Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

June 23, 2011

10 CFR 50.4

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

Watts Bar Nuclear Plant, Unit 2
NRC Docket No. 50-391

Subject: WATTS BAR NUCLEAR PLANT (WBN) UNIT 2 – INSTRUMENTATION AND CONTROLS STAFF INFORMATION REQUESTS

Reference: 1. Licensee Open Items to be Resolved for SER Approval List

The purpose of this letter is to provide TVA's responses to NRC's information requests on the "Licensee Open Items to be Resolved for SER Approval List." Enclosure 1 to this letter provides TVA's responses to the information requested by NRC.

Enclosure 2 contains the supporting document for TVA's responses to NRC's requests/questions provided in Enclosure 1. Enclosure 3 contains a list of references on which TVA's responses are based.

This letter does not contain any new regulatory commitments. If you have any questions, please contact William Crouch at (423) 365-2004.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 23rd day of June, 2011.

Respectfully,

David Stinson
Watts Bar Unit 2 Vice President

D030
NRR

Enclosures:

1. Responses to Licensee Open Items To Be Resolved For SER Approval
2. Attachment, "WINCISE Documents Available for Audit at Westinghouse Rockville Office"
3. List of References

cc (Enclosures):

U. S. Nuclear Regulatory Commission
Region II
Marquis One Tower
245 Peachtree Center Ave., NE Suite 1200
Atlanta, Georgia 30303-1257

NRC Resident Inspector Unit 2
Watts Bar Nuclear Plant
1260 Nuclear Plant Road
Spring City, Tennessee 37381

Enclosure 1
TVA Letter Dated June 23, 2011
Responses to Licensee Open Items to be Resolved for SER Approval

NOTE: The NRC can make arrangements to view documents in the Westinghouse Rockville office by contacting Ms. Leslie Collins at 301-881-7040 (e-mail: collinlj@westinghouse.com).

The following acronyms/abbreviations are used in this letter and attachment:

ADAMS	Agencywide Documents Access and Management System
ARO	All Rods Out
[1]BEACON™	Best Estimate Analyzer for Core Operations Nuclear
BNL	Brookhaven National Laboratory
CET	Core Exit Thermocouple
COLR	Core Operating Limits Report
CFR	Code of Federal Regulation
DBE	Design Basis Event
DMM	Direct Margin Monitor
EDCR	Engineering Document Change Request
EOP	Emergency Operating Procedure
FMEA	Failure Modes and Effects Analysis
FSAR	Final Safety Analysis Report
HZP	Hot Zero Power
IIS	Incore Instrument System
IITA	Incore Instrument Thimble Assembly
ILRT	Integrated Leak Rate Test
LOCA	Loss of Coolant Accident
MI	Mineral Insulated
MIDS	Movable In-core Detector System
NRC	Nuclear Regulatory Commission
[2]OPARSSEL™	Optimized Proportional Axial Region Signal Separation Extended Life
PAMS	Post Accident Monitoring System
PDMS	Power Distribution Monitor System
RAI	Request for Additional Information
RTP	Reactor Thermal Power
SE	Safety Evaluation
SPD	Self Powered Detector
SPS	Signal Processing System
TPBAR	Tritium Producing Burnable Absorber Rod
TER	Technical Evaluation Report
TRM	Technical Requirements Manual
TS	Technical Specifications
TSM	Technical Specification Monitor
TVA	Tennessee Valley Authority
WBN	Watts Bar Nuclear Plant
[3]WINCISE™	Westinghouse In-Core Information Surveillance & Engineering

[1] BEACON is a registered trademark of the Westinghouse Electric Company LLC
[2] OPARSSEL is a registered trademark of the Westinghouse Electric Company LLC
[3] WINCISE is a registered trademark of the Westinghouse Electric Company LLC

1. **NRC Request (Item Number 375)**

The following are the remaining open questions from this item number with the updates provided by the reviewer following the May 12, 2011 public meeting.

9. *In the NRC SE for WCAP-12472-P-A for the BEACON system, the staff accepted this system but subject to three conditions. In the TVA submittal for use of the Beacon system in Unit 1, TVA described how they met these conditions for Unit 1. Please describe how TVA will meet these conditions for Unit 2.*

14. *The FMEA provided by TVA on 4/15 has not been updated (see email from M. S. Clark on 4/11). Also, the FMEA provided focus on failures during installation and commissioning and it does not identify measures for failures during operation. Last, this FMEA does not address software failures, only component failures and installation failures. Please provide an updated and complete version of the FMEA.*

    Clarification: Please provide updated FMEA that discusses the failure modes of the MI insulated cable – only for the part of the system that is 1E.

