

**WBN2Public Resource**

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**From:** Boyd, Desiree L [dlboyd@tva.gov]  
**Sent:** Monday, June 13, 2011 9:09 AM  
**To:** Epperson, Dan; Poole, Justin; Raghavan, Rags; Milano, Patrick; Campbell, Stephen  
**Cc:** Crouch, William D; Hamill, Carol L; Boyd, Desiree L; Knuettel, Edward Terry; Stockton, Rickey A  
**Subject:** TVA letter to NRC\_06-10-11\_I&C RAI Response  
**Attachments:** 06-10-11\_I&C RAI Response\_Final.pdf

*Please see attached TVA letter that was sent to the NRC today.*

*The attachments are too large to send by e-mail. For those of you who receive a cc in the mail, the attachments will be included with your letter.*

*Thank You,*

~\*~\*~\*~\*~\*~\*~\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

*Desirée L. Boyd*

**WBN 2 Licensing Support  
Sun Technical Services**

**[dlboyd@tva.gov](mailto:dlboyd@tva.gov)  
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**Hearing Identifier:** Watts\_Bar\_2\_Operating\_LA\_Public  
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**Received Date:** 6/13/2011 9:09:52 AM  
**From:** Boyd, Desiree L

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

June 10, 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 documents 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 10<sup>th</sup> day of June, 2011.

Respectfully,

A handwritten signature in black ink, appearing to read "David Stinson".

David Stinson  
Watts Bar Unit 2 Vice President

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Enclosures:

1. Responses to Licensee Open Items To Be Resolved For SER Approval
2. List of Attachments
3. List of References

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U.S. Nuclear Regulatory Commission  
Page 3  
June 10, 2011

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**Enclosure 1**  
**TVA Letter Dated June 10, 2011**  
**Responses to Licensee Open Items to be Resolved for SER Approval**

The following acronyms/abbreviations are used in this letter:

AC160	<sup>1</sup> Advant <sup>®</sup> Controller 160
<sup>2</sup> AP1000	Westinghouse Generation III+ advanced light water reactor design
<sup>3</sup> BEACON™	Best Estimate Analyzer for Core Operations Nuclear
CAPS	Westinghouse Corrective Action Process System
CET	Core Exit Thermocouple
CFR	Code of Federal Regulation
EDCR	Engineering Document Change Request
EQ	Environmental Qualification
DCI-CVIB	Division of Component Integrity-Vessels and Internals Integrity Branch
FPDS	Flat Panel Display System
FSAR	Final Safety Analysis Report
ICS	Integrated Computer System (aka Plant Computer)
<sup>4</sup> IEEE™	Institute of Electrical and Electronics Engineers
IIS	Incore Instrument System
IITA	Incore Instrument Thimble Assembly
LPMS	Loose Parts Monitoring System
MCR	Main Control Room
MI	Mineral Insulated
MIDS	Movable In-core Detector System
MTP	Maintenance and Test Panel
NRC	Nuclear Regulatory Commission
OI	Open Item (from NRC I&C Open Item Matrix)
OM	Operators Module
PAMS	Post Accident Monitoring System
PDMS	Power Distribution Monitor System
QA	Quality Assurance
RAI	Request for Additional Information
RCS	Reactor Coolant System
RG	Regulatory Guide
SCMP	Software Configuration Management Plan
SDD	Software Design Document
SPD	Self Powered Detector
SPM	Software Program Manual
SPS	Signal Processing System
SRP	Standard Review Plan (NUREG-800)
SRS	Software Requirements Specification
SysRS	System Requirements Specification
TSM	Technical Specification Monