated loop MFW regulating and bypass regulating valves to fail OPEN
- CP01, 2, 3, or 4 fails LOW - causes associated loop MFW regulating and bypass regulating valves to fail CLOSED
- CP01, 2, 3 or 4 fails As-Is - causes associated loop regulating valves to fail 'as-is'
- CP05 fails HIGH - causes MFPs to increase to max speed, MFP recirc valves fail CLOSED
- CP05 fails LOW - causes MFPs to slow to min speed, MFP recirc valves fail 'AS-IS'
- CP05 fails As-Is - causes MFPs to fails 'as-is', MFP recirc valves fail OPEN
- CP06 fails HIGH - NIS signal fails HIGH; SG program level fails to 60%
- CP06 fails As-Is - NIS signal fails 'as-is'; SG program level fails 'as-is'
- CP06 fails LOW - NIS signal fails LOW; SG program level fails to 38%

The new digital DCS system replaces function-for-function existing analog components for SG level control with many reliability improvements. The new system provides redundant inputs, redundant processors, networks, power supplies, etc. The new system is designated as "Quality Related" and is designed to meet Quality Related requirements; the reliability of the new system is superior to the old analog system. The modification does not negatively affect any SSC that is important to safety nor does it affect the consequences or the frequency of their occurrence. The new DCS does not cause a new type of malfunction or accident to be created. The new DCS reduces the likelihood of failures and their consequences by providing more reliable and redundant control system. In addition, this modification provides the capability to reduce manual operator actions, thereby, allowing greater opportunity for assessment, monitoring and response.

2. EVALUATION NUMBER: DCN 58384B

The Revision A original issue of DCN 58384 was an Advanced Authorization (AA) that allowed the implementing organization to proceed with the routing and installation of the new cables and conduits associated with the installation of new hand switches in the Main Control Room (MCR) and relay panels in the Auxiliary Instrument Room. DCN 58384B terminates new cables to plant systems that were previously installed via AA DCN 58384A and installs new hand switches in the MCR in order to mitigate the failure modes concerning Multiple Spurious Operations (MSO) #10. This MSO is defined as a functional Loss of Primary Inventory Control. This Rev. B is a final issuance of the DCN for the full scope of work which entails:

- Installation of new Hand Switches 1-HS-70-81BA and 1-HS-70-81EA in MCR Panel 1-M-23A with valve position indicating lights for Component Cooling System (CCS) Containment Isolation Valves (CIVs) 1-FCV-70-87 and 1-FCV-70-90.
- Termination of new cables (previously installed by AA DCN) for the new hand switches in series with Flow Differential Switch Relays 1-FDS-70-81E and 1-FDS-70-81B located in Relay Cabinets 1-R-73-A and 1-R-78-B, respectively. The cabinets are located in the Auxiliary Instrument Room.
- Termination of new cables (previously installed by AA DCN) for the new indicating lights to the existing indication lights in the MCR Panel 0-M-27B and mimic of the status indicators for CIVs 1-FCV-70-87 and 1-FCV-70-90.
- Termination of new cables (previously installed by AA DCN) to MCR Panel 1-M-21 for annunciation indicating operation of Hand Switches 1-HS-70-81BA or 1-HS-70-81EA which is located at the existing Overhead Annunciator Panel 1-XA-55-23A.
- Installation and termination of two new control cables from the existing Hand Switches 1-HS-70-90A and 1-HS-70-87A in Panel 0-M-27B internally through the panels while maintaining separation to the new Hand Switches 1-HS-70-81EA and 1-HS-70-81BA in the existing Panel 1-M-23A.
- In addition, the two control and two signal cables installed in AA DCN 58384A that are coiled up in the cable trays in the Cable Spreading Room (CSR) below the panels, are pulled through the vertical risers into the panels where they are terminated at the equipment.

The new hand switches give the MCR Operators the ability to block the automatic differential flow isolation signal for the supply and return headers on the Thermal Barrier Cooling portion of the CCS. This blocking function is required to prevent a false system isolation signal as a result of a fire located in the vicinity of the Differential Flow Transmitters 1-FT-70-81B and 1-FT-70-81E. Isolation of cooling water flow to the thermal barrier coolers would unnecessarily affect the Operator's ability to place the plant in cold shutdown during an Appendix R fire. The switches, regardless of their position status, will not prevent valve closure as a result of a Phase B Containment Isolation signal. Failure of the switches will not prevent remote manual operation of the thermal barrier supply and return header isolation valves or the thermal barrier booster pumps. Installation of this modification is necessary to eliminate a 13 minute manual operator action required to reestablish thermal barrier cooling flow following a fire related isolation signal.

The installation of new hand switches to block the thermal barrier cooling differential flow isolation signal can be implemented without prior NRC approval because the modification has no affect on the performance of the CCS during any of the UFSAR Chapter 15 design basis accidents. The new hand switches introduce no new credible failure modes which result in an increase in the likelihood of an accident or malfunction or result in increased consequences of an accident or malfunction.