16. *TVA attachment 4 of the 4/15 letter show modifications to the DBE design criteria. Please provide detailed explanation about these modifications.*

17. *Please explain if new penetration and routing were required for IIS' signals. If new penetrations are required, explain how these were qualified. Also, explain the criteria used to route the power/control cables.*

18. *Questions on Technical Specification:*

    (1) *The TVA package states that TS 3.1 and TS Bases 3.1 were modified due to WINCISE. Please provide detailed information to evaluate the modifications to the TS.*

    (2) *The TVA mark up does not define the operating limits in the TS for the reactor power distribution. Please provide detailed information on how the IIS may impact the Technical Specification.*

TVA Response to NRC Request:

9. In the NRC Safety Evaluation Report for WCAP-12472-P-A, the NRC staff evaluated the BEACON methodology, the uncertainty analysis, and the operation of the overall system and concluded that BEACON is acceptable for performing core monitoring and operations support functions for Westinghouse PWRs but subject to certain conditions as specified in the BNL TER. These conditions are listed below. After each condition listed, a description of how the condition will be met at WBN Unit 2 is provided.

    1. *In the cycle-specific application of BEACON, the power peaking uncertainties $U\Delta H$ and UQ must provide 95% probability upper tolerance limits at the 95% confidence level.*

Cycle-specific BEACON calibrations performed before startup and at beginning-of-cycle conditions will ensure that power peaking uncertainties provide 95% probability upper tolerance limits at the 95% confidence level. These calibrations are to be performed using the NRC approved Westinghouse methodology, as described below. Until these calibrations are complete, more conservative default uncertainties will be applied. The calibrations will be documented and retained as records.

More specifically, the NRC approved Addendum 1-A to WCAP-12472-P-A and extended the previously licensed BEACON power distribution monitoring methodology to plants containing fixed incore self-powered detectors. Addendum 1-A also describes the methodology used to assess uncertainties to be applied to the measured power distribution. The NRC approved Addendum 2-A to WCAP-12472-P-A, which incorporates the use of vanadium fixed incore non-depleting self-powered detectors.

As described in the original WCAP-12472-P-A, the power distribution uncertainty is shown to be a function of detector measurement variability and the number and layout of the available detectors. The BEACON uncertainty is statistically simulated using a randomly selected set of available detectors and detector variability. The resultant bounding 95/95 upper tolerance limits on assembly and peak node power are expressed as polynomial fits as a function of detector measurement variability and the number and layout of the available detectors. The total uncertainty is obtained by statistically convoluting the uncertainty components. As such, the cycle-specific power peaking uncertainties provide 95/95 tolerance limits provided the BEACON calibrations are performed in accordance with the NRC approved Westinghouse methodology.

2. *In order to ensure that the assumptions made in the BEACON uncertainty analysis remain valid, the generic uncertainty components may require reevaluation when BEACON is applied to plant or core designs that differ sufficiently to have a significant impact on the WCAP-12472-P-A database.*

WBN utilizes a Westinghouse 4-loop nuclear steam supply system (NSSS) and all fuel is presently of Westinghouse manufacture. WBN Unit 2 will utilize fixed incore instrumentation with Vanadium self-powered detectors. As described above, WCAP-12472-P-A Addendums 1-A and 2-A extend the BEACON methodology to the use of these fixed incore detectors. Furthermore, WBN Unit 2 does not currently utilize TPBARs in the core design. The WBN Unit 2 plant and core design will be consistent with the plant and core designs used in the WCAP-12472-P-A database.

During the review of the Westinghouse topical report WCAP-12472-P-A, the NRC requested additional information on how BEACON treats core loadings with fuel designs from multiple fuel vendors and the impact to the BEACON uncertainty analysis. Westinghouse responded that for all BEACON applications, the previous operating cycle is examined to establish reference uncertainties. This examination accounts for loading of fuel supplied by multiple vendors by comparing a BEACON model to actual operating data over the cycle. The initial flux mapping at the start of the cycle ensures model calibration factors that reflect the actual fuel in the reactor before the PDMS system is declared operable.

3. *The BEACON Technical Specifications should be revised to include the changes described in Section 3* [of the BNL TER] *concerning Specifications 3.1.3.1 and 3.1.3.2 and the Core Operating Limits Report.*

   WCAP-12472-P-A described an application of BEACON (i.e. BEACON-DMM) where the core operating limits are changed. As noted previously, TVA is proposing only to use BEACON as a core TS monitor for conformance to WBN's existing limits (i.e. BEACON-TSM). The recommended changes to Specifications 3.1.3.1 and 3.1.3.2 and the COLR mentioned above apply to the BEACON-DMM application and not to the BEACON-TSM application of BEACON. Therefore, the issue addressed by this condition is not applicable to the license amendment requested.

14. The safety-related function impacted by a mineral insulated cable failure is a loss of the CET. Failure of the CET is addressed in the Common Q FMEA WNA-AR-00180-WBT-P, Revision 2, submitted on TVA to NRC letter dated March 2, 2011 (Reference 4).

16. The following is the explanation for the changes:

Page	**Explanation**
vii	Update the Description of Revision section to provide a description of the changes
viii	Add PDMS - Power Distribution Monitoring System to the list of abbreviations This brings the document into agreement with the Unit 1 and Unit 2 Technical Specifications and Technical Requirements Manuals.
586	Revise the description of the system used to detect a core misload event, to reflect that a flux map or PDMS is used. This is based on plant startup procedures which require the following tests to be performed. These tests have the potential to identify a core misload event:

1. Flux Symmetry (at $\leq$ 30% RTP)
2. Power Distribution (between 40% RTP and 80% RTP and again at > 90% RTP)

587 Section 4.37.3.1

The tests identified in response to the change of page 586 require that reactor thermal power be in the power range. This is why the change was made from mode 2 to mode 1. Low power testing is done in either mode 2 or 3 using the reactivity computer to determine hot zero power (HZP) critical boron all rods out (ARO) and Rod Worth. These tests have the potential to identify a core misload, but do not involve a flux map as stated in the design criteria.

587 Section 4.37.3.2

Refer to the response for Section 4.37.3.1.

590 Changed the title from "incore detector system" to "Incore Instrumentation System" to agree with the normal system title which consists of two subsystems, the Incore Flux Mapping System and the Incore Thermocouple System. Both of the subsystems are used to detect an improperly loaded fuel assembly and this change eliminates any potential confusion caused by the incorrect system title.

595 Changed the title from "Incore Flux Instrumentation System" to "Incore Instrumentation System" to agree with the normal system title which consists of two subsystems, the Incore Flux Mapping System and the Incore Thermocouple System. Both of the subsystems are used to detect an improperly loaded fuel assembly and this change eliminates any potential confusion caused by the incorrect system title.

17. The IIS signals are non-safety-related and are transmitted over fiber optic cables from the SPS cabinets to the application servers. These cables are run with other non-safety-related cables of similar voltage level. The containment penetration modules for the IIS fiber optic penetrations were purchased safety-related and environmentally qualified for the application.

    The power to the SPS cabinets is derived and isolated from a 1E source that aligns with the CET group it shares MI cables with (i.e. Train A with PAM 1 and Train B with PAM 2). Outside of containment, the power cables are routed in trays and/or conduits with train and/or associated train cables of similar voltage level. Inside containment, each cable has its own dedicated conduit from the penetration to the cabinet.

18. (1) The primary changes to the Technical Specifications and Technical Requirements Manual for the Power Distribution Monitoring System (PDMS which includes WINCISE and BEACON) were implemented in Revision B of these documents. The documents are available for review in ADAMS Accession Number ML100550326.

    (2) Additional changes for rod position verification using PDMS were made in Revision E of the Technical Specifications. Revision E is available for review from ADAMS Accession Number (ML110270108).

2. <u>NRC Request (Item Number 377)</u>

1. *Further explanation is required for the sentence in EDCR 52321 Rev A Page 2, "During certain accident scenarios, it is possible for the CETs to see temperatures up to 20 degree F different from Unit 1".*

   (a) Which accident scenarios do the above statements refer to?

   (b) Compare the accuracy for flux mapping with movable detectors (MIDS) and fixed detectors such as SPDs.