3. EVALUATION NUMBER: DCN 58784A

DCN 58784A modifies selected ERCW Containment Isolation Valves and Strainer Backwash and Flush Valves by removing the stop nuts from the valve Limitorque HBC-0 Series actuators and replacing the drive sleeves and worm gear assemblies in the actuators with 360 degree gear sets. The modification provides an acceptable solution to satisfy 10CFR50 Appendix R analysis to resolve a concern with Multiple Spurious Operation (MSO) Scenario 53 for the ERCW System. The affected valves are:

Containment Isolation Valves	Strainer Backwash and Flush Valves
1-FCV-67-104-A	1-FCV-67-9A-A
1-FCV-67-107-A	1-FCV-67-9B-A
1-FCV-67-112-A	2-FCV-67-9A-A
1-FCV-67-83-B	2-FCV-67-9B-A
1-FCV-67-88-B	1-FCV-67-10A-B
1-FCV-67-91-B	1-FCV-67-10B-B
1-FCV-67-96-B	
1-FCV-67-99-A	

The screening review determined that an evaluation should be performed for two potential adverse effects on the design function of these valves. One, the actuator motors and valve seats could become damaged if a fire generated MSO condition occurs. The fire event can be considered as adverse to the design function and an evaluation is required. Two, the removal of the traveling stop nuts can be viewed as a reduction in diversity or defense in depth of the design function of the valve. This can be considered as adverse and an evaluation is required.

The first evaluation concluded that the modification to the valves does not adversely affect the design function of these valves. These valves will continue to operate following the modification as they are presently designed and will continue to open and close to the present design requirements to satisfy containment isolation and strainer backwash and flush operations and there is no change to any accident analysis.

The second evaluation concluded that the modification does not result in the possibility of new accidents or malfunctions, and does not result in an increased frequency of accidents or malfunctions evaluated in the UFSAR. The modification does not result in more than minimal increases in the consequences of an accident or malfunction and does not result in an unacceptable departure from the methodologies used to establish the design bases and accident analysis. No fission product barriers design basis limits are exceeded or altered by this modification and the Technical Specifications are not affected.

4. EVALUATION NUMBER: Functional Evaluation PER 493932

PER 493932 documents that the total Auxiliary Building Gas Treatment System (ABGTS) vacuum relief makeup airflow did not meet the Acceptance Criteria of greater than or equal to 1370 cubic feet per minute (cfm). This condition was identified during performance of Surveillance Instruction 0-SI-30-7-A, Auxiliary Building Gas Treatment System Pressure Test Train A. Troubleshooting Work Order (WO) 113125164 was performed to identify potential causes of excess in-leakage into the Auxiliary Building Secondary Containment Enclosure (ABSCE) boundary. Troubleshooting identified that Train A ABSCE dampers 2-FCO-30-271, 2-FCO-30-275, 2-FCO-30-108, and 2-FCO-30-21 were exhibiting excessive in-leakage. As a compensatory action, Train B ABSCE dampers 2-FCO-30-272, 2-FCO-30-276, 2-FCO-30-22, and 2-FCO-30-109 in series with the listed Train A dampers were administratively maintained in the closed position and 0-SI-30-7-A was reperformed. Total ABGTS vacuum relief makeup airflow successfully passed in all ABSCE door configurations with the Train B dampers maintained in the closed position.

The functional evaluation (FE) prepared for PER 493932 concluded that the Train A ABSCE pressure boundary is functional but degraded with respect to meeting the intent of design requirement of greater than or equal to 1370 cfm vacuum relief makeup airflow. The FE further concluded that implementation of compensatory actions will assure that the Train A ABSCE boundary can perform its safety-related design function. The purpose of this Evaluation is to apply 10 CFR 50.59 to the implementation of the compensatory actions. This Evaluation will determine whether the compensatory actions (not the degraded condition) affect other aspects of the facility or procedures described in the UFSAR. The purpose of the compensatory actions required by FE 493932 is to assure that the Train A ABSCE pressure boundary can perform its design function of isolating the ABSCE and allowing the ABGTS to maintain a required negative pressure of 0.25 inches w.g. within the ABSCE following an abnormal event. Isolation of the dampers assures that an effective barrier exists for airborne fission products that may leak from the Auxiliary Building during a Loss of Coolant Accident (LOCA) or a Fuel Handling Accident (FHA). As a result of closing the Unit 2 Train B ABSCE dampers specified above, the Unit 2 portion of the ABVS will not be available. LOCA and FHA are the design basis accidents involved. Compensatory actions place the components in their fail safe position during normal plant operations prior to any postulated DBEs, therefore, there are no credible failure modes associated with this activity.

The proposed compensatory actions required by FE for PER 493932 requires Unit 2 Train B dampers 2-FCO-30- 272, 2-FCO-30-276, 2-FCO-30-22, and 2-FCO-30-109 to be administratively maintained in the closed position. The purpose of the compensatory actions is to assure that the Train A ABSCE pressure boundary can perform its design function of isolating the ABSCE and allowing the ABGTS to maintain a required negative pressure of 0.25 inches w.g. within the ABSCE following an abnormal event.

The proposed changes do not result in new accidents or unacceptable malfunctions, and do not result in increased frequency or unacceptable consequences of accidents or malfunctions evaluated in the UFSAR. The change does not result in more than minimal increases of the consequences of an accident or malfunction and does not result in an unacceptable departure from methodologies used to establish the design basis and safety analysis. In addition, no fission product barriers are challenged by this change, and the Technical Specifications are not affected.

5. EVALUATION NUMBER: PBC-11-067.2-001 Rev. 1

Permanent Boundary Change (PBC) 11-067.2-001 Revision 1 removes specific existing Technical Instruction (TI) 12.08, Control of Unit Interfaces, controls to support establishment of ERCW flows to any combination of Unit 2 Engineered Safety Features (ESF) pump room coolers and Unit 2 Upper Compartment Coolers (UCCs) while those components are the responsibility of Unit 2 Startup Engineering during Unit 1 operations. Establishment of flow through those specific ERCW lines aids in maintaining chemistry controls without establishing lay-up conditions. PBC-11-067.2-001 Revision 1 is developed in accordance with approved TI-12.08.