2. *Explain how the linear heat generation rate is monitored using the new IITA system.*

3.
   (a) Page 26 of the EDCR 52321-A states that "certain SPS electronics cannot withstand the increased pressure during an Integrated Leak Rate Testing (ILRT). As a result, these SPS electronics need to be removed prior to starting the ILRT." If SPS electronics does not survive an ILRT, what will be their status during a design basis accident, such as, loss of coolant accident?

   (b) Page 129 of EDCR 52321-A Item Number 7 CET Requirements states that "The CET must be operable before, during, and after a design basis accident without loss of safety function, and for the time required to perform the safety function." Does this CET requirement conflict with the scenario in Part (a) above, such that the malfunction of the electronics during high pressure during the design basis accident?

4. *BEACON Power Distribution Monitoring System (PDMS) with WINCISE seems to be functioning different from old conventional BEACON monitoring system. Explain the differences between the new and old system and the advantages, if any, of the new system over the old one.*

5. *EDCR 52321-A Page 129 (WBN2-94-4003 Rev 0000 Page 18 of 41) "WINCISE Requirements" Sections 1 and 2 specify minimum requirements for inputs from SPDs such that "the WINCISE system shall not require input from 75% (50% for Section 2) of the instrumented locations, with at least five operable SPD associated with the top half of the active core and at least five operable SPD associated with bottom half of the active core per quadrant,...." Section 3 states that "The WINCISE System will be capable of performing its required core monitoring functions at or above 20% RTP." Provide documents supported by analyses that will show that the incore monitoring systems and the CET system will be fully capable of performing the intended functions under the circumstances prescribed in Sections 1, 2 and 3 of "WINCISE Requirements."*

6. *Section 6.0 of WCAP-12472-P-A Addendum 2-A stipulates that in addition to maintaining power distribution Technical Specification that require surveillance of parameters related to hot rod power and local power density, it will be necessary for the licensees to include a BEACON Operability specification in the Technical Requirements Manual (TRM) associated with either the NUREG-1430 or NUREG-1432 format TS. Are the minimum requirements (50% and 75% of the instrument locations input) and functions of WINCISE and CET systems specified in Sections 1 through 6 of "WINCISE Requirements" included in the WBN-2 Technical Specifications? If the answer is "no", explain why. Also, please provide the agency with a copy of the Technical Requirements Manual for the WINCISE system proposed for WBN-2*

7. *NRC Staff's search for references listed in Section 7 of EDCR 52321-A resulted in lack of any specific reference to Westinghouse Topical Report in the EDCR 52321-A.*

   (a) *Please specify which of the Addendums for WCAP 12472 Topical Report or any other Westinghouse TR is the basis for the planned WINCISE system to be installed at Watts Bar -2.*

   (b) *Provide the Agency with all relevant calculations and analyses supporting the proposed WINCISE system for Watts Bar 2.*

<u>TVA Response to NRC Request:</u>

The following responses are based on responses provided in Westinghouse to TVA letter WBT-D-3258 (Reference 3).

1.a The Watts Bar Unit 2 CETs are located inside the fuel assembly Instrument Thimble axially positioned near the top of the active fuel instead of at the bottom of the upper core plate as they are in Watts Bar Unit 1. The Watts Bar Unit 1 CETs are exposed to water that has originated from all the fuel assemblies in the vicinity below the CET location. The Watts Bar Unit 2 CET effectively sees only water that has traveled up through the fuel assembly containing the CET. This difference in positioning will result in the measurement of different temperatures even if the radial locations of the CET are indicated to be the same. Additionally, the water flowing past the Watts Bar Unit 2 CETs inside the fuel assembly Instrument Thimble is moving somewhat faster than the water that flows up through the fuel pins inside the fuel assembly. This means that the water does not absorb as much heat during the trip up the length of the fuel assembly as does the water traveling up through the fuel pins in that fuel assembly. The Watts Bar Unit 1 CETs are surrounded by water that is a mix of the water that has traveled up through the fuel pins and the water that has traveled up through the Instrument Thimble. The result is that the temperature of the water surrounding the Watts Bar Unit 2 CETs will generally be lower than the temperature of the water surrounding the Watts Bar Unit 1 CETs.