The scope of PBC 11-067.2-001 Revision 1 screening-in for evaluation removes TI-12.08 controls that isolated the ERCW system from the cooling coils of the Unit 2 in-containment UCCs. With the removal of these specific administrative controls, PBC 11-067.2-001 Revision 1 introduces the potential for ERCW leakage from these coils, which are qualified for location retention but not ERCW pressure boundary integrity during either normal Unit 1 operations or during any postulated Unit 1 Design Basis Event.

Consistent with WB-DC-40-64 Appendix 0 requirements for non-safety related structures, systems, and components impacts on safety-related systems, a revised ERCW pressure drop calculation and other referenced, existing calculations demonstrate that existing Unit 1 ERCW flow balance settings support an ERCW configuration that includes ERCW flow through the cooling coils of the Unit 2 in-containment UCCs as well as full ERCW flow through each qualified ERCW supplied Unit 2 ESF pump room cooler located in the Auxiliary Building. (The latter postulated ERCW flow for Unit 2 ESF pump room coolers correspond to removal of other TI-12.08 controls within the scope of PBC 11-067.2-001 Rev. 1, which are addressed in the Screening Review.)

In accordance with TI-12.08, PBC 11-67.2-001 Revision 1 includes a set of Special Requirements supporting compliance with current Unit 1 Technical Specifications (TSs), including TS 3.7.8, and current Unit 1 Technical Requirement Manual requirements upon and following removal of the corresponding TI-12.08 controls. These defined Special Requirements include establishment of administrative controls, developed and approved in accordance with applicable procedures, to: (i) confirm the availability of a functional valve for on-demand isolation of each applicable Unit 2 ERCW branch line, and (ii) monitor each applicable Unit 2 ERCW branch line for leakage.

Removal of TI-12.08 controls that isolated the ERCW system from the cooling coils of Unit 2 UCCs results in no required changes to the set of ERCW valves applicable to any Unit 1 Technical Specification Surveillance Requirement. (A separate DCN addresses dual unit ERCW flow balance.) Other PBC Special Requirements require isolation of the subject Unit 2 ERCW branch lines when there is either ERCW cross-train operations or operation of a cross-tie of ERCW same train headers.

When a subject valve in an ERCW branch line for a Unit 2 UCC is also an interim Auxiliary Building Secondary Containment Enclosure (ABSCE) boundary device, a specific PBC Special Requirement requires confirmation of an applicable TI-65 ABSCE breach permit prior to opening the subject valve. This specific PBC Special Requirement supports continuing operability of each of the two Auxiliary Building Gas Treatment (ABGTS) trains.

5. EVALUATION NUMBER: PBC-11-067.2-001 Rev. 1 (continued)

PBC 11-067.2-001 Revision 1 does not create the possibility of either (i) an accident of a different type than previously evaluated in the UFSAR or (ii) a malfunction of an SSC important to safety with a different result than previously evaluated. Also frequency and consequences of accidents, fission product barriers, and Technical Specifications are not affected by the revised PBC.

6. EVALUATION NUMBER: TACF 0-12-0005-959 R0

Temporary Alteration Control Form (TACF) 0-12-0005-959 allows for use of Demineralized Water Booster Pumps 0-PMP-959-0030 and 0-PMP-959-0031. On 2/23/12, the basement of the New Makeup Demineralizer (NMUDI) Building flooded causing the loss of several pieces of equipment and instrumentation. 0-LS-959-0030A, Demineralized Water Storage Tank Lo-Lo Level, and supporting equipment were damaged during the flood. This instrumentation provides for low suction head protection for the Demineralized Water Booster Pumps. With the loss of the instrumentation, the contact which enables the use of the Booster Pumps remained open and the pumps were unable to run. WO 113261363 provided for a jumper across this Lo-Lo level contact to allow for continued operation of the pumps. The jumper is installed inside panel 0-L-582 on terminal block TB2 from terminal 5 to terminal 6. A temporary (0-60 psig) pressure gauge is installed in panel 0-L-61 just downstream of 0-RTV-959-227, 0-LT-959-30 Root, to monitor level in the Demineralized Water Storage Tank (in addition to the switch an indicator was also unavailable for use). A TACF is being issued because the Temporary Alteration duration will exceed 90 days as there have been difficulties obtaining replacement parts.

The Demineralized Water System is designed to supply the requirements for high purity water for makeup to the steam generators, the primary water system, and the demineralized water system for cask decontamination, cleaning, flushing, and makeup for miscellaneous services including providing makeup water to the Condensate Storage Tanks (CSTs). As stated in Updated Final Safety Analysis Report (UFSAR) section 9.2.3 the demineralized water makeup system is not required for maintenance of plant safety in the event of an accident and is not a part of the engineered safety systems, therefore, the reactor containment isolation valves and the piping connecting the valves are the only portions of this system which have a nuclear safety class designation in accordance with TVA Classification B. This TACF will not affect that portion of the Demineralized Water System. Among the many loads the Demineralized Water System feeds, makeup to the CSTs is of great interest. The design function of the CSTs with reference to the Auxiliary Feedwater (AFW) system is to serve as the preferred, non safety-related supply of water to the Auxiliary Feedwater system. As stated in UFSAR section 9.2.6, the condensate storage tanks are not an engineered safety feature and are not seismically qualified. The storage tanks supply the preferred source of water to the auxiliary feedwater system, but the engineered safety feature source is the Essential Raw Cooling Water (ERCW) system (Safety Class 2b). The design function of the AFW system is to supply sufficient feedwater to the steam generators to remove heat from the primary side of the plant when required. This system is required to function for many Design Basis Events. None of these Design Basis Events are affected by this TACF.