When the Reactor Coolant pumps are operating and reactor coolant flow is at nominal conditions operating plants that have switched from the "top-mounted" CET System design like that used at Watts Bar Unit 1 to a "bottom-mounted" design like that that will be used at Watts Bar Unit 2 have seen changes in the corresponding radial location CET temperature at the highest assembly power locations approaching 15 °F. Based on this information, it is conservatively assumed that differences of this magnitude may exist between the indications at Watts Bar Unit 1 and Watts Bar Unit 2 during any full-flow accident conditions (i.e., good coolant circulation). In situations where there is no forced coolant flow (e.g., Loss of Forced Reactor Coolant Flow [normally caused by a Station Black Out], Large Break LOCA or Rod Control Cluster Assembly Ejection), there is not expected to be any significant difference between the Unit 1 and Unit 2 indications.

The temperature difference was identified on the Unit Difference form in the WINCISE EDCR 52321 as 20 °F. It was subsequently revised in an administrative revision to indicate that during certain accident scenarios, it is possible for the CETs to see temperatures up to 15 °F different from Unit 1 rather than 20 °F. 20 °F was the initial approximation noted in Westinghouse's Final Design Review meeting but Westinghouse to TVA letters WBT-D-2033 (Reference 5), WBT-D-2428 (Reference 6), and WBT-D-2697 (Reference 7) provided the final value. The Common Q PAMS EDCR 52351 Unit Difference form contains the 15 °F value.

The EOP setpoint calculations have been revised to include the 15 °F difference between Unit 1 and Unit 2. These calculations are the basis for developing the unit specific emergency operating instructions.

1.b The ability of the Watts Bar Unit 2 In-core Instrumentation System (IIS) to accurately measure the core peaking factors $F_{\Delta H}$ and F_Q is described in the staff approved versions of WCAP-12472 Addendums 1 and 2. Specifically, Section 4 of WCAP-12472 describes the methodology used to account for sensor system "measurement variability" and Section 5 identifies how this measurement variability is used to establish the peaking factor uncertainties. The base uncertainties for an SPD-based measurement system are shown in Figures 4 and 5 in WCAP-12472 Addendum 1. As can be seen from the information in these figures, the peaking factor measurement uncertainty is a function of the number of operable SPD elements. The specific measurement variability applicable to the vanadium SPD that will be used in Watts Bar Unit 2 is provided in Table 2 in WCAP-12472 Addendum 2. The peaking factor measurement uncertainty for a plant using a MIDS is 4% on $F_{\Delta H}$ and 8.15% on F_Q as long as more than 75% of the instrumented core locations are measured. For a self powered detector system, the measurement uncertainties are a function of the measurement variability of the SPD and the number of operable SPDs. Since the Technical Specifications require that there must be at least 75% of the instrumented location available for a valid measurement, there is no dependence of uncertainty on the number of core locations measured.

2 There is no fundamental difference between the methods used to calculate a measured F_Q between BEACON Systems using SPD and MIDS. The only difference is in how the predicted power distribution, including the linear heat generation rate, is adjusted to produce a core power distribution measurement.

The Watts Bar Unit 1 BEACON System relies on CET signal measurements to adjust the nodal calibration factors for radial power distribution changes from a reference calibration condition and signals from the Power Range detectors to make continuous axial power distribution changes. The Watts Bar Unit 2 BEACON System performs the core power distribution predictions in exactly the same fashion but continuously adjusts both the radial and axial nodal calibration factors using only data from the SPD signal measurements. The Unit 2 CETs are not used to adjust the nodal calibration factors for radial power distribution changes. The measured core power distribution in both cases results from adjustments to the predicted core power distribution made by the updated nodal calibration factors.

3.a The SPS electronics are non-safety-related and perform no post accident function. Therefore, failure of the SPS during a LOCA or other event does not degrade the ability of the plant or the operators to mitigate the consequences of the event.

3.b The safety-related CET function is completely independent of the SPS cabinets. The CET cables split from incore detector cables at the IITA connector at the seal table and are routed directly to the Common Q PAMS cabinets in the Auxiliary Instrument Room.