There are no Technical Specifications (TSs) associated with the Demineralized Water System. With respect to the makeup this system supplies to the CSTs, TS 3.7.6 requires the CST level be greater than or equal to 200,000 gallons. The proposed change does not affect the ability of the CST to obtain/maintain that volume of water. As makeup to the CSTs for the AFW System is an important load for the Demineralized Water System, TS 3.7.5 requires three trains of AFW be operable in Modes 1-4. The AFW System is considered OPERABLE when the components and flow paths required to provide redundant AFW flow to the steam generators are OPERABLE. This requires that the two motor driven AFW pumps be OPERABLE in two diverse paths, each supplying AFW to separate steam generators. The turbine driven AFW pump is required to be OPERABLE with redundant steam supplies from each of two main steam lines upstream of the Main Steam Isolation Valves, and shall be capable of supplying AFW to any of the steam generators. The piping, valves, instrumentation, and controls in the required flow paths also are required to be OPERABLE.

6. EVALUATION NUMBER: TACF 0-12-0005-959 R0 (continued)

The proposed change does not affect the ability of the AFW System to maintain operability as defined here. The proposed change does not introduce a new malfunction, a new accident, or increase the consequences from a design basis accident. It is concluded the TACF will not affect the ability to meet system design functions nor does it affect the ability to satisfy TS surveillance requirements. The change is positive as it will allow for providing demineralized water to various loads in the plant, including makeup to the CSTs.

7. EVALUATION NUMBER: TACF 1-12-0001-002 R0

TACF 1-12-0001-002 allows for filling Condensate Storage Tank (CST) A via a temporary filter/demineralizer skid provided by GE Mobile Water. This TACF is required, because the permanently installed Demineralized Booster Pumps are incapable of providing demineralized water to the plant, due to the fact that their associated motors were immersed in water when the area in which they are located flooded. Specifically, makeup to CST A is required to maintain the storage capacity for this tank, to provide for makeup to the Condensate System and as a clean supply of water to the Auxiliary Feedwater (AFW) System. A supply of water (approximately 250-300 gpm) will be provided to the skid via a hose connected to an adjacent fire hydrant. Another hose with a check valve installed to prevent backflow from the CST will be attached to the skid and routed to and attached to 1-DRV-2-500, CST A DRAIN. The water provided by this temporary skid will be required to meet the same stringent chemistry specifications as the existing Demineralized Water System in order to maintain system cleanliness.

The Demineralized Water System is designed to supply the requirements for high purity water for makeup to the steam generators, the primary water system, and the demineralized water system for cask decontamination, cleaning, flushing, and makeup for miscellaneous services including providing makeup water to the CSTs. As stated in Updated Final Safety Analysis Report (UFSAR) section 9.2.3, the demineralized water makeup system is not required for maintenance of plant safety in the event of an accident and is not a part of the engineered safety systems, therefore, the reactor containment isolation valves and the piping connecting the valves are the only portions of this system which have a nuclear safety class designation in accordance with TVA Classification B. This TACF will not affect that portion of the Demineralized Water System. The design function of the CSTs with reference to the Auxiliary Feedwater (AFW) system is to serve as the preferred, non safety-related supply of water to the Auxiliary Feedwater system. As stated in UFSAR section 9.2.6, the CSTs are not an engineered safety feature and are not seismically qualified. The storage tanks supply the preferred source of water to the auxiliary feedwater system, but the engineered safety feature source is the Essential Raw Cooling Water (ERCW) system (Safety Class 2b). The design function of the AFW system is to supply sufficient feedwater to the steam generators to remove heat from the primary side of the plant when required. This system is required to function for many Design Basis Events. None of these Design Basis Events are affected by this TACF.

Technical Specification (TS) 3.7.6 requires the CST level be greater than or equal to 200,000 gallons. The proposed change does not affect the ability of the CST to obtain/maintain that volume of water. TS 3.7.5 requires three trains of AFW be operable in Modes 1-4. The AFW System is considered OPERABLE when the components and flow paths required to provide redundant AFW flow to the steam generators are OPERABLE. This requires that the two motor driven AFW pumps be OPERABLE in two diverse paths, each supplying AFW to separate steam generators. The turbine driven AFW pump is required to be OPERABLE with redundant steam supplies from each of two main steam lines upstream of the Main Steam Isolation Valves (MSIVs), and shall be capable of supplying AFW to any of the steam generators. The piping, valves, instrumentation, and controls in the required flow paths also are required to be OPERABLE. The proposed change does not affect the ability of the AFW System to maintain operability as defined here. The proposed change does not introduce a new malfunction, a new accident, or increase the consequences from a design basis accident. It is concluded the TACF (installation of a temporary skid at CST A) will not affect the ability to meet system design functions nor does it affect the ability to satisfy TS surveillance requirements.

7. EVALUATION NUMBER: TACF 1-12-0001-002 R0 (continued)

The change is positive as it will allow for maintaining CST level above Technical Specifications limits and will allow for the resumption of Steam Generator Blowdown flow for reduction of secondary side contaminants.