4 The response to Question 2 identifies the fundamental differences between the Unit 1 and Unit 2 BEACON Systems. The primary advantages of the Unit 2 system over the Unit 1 system is that the data used to continuously adjust the nodal calibration factors needed to produce a continuous core power distribution measurement in the Unit 2 system come from sensors located inside the reactor core versus the ex-core sensors used to adjust the reference nodal calibration factors in the Unit 1 system. This allows a more accurate continuous nodal calibration factor adjustment to be performed. However, the level of axial reference nodal calibration factor detail available using MIDS measurements does offset this advantage to some degree. The net result is that the Unit 1 and Unit 2 core power distribution measurement accuracy is equivalent. The fundamental benefit of the Unit 2 system over the Unit 1 system is that the Unit 2 system requires fewer types of input data, it will be more reliable and easier to maintain.

5 The uncertainty methodology used to establish the number and distribution of required SPD sensors is described in detail in WCAP-12472 Addendums 1 and 2. Specifically, the uncertainty methodology is described in Section 5 of Addendum 1 and the basis for the requirements on the number and distribution of sensors is provided in Section 6 of Addendum 2. The power cutoff was established to provide a lower limit for power distribution related uncertainty analysis used to develop the total peaking factor measurement uncertainty limits described in Section 5 of Addendum 1. These documents have already been submitted and approved by the staff. The Watts Bar Unit 2 BEACON System does not use the CET signals, so there is no relevant discussion possible.

6 There is no BEACON operability section in either the Technical Specifications or the Technical Requirements Manual. The operability discussion is for the Power Distribution Monitoring System (PDMS) which includes the BEACON software and the WINCISE hardware. PDMS changes to Technical Specifications (TS 3.1.8, TS 3.2.1, TS 3.2.2, TS 3.2.4 and TS 3.3.1) were incorporated in Revisions B (ADAMS Accession Number ML100550326) and E (ADAMS Accession Number ML110270108). PDMS changes to the Technical Requirements Manual (TRM 3.3.3) were incorporated in Revision B (ADAMS Accession Number ML100550326).

The minimum WINCISE function requirements (50% and 75%) are included in TRM 3.3.3. The minimum CET function requirements are included in Technical Specification 3.3.3, Post Accident Monitoring Instrumentation, Table 3.3.3-1.

7.a WCAP-12472 Addendum 1-A was approved by the NRC for use with fixed incore detector systems such as the WINCISE system being installed in WBN2. WCAP-12472 Addendum 2-A was approved by the NRC for use with vanadium detectors which are utilized in the WBN2 WINCISE design. There are no changes to staff approved BEACON methodology in the Watts Bar Unit 2 BEACON System. Consequently, there are no planned addenda to WCAP-12472 that impact Watts Bar Unit 2.

7.b As identified in Westinghouse to TVA letters WBT-D-3228 (Reference 1) and WBT-D-3245 (Reference 2), supporting calculations and analyses for the WINCISE system for Watts Bar Unit 2 are available for review at the Westinghouse Rockville office. See the Attachment for the document listing.