8. EVALUATION NUMBER: UFSAR Table 6.2.6-3

The proposed change to the UFSAR will allow Containment Integrated Leak Rate Testing (CILRT) to be performed with certain equipment in the Main and Reheat Steam Systems not in their normal lineup. This change will allow for pressure transmitters in the Main and Reheat Steam System, located downstream of Penetrations X-13A, X- 13B, X-13C, and X-13D, to not be installed in U1R11 Mode 5 during CILRT. WBN-1-PT-001-30, 1-PT-001-30-27B, 1-PT-001-30-2B,1-PT-001-30-5, 1-PT-001-30-9A,1-PT-001-30 -12, 1-PT-001-30-20A, and 1-PT-001-30-23 do not have to be installed due to ongoing outage related modification activities associated with DCN 58382-A. This is outside the requirements for normal system lineup as described in the Updated Final Safety Analysis Report (UFSAR). However, the root valves just upstream of the transmitters must be closed, thereby isolating the system during the test. Post-modification testing performed in accordance with the re-installation of the pressure transmitters will verify that the transmitters and associated connections meet acceptable leakage criteria. Therefore, this change will not increase the likelihood of a malfunction of a System, Structure, or Component important to safety.

This evaluation supports a change to the UFSAR to allow certain Main and Reheat Steam pressure transmitters to not be installed during CILRT provided that the associated root valves for the transmitters are isolated. Post modification testing performed in accordance with the re-installation of the pressure transmitters will verify that the transmitters and associated connections meet acceptable leakage criteria. The design basis verification of containment integrity as a result of CILRT is not affected by this change. Therefore, this change does not result in any new accidents or malfunctions, and does not result in increased frequency or consequences of accidents or malfunctions evaluated in the UFSAR. In addition, no fission product barriers are challenged by this change.

9. EVALUATION NUMBER: EDC 56160A

EDC 56160-A revises Special Operations section 4.24 of SDD N3-30AB-4001 to incorporate guidance from the NRC regarding the management of redundant 100% capacity non-TS support systems when they are removed from service. The proposed revision will allow the use of paragraph (a)(4) of 10 CFR 50.65, the "maintenance rule," to assess and manage the risk associated with one train of the Shutdown Board Room (SDBR) HVAC system becoming inoperable or being removed from service to perform maintenance activities. The SDBR HVAC system is not specifically discussed in the WBN Technical Specifications (TSs). Because the SDBR HVAC system meets the criteria of a non-TS support system having two redundant 100% capacity subsystems, each capable of supporting both TS trains of the electrical distribution system, application of the NRC guidance is appropriate. In addition, the EDC revises Updated Final Safety Analysis Report (UFSAR) section 9.4.3.2.4 to provide clarification if one train of the SDBR air-conditioning system is inoperable or taken out of service to perform maintenance activities, a risk assessment associated with the activity will be managed in accordance with paragraph (a)(4) of 10 CFR 50.65. Reference to the NRC letter dated April 5, 2002 (Docket No. 50-440) - Application of Generic Letter 80-30 Guidance to an Inoperable Non-Technical Specification Support System as defined in the TS Bases for LCO 3.0.6 was added as reference 1 applicable to this UFSAR section. This guidance has already been incorporated into the Bases for TS LCO 3.0.6 by EDC 54175-A. The screening review determined that this portion of the proposed change is adverse to the UFSAR described design function of the SDBR air-conditioning system and requires evaluation under 10 CFR 50.59. The remaining change proposed by the EDC involves deleting the TS type guidance for dealing with both trains of SDBR HVAC inoperable concurrently from section 4.24 of the SDD. Although the SDBR HVAC system is not explicitly discussed in the WBN TSs, it is considered as attendant equipment to the Systems, Structures, and Components (SSCs) governed by the WBN TSs located within the SDBRs, for example the electrical power distribution systems. Therefore, the definition of "Operable-Operability" in section 1.1 of the WBN TSs is applicable and should be used in determining operability of the supported SSCs when both trains of attendant SDBR cooling are inoperable concurrently. Because the guidance currently exists in the Technical Specifications, it is not necessary to provide such guidance in the SDD. This portion of the change was screened out and will not be discussed further in this evaluation.

The evaluation has determined that the proposed changes do not result in new accidents or unacceptable malfunctions, and do not result in increased frequency or unacceptable consequences of accidents or malfunctions evaluated in the UFSAR. The change does not result in more than minimal increases of the consequences of an accident or malfunction and does not result in an unacceptable departure from methodologies used to establish the design basis and safety analysis. In addition, no fission product barriers are challenged by this change, and the Technical Specifications are not affected.

10. EVALUATION NUMBER: DCN 51656-A

The control building Electrical Board Room (EBR) Air-Conditioning (A/C) subsystem consists of two 100% capacity trains, designed to provide cooling for spaces located on elevations 692.0 and 708.0. Each train consists of two 50% capacity Air Handling Units (AHUs), a water chiller, a chilled water pump, and associated piping, ductwork, dampers, instrumentation, and controls. The EBR A/C subsystem is primarily safety-related and operates during both normal and Control Room Isolation (CRI) modes. During a CRI, this subsystem maintains the same system alignment as during the normal mode. Rooms served by this system include the mechanical equipment rooms, battery board rooms, battery rooms, communications room, Secondary Alarm Station (SAS), computer room, and auxiliary instrument rooms. Each train of this subsystem was originally designed to maintain the spaces between 60°F and 104°F during all modes of operation as stated in Section 9.4.1.1 of WBN Updated Final Safety Analysis Report (UFSAR) and paragraph 3.1.5 of System Description N3-30CB-4002. One train operates while the other is on standby. The standby train starts automatically on low airflow signal from the operating AHUs, high return air temperature, or decreasing pressure across the operating chilled water pump. Failure of the operating train for any of these reasons is annunciated in the Main Control Room (MCR).

The proposed design change supports resolution of the following three Problem Evaluation Report (PER) issues:

PER 02-005113-000 (ECAP number 13531) states that auxiliary instrument room temperatures are continually elevated above 78°F which has resulted in internal electrical equipment rack temperatures greater than 84°F. Industry experience indicates that cooler operating conditions are desirable for electronic equipment of the type located in the Unit 1 auxiliary instrument room. The PER requests that the temperature be reduced to help extend the life of these components. Therefore, one objective of this DCN is to lower both the normal and post-accident environmental temperature without adversely affecting equipment or personnel comfort.

PER 03-011087-000 (ECAP number 7610) states that operation of the EBR chillers subsequent to a Loss of Off-Site Power (LOOP) event could result in temperatures below the design value of 60°F specified in the UFSAR. The apparent cause detailed in the PER determined that the face damper portion of each of the EBR AHU face and bypass dampers was removed prior to startup via DCN M02693-A. Removal of the face dampers has not been addressed in calculation EPM·MCP-071689, Cooling/Heating and Equipment/Component Performance Analysis for the Control Building Electrical Board Room Areas (EL. 692.0 and 708.0).

PER 69479 states that the upper analytical limiting temperature of 104°F specified in revision 25 of calculation EPM-WVC-101089, WBN Instrument Safety Limits HVAC Systems 30, 31, and 65, for temperature switches 0-TS-31-150B and 0-TS-31-157B does not account for the temperature difference between the return air (at the location of the temperature switches) and the computed worst case air temperature in the rooms served. Based upon a review of calculation EPM-MCP-071689, revision 12, the Loss of Coolant Accident (LOCA) condition case results in a return air temperature of 84.9°F with a corresponding Unit 1 auxiliary instrument room temperature of 90.8°F. The difference between these values is 5.9°F. Therefore, the upper analytical limit for these temperature switches should be 104°F - 5.9°F = 98.1°F

10. EVALUATION NUMBER: DCN 51656-A (continued)

The proposed design change focuses on resolving each of these issues and consists of three stages. The staging sequence affects system design requirements, therefore, each stage must be performed sequentially starting with stage 1. Each stage will allow for the work to be completed during the scheduled outage of the respective AHU train.

Stage 1 will reduce the set point for temperature controllers 0-TC-031-0335 and 0-TC-031-0336 from the current value of 75°F to 68°F. These temperature controllers are associated with control of the bypass dampers for train A EBR AHUs A-A and B-A (0-AHU-031-30B and 0-AHU-031-300). Work on these controller set-points will occur when this train is Out of Service (OOS). It is recognized that during this interim condition, the temperature within the SAS will be reduced (should the train A AHUs be started) since the air flow rate to the SAS will not be reduced until stage 3 to offset the reduced controller setpoint. This interim condition is also analyzed in revision 14 to calculation EPM-MCP-071689 for both normal and post-accident conditions. Although the reduced temperatures may result in less than ideal conditions for personnel stationed in the SAS, it will not result in any adverse impact on equipment. Temperature switches 0-TS-031-0122, 1-TS-031-0427, 2-TS-031-0427, and 0-TS-031-0434 (associated with non-safety-related duct heaters 0-HTR-3-83, 1-HTR-31-87, 2-HTR-31-89, and 0-HTR-31-85, respectively) will have a range specified as 60°F to 68°F in the Master Equipment List (MEL) instrument data field as part of Stage 1 also. Previously, a set point range has not been specified for these non-safety-related duct heater temperature switches. This range was chosen to be consistent with the desired room temperatures. Note: The actual set point for 0-TS-31-150B will remain unchanged in consideration of the reduced analytical limit of 95°F and reduced lower operational limit of 76°F (as specified in calculation EPM-WVC-101089, Rev. 27)

Stage 2 will reduce the set point for temperature controllers 0-TC-031-0337 and 0-TC-03-0338 from 75°F to 68°F. These temperature controllers are associated with control of the bypass dampers for Train-B EBR AHUs C-B and D-B (0-AHU-031-31-B and 0-AHU-031-31-D). As discussed above, when the train A system is put into service, the temperature within the SAS will be reduced since the air flow balance of stage 3 has not yet been performed. Note: Similar to 0-TS-31-150B above, the actual set point for 0-TS-31-157B will remain unchanged in consideration of the reduced analytical limit of 95°F and reduced lower operational limit of 76°F (as specified in calculation EPM-WVC-1 01 089, Rev. 27)

Stage 3 will re-balance the air flows on elevation 692.0 by throttling 0-BLD-031-5425 to reduce the supply air flow rate into the SAS from the current design value of 695 cfm to a new design value of 200 cfm. The excess 495 cfm will be proportionally distributed between rooms C2 through C10 on elevation 692.0. The total branch flow rate of 12,905 cfm serving these rooms (downstream of mechanical equipment room 1) will remain unchanged. No other balancing dampers will require adjustment as long as the tested flow rates remain within the G-37 acceptance criteria of ± 10%. This will raise the normal operating temperature in the SAS to off-set the effects of the reduced bypass damper controller setpoints of stages 1 and 2.

The Design Basis Event (DBE) scenario which results in reducing the minimum temperature below the current design value of 60°F for most rooms served by the EBR A/C subsystem (in consideration of the removed face damper) is one which results in minimum cooling loads within the rooms served.