<u>Attachment</u>

WINCISE Documents Available for Audit at Westinghouse Rockville Office

Westinghouse Watts Bar 2 WINCISE Documents at Westinghouse Rockville Office List current as of June 16, 2011					
Letter #	**Date**	**Document Title**	**Document #**	**Rev**	**Note**
WBT-D-3201	5/23/2011	WINCISE Functional Specification for Watts Bar Unit 2	420A90	2	
WBT-D-3201	5/23/2011	BEACON Data Processing Application Program Software Requirements Specification	WNA-DS-02196-WBT	1	
WBT-D-3201	5/23/2011	Standard Fixed In-Core Detector Data Processing (PRI.QFD0.2) Function Block Specification	WNA-DS-01400-GEN	0	
WBT-D-3201	5/23/2011	Standard Vanadium Detector Filter (FBM.SPD0.2) Function Block Specification	WNA-DS-01402-GEN	0	
WBT-D-3201	5/23/2011	IIS SPS Datalink Client Software Interface Specification	WNA-DS-02208-WBT	1	
WBT-D-3201	5/23/2011	BEACON™ Datalink Interface Specification	WNA-DS-02194-WBT	1	
WBT-D-3201	5/23/2011	ICS Datalink Interface Specification	WNA-DS-02193-WBT	1	
WBT-D-3201	5/23/2011	Watts Bar 2 Incore Instrument System (IIS) Signal Processing System (SPS) Isolation Requirements	WNA-CN-00157-WBT	0	
WBT-D-3228	6/3/2011	Design Report for OPARESSEL In-Core Instrumentation Thimble Assembly	021-1064	0	
WBT-D-3228	6/3/2011	Westinghouse In-core Instrumentation Surveillance and Engineering (WINCISE) Incore Instrument Thimble Assembly (IITA) Vibration Analysis for Watts Bar Unit 2	CN-NO-09-15	0	
WBT-D-3245	6/13/2011	Design and Fabrication Specification for Mineral Insulated Cable Assemblies Without Integral Reference Junctions	00000-FEA-6102	8	1
WBT-D-3245	6/13/2011	Common Q Power Supply System Technical Manual	00000-ICE-3453	2	2
WBT-D-3245	6/13/2011	Engineering Specification for In-core Instrumentation Thimble Assembly (IITA)	418A28	2	
WBT-D-3245	6/13/2011	OPARSSEL™ In-Core Instrumentation Thimble Assembly	6657E27 (sheet 1)	5	
WBT-D-3245	6/13/2011	OPARSSEL™ In-Core Instrumentation Thimble Assembly	6657E27 (sheet 2)	5	
WBT-D-3245	6/13/2011	Watts Bar Unit 2 WINCISE Power Supply Panel Assembly	10004D05 (sheet 1)	1	
WBT-D-3245	6/13/2011	Watts Bar Unit 2 WINCISE Power Supply Panel Assembly	10004D05 (sheet 2)	1	
WBT-D-3245	6/13/2011	Watts Bar Unit 2 WINCISE Power Supply Panel Assembly	10004D05 (sheet 3)	0	
WBT-D-3245	6/13/2011	Standard Safety Power Input Line Filter Panel Assembly	10042D05 (sheet 1)	10	
WBT-D-3245	6/13/2011	Standard Safety Power Input Line Filter Panel Assembly	10042D05 (sheet 2)	4	
WBT-D-3245	6/13/2011	Standard Safety Power Input Line Filter Panel Assembly	10042D05 (sheet 3)	5	

Westinghouse Watts Bar 2 WINCISE Documents at Westinghouse Rockville Office List current as of June 16, 2011					
Letter #	**Date**	**Document Title**	**Document #**	**Rev**	**Note**
WBT-D-3245	6/13/2011	Standard Safety Power Input Line Filter Panel Assembly	10042D05 (sheet 4)	3	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 1)	7	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 2)	6	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 3)	5	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 4)	6	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 5)	4	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 6)	3	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 7)	4	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 8)	5	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 9)	4	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 10)	4	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 11)	4	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 12)	3	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 13)	3	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 14)	2	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 15)	2	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 16)	2	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 17)	3	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 18)	2	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 19)	2	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 20)	2	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 21)	2	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 22)	2	
WBT-D-3245	6/13/2011	Standard Safety Power Supply Panels Assembly	10043D28 (sheet 23)	2	

Westinghouse Watts Bar 2 WINCISE Documents at Westinghouse Rockville Office List current as of June 16, 2011					
Letter #	**Date**	**Document Title**	**Document #**	**Rev**	**Note**
WBT-D-3245	6/13/2011	Test Report for Mechanical Cycling & LOCA Testing of One (1) ERD Multipin Connector for Commonwealth Edison Company	60353-94N	0	
WBT-D-3245	6/13/2011	Summary Report: Class 1E Qualification Test of the Electronic Resources Division (ERD) Electrical Connectors and Mineral Insulated Cable	CE-NPSD-275-P	0	
WBT-D-3245	6/13/2011	Qualification Summary Report for the Single Glass Bead Seal Multipin Connector Family Supplied by ERD for Combustion Engineering	CE-NPSD-275-P, Supplement 2-P	0	
WBT-D-3245	6/13/2011	Qualification Summary Report for the Conax Feedthrough Modules with Whittaker Connectors	CE-NPSD-329	0	
WBT-D-3245	6/13/2011	Qualification Summary Report for the Imaging and Sensing Technology Canada Inc. Flexible MI Cable with Litton Connectors	CE-NPSD-654-P	0	
WBT-D-3245	6/13/2011	Aging Calculations for the Watts Bar Unit 2 WINCISE Cable & Connector Upgrade	CN-ME-09-5	0	
WBT-D-3245	6/13/2011	Technical Manual for the WINCISE Cable and Connector Upgrade at Watts Bar Unit 2	DP-ME-09-1	0	
WBT-D-3245	6/13/2011	Electromagnetic Compatibility Test Plan and Procedure for Westinghouse Incore Information Surveillance & Engineering System (WINCISE) Signal Processing System Equipment Qualification Cabinet	EQ-TP-98-WBT	0	
WBT-D-3245	6/13/2011	Monitoring Test Procedure for Westinghouse Incore Information Surveillance & Engineering System (WINCISE) Signal Processing System Equipment Qualification Cabinet	EQ-TP-98-WBT, Appendix A	0	
WBT-D-3245	6/13/2011	Seismic Qualification Procedure for Westinghouse Incore Information Surveillance & Engineering System (WINCISE) Signal Processing System Equipment Qualification Cabinet	EQ-TP-99-WBT	0	
WBT-D-3245	6/13/2011	Monitoring Test Procedure for Westinghouse Incore Information Surveillance & Engineering System (WINCISE) Signal Processing System Equipment Qualification Cabinet	EQ-TP-99-WBT, Appendix B	0	
WBT-D-3245	6/13/2011	WINCISE 1 to 2 Transition Cable Assemblies	E-WBN2-155-002 (sheet 1)	1	
WBT-D-3245	6/13/2011	WINCISE 1 to 2 Transition Cable Assemblies	E-WBN2-155-002 (sheet 2)	1	
WBT-D-3245	6/13/2011	WINCISE 6 to 1 Transition Cable Assemblies	E-WBN2-155-003 (sheet 1)	1	