10. EVALUATION NUMBER: DCN 51656-A (continued)

This was determined to occur during a DBE LOOP without a postulated concurrent Loss of Coolant Accident (LOCA) since only safety-related cooling loads would be present (non-safety-related loads would not).

This means that additional loads required for LOCA mitigation within certain rooms, such as Unit 1 auxiliary instrument room would not be energized. Revision 14 to calculation EPM-MCP-071689 was prepared to compute the room temperatures resulting from this condition. Previously, the calculation only considered a combination LOCA/LOOP wintertime scenario as bounding for minimum room temperatures. Results indicate that a postulated worst case combination of expected DBE LOOP electrical loads, continued air flow through the cooling coils (due to elimination of the face damper), minimum chilled water temperature of 42°F, 110% of the design air and water flow rates, 13°F wintertime design outside temperature (pressurizing and make-up air flow to the battery rooms), and no credit for non-safety-related heaters would result in temperatures below the current minimum design value of 60°F currently specified in the UFSAR section 9.4, SDD N3-30CB-4002 and on Environmental Data Drawings (EDOs) 47E235-17, 47E235-19, and 47E235-23 for most rooms. A temperature of 55°F is established in the proposed change as the new bounding minimum DBE temperature for all rooms served by the EBR A/C system with the exception of the Unit 1 auxiliary instrument room (708.0-C1) which will only be reduced to 60°F. It should be understood that the reduced DBE minimum temperatures result from consideration of the scenario described above along with the missing face dampers (removed via DCN M02693-A) and is not as a result of the reduced controller setpoint of 68°F. The bypass damper in the operating AHUs will remain fully open with either the current setpoint of 75°F, or the proposed new setpoint of 68°F. However, without the face dampers, air flow continues through each cooling coil and results in the reduced minimum temperature. This is a latent error in the analysis that is being corrected as a part of this DCN. The impact of the proposed reduction in the controller setpoint temperature to 68°F is that the normal minimum temperature for most rooms served by the EBR HVAC system will be reduced slightly and the normal average temperature was reduced slightly for rooms 708.0-C1 and 708.0-C4 only. The revised temperatures will be reflected on the EDDs mentioned previously. Rev. 14 of calculation EPM-MCP-071689 also includes the reduced air flow rate of 200 cfm to the SAS in the computer model and demonstrates that acceptable temperatures will be maintained during both normal operational and post-accident conditions in this room. The reduced air flow rate to the SAS will off-set the effect of the reduced controller setpoint to prevent over-cooling this area during normal operational conditions. The revised calculation also addresses the interim condition that will exist prior to completion of stage 3 (i.e., with the current design flow rates on elevation 692.0).

As a result of this evaluation, it is concluded that this activity does not meet any of the criteria of 10CFR50.59(c)(2), and therefore obtaining prior NRC approval is not required to implement this activity.

11. EVALUATION NUMBER: TACF 1-11-0012-030 Rev 0

The Lower Compartment Cooler (LCC) 1C-A upper outboard coil experienced a leak which was located in the second or third tube from the top, which is not repairable in place. WBN has not been successful in attempts to repair this leak. This evaluation covers TACF 1-11-0012-030 Rev 0, which will blank off the supply and return of the Essential Raw Cooling Water (ERCW) to this cooling coil which will result in seven out of the eight coils remaining functional. Blanking plates constructed of 0.1345" thick stainless steel plate (QA-1, ASME Section III, Class-2, ASME SA 240, TP304) capable of withstanding the design ERCW System pressure of 160 psig will be installed at the supply and return flanges associated with the leaking coil. The gaskets currently installed will be replaced with suitable replacement gaskets on both the supply and return flange connections. This temporary alteration will isolate ERCW flow to this coil only and will not adversely affect continued ERCW and air flow to the remaining seven coils associated with this cooler.

Proper operation of the LCC cooling coils is not a safety related function. Operation of all four of the LCCs is needed during the summer/fall time period when ERCW temperatures are at their highest during the year. Operation of these coolers is needed to maintain containment air temperature of 120°F during normal plant operation. If the water leak is allowed to continue an increase in the relative humidity levels inside lower containment is expected. This condition could mask water leaks inside lower containment.

Proper operation of the LCC cooling coils is not a safety related function and is not required for mitigation of any Updated Final Safety Analysis Report (UFSAR) Chapter 6 or 15 accidents. The blanking plate will be designed to meet the design conditions of the ERCW system. The design basis functions (movement of air in lower containment) of the LCC 1C-A is maintained and not adversely affected by this proposed design change. Therefore, this change does not result in any new accidents or malfunctions, and does not result in increased frequency or consequences of accidents or malfunctions evaluated in the UFSAR. In addition, no fission product barriers are challenged by this change.

As a result of this evaluation, it is concluded that this activity does not meet any of the criteria of 10CFR50.59(c)(2), and therefore obtaining prior NRC approval is not required to implement this activity.

12. EVALUATION NUMBER: AREVA FS-266 Rev 0

During Cycle 7 operation, the WBN core exhibited symptoms of Crud Induced Power Shift (CIPS). The root cause of CIPS is boiling near the upper surfaces of high-powered fuel rods, leading to deposition of crud in these regions. These crud deposits provide a matrix for the hideout of reactor coolant impurities during power operations, which includes ${}_5B^{10}$ used for reactivity control. The boron isotope that is held in the deposits is responsible for suppressing power in the upper half of the reactor core.

CIPS has been observed at a number of Pressurized Water Reactors, most severely at AmerenUE's Callaway Plant. In April 1999, Dominion Engineering, Inc. (DEI) developed an Ultrasonic Fuel Cleaning (UFC) System in conjunction with EPRI for use at Callaway. Subsequent operation successfully cleaned the entire reload fuel batch during Callaway's spring 2001 refueling outage. Callaway's cycle 12 was the first fuel cycle since cycle 8 to show no signs of CIPS.

Watts Bar has used the DEI UFC System since its cycle 7 refueling outage. Subsequent operation in cycles 8, 9, and 10 have resulted in no operational challenges associated with CIPS. Recent modifications to the Unit 2 transfer canal associated with the construction and operation of WBN Unit 2 have necessitated that a newer, High Efficiency UFC (HE-UFC) system be used at WBN. In comparison to the previous DEI UFC system, the HE-UFC is inherently safer in terms of nuclear and industrial safety for the reasons summarized below.

1) The HE-UFC is an open cleaning system whereas the previous DEI UFC is a closed cleaning system. The closed system requires additional cooling analysis and has minimal margin to challenging peak cladding temperatures in the event forced cooling is lost.
2) The HE-UFC is a single cleaning chamber system and allows fuel to remain latched to the spent fuel handling tool at all times. The previous DEI UFC is a dual chamber cleaning system and requires fuel to be unlatched before each cleaning. These differences allow the HE-UFC to be bounded by current UFSAR fuel handling accident analysis as well as SFP criticality analysis.
3) The HE-UFC is less than half the weight of the previous DEI UFC. This difference results in no NUREG 0612 heavy loads associated with installation and removal of the HE-UFC.

The HE-UFC is designed to remove corrosion products from nuclear fuel assemblies using ultrasonic energy. It is a high throughput system consisting of a single-chamber cleaning fixture that cleans by passing the fuel assembly vertically through the machine. Corrosion products removed from the fuel are pumped through a pumping skid and deposited in multiple filter elements housed in an All Metal Filter Module (AMFM) shaped like a fuel assembly.

The cleaning fixture is comprised of two planar transducers attached at the top and bottom by a top and bottom tie plate, respectively. Each transducer consists of multiple oscillating heads that provide the ultrasonic energy necessary for crud removal for a total of 12,000W output. The cleaning chamber is open at the bottom, allowing the fuel assembly to be passed completely through.

The filtration system consists of a pumping skid, which contains a pump that draws suction from the center of the cleaning fixture and discharges to the AMFM. The filter cartridges are arranged in the shape of a fuel assembly to facilitate handling. This fuel-sized metal filter has the capacity to store all crud removed throughout multiple outage campaigns. Filter system instrumentation includes water temperature, filter differential pressure, process flow, and in-line gamma dose rate.

Other cleaning system equipment includes an electrical distribution skid, a transducer cabinet, and a control station. The electrical distribution skid connects to 480 VAC power and supplies power to the filtration system pump and generator cabinet. The control station consists of a computer with connections for peripherals such as a keyboard and monitor that the operator uses to control the cleaning process via a Windows interface. The generator cabinet contains six ultrasonic generators and is connected to the cleaning chamber by two 8-conductor cables, one for each planar L-transducer.

In addition to the HE-UFC specific cleaning equipment, the HE-UFC has been designed to support mounting of 4-face visual inspection equipment. The inspection equipment consists of four underwater cameras (one for each face of the fuel assembly), one underwater camera for the bottom nozzle inspection, and four underwater lights. The control station for the 4-face system contains two display monitors as well as equipment for recording video data.

The HE-UFC will be installed in the transfer canal and suspended via cabling attached to support brackets resting on the top ledge of the transfer canal. The HE-UFC cleaning process begins when fuel is lowered into the HE-UFC chamber. The filtration system pump is running to establish a target flow rate of 200 gpm. All ultrasonic generators are powered on and the transducers are started. The fuel assembly is inserted through the cleaner with the Spent Fuel Pool (SFP) bridge crane hoist in slow speed and is subsequently raised in slow speed. The duration of each cleaning is approximately four minutes. During cleaning the filtration system circulates flow through the cleaner and into the all metal filter module where dislodged crud is captured and stored. Inline gamma detector readings are monitored throughout the process as a primary indication of the cleaning progress. Operators also monitor filter differential pressure throughout the process. Once the cleaning cycle is complete, transducer power is turned off and the process is repeated for another fuel assembly.

The Spent Fuel Cooling and Cleaning system is a safety related system. Its design functions are to remove decay heat generated by the spent fuel assemblies, clean up and purify water in the spent fuel pool, transfer canal, refueling cavities, and the refueling water storage tanks, and provide for open reactor cooling (such as during refueling) when floods exceed plant grade (design basis flood). Operation of the HE-UFC system will add negligible heat loads to the Spent Fuel Cooling system and will not prevent the spent fuel cooling system from performing its intended design function of cooling the fuel. Additionally, operating the HE-UFC has the potential to introduce crud into the SFP; however, the amount of crud will not prevent the Spent Fuel Cooling and Cleaning system from performing its design function to clean up and purify water in the spent fuel pool, transfer canal, refueling cavities, and the refueling water storage tanks.

This evaluation also reviewed effects on fuel integrity and potential damage to the SFP liner if a seismic event were to occur with the HE-UFC equipment installed. It was determined that use of the HE-UFC equipment maintains cladding vibration during cleaning below the level which could result in damage to the fuel cladding, pellets, or other components and that the SFP liner will remain intact.

The fuel handling portion of this activity is bounded by previous accident analysis for a Fuel Handling Accident in the UFSAR. All fuel handling will be performed within the bounds of UFSAR procedures.