Westinghouse Watts Bar 2 WINCISE Documents at Westinghouse Rockville Office List current as of June 16, 2011					
Letter #	**Date**	**Document Title**	**Document #**	**Rev**	**Note**
WBT-D-3245	6/13/2011	WINCISE System Wiring Diagram	E-WBN2-155-006 (sheet 1)	1	
WBT-D-3245	6/13/2011	BMI Jacking Tool Manual	IM-0013	0	
WBT-D-3245	6/13/2011	Watts Bar 2 Incore Instrument System Dielectric Characteristics of Completed MI Cable Assemblies	LTR-ME-10-3	0	
WBT-D-3245	6/13/2011	Incore Instrument Thimble Assembly Technical/Instruction Manual	LTR-NO-10-94	3	
WBT-D-3245	6/13/2011	Response to WINCISE - Cable Critical Technical Input	WBT-TVA-0125R	N/A	
WBT-D-3245	6/13/2011	WINCISE Signal Processing System Design Requirements	WNA-DS-01811-WBT	0	
WBT-D-3245	6/13/2011	WINCISE Signal Processing System Cabinet Operation & Maintenance Manual	WNA-GO-00075-WBT	0	
WBT-D-3245	6/13/2011	Westinghouse Incore Information Surveillance & Engineering (WINCISE) Site Acceptance Test Procedure	WNA-TP-02985-WBT	0	

List of References

1. Westinghouse letter to TVA, WBT-D-3228, dated May 23, 2011, "NRC Access to WINCISE Documents at the Westinghouse Rockville Office" [Letter Item #2 (NRC Request #377 [7.b])]

2. Westinghouse letter to TVA, WBT-D-3245, dated June 13, 2011, "NRC Access to WINCISE Documents at the Westinghouse Rockville Office" [Letter Item #2 (NRC Request #377 [7.b])]

3. Westinghouse letter to TVA, WBT-D-3258, dated June 15, 2011, "Non-Proprietary Response to Additional NRC WINCISE Questions" [Letter Item #2 (NRC Request #377)]

4. TVA letter to NRC, dated March 2, 2011, "Watts Bar Nuclear Plant (WBN) Unit 2 - Instrumentation and Controls (I&C) Staff Information Requests [Letter Item #1 (NRC Request #375 [14])]

5. Westinghouse letter to TVA WBT-D-2033, dated June 14, 2010, "Temperature Difference Between Unit 1 CETs and Unit 2 WINCISE CETs" [Letter Item #2 (NRC Request #377 [1.b])]

6. Westinghouse letter to TVA WBT-D-2428, dated September 23, 2010, "Response to Questions Concerning WINCISE CET Uncertainties" [Letter Item #2 (NRC Request #377 [1.b])]

7. Westinghouse letter to TVA WBT-D-2697, dated November 21, 2010, "Further Information on CET Valves" [Letter Item #2 (NRC Request #377 [1.b])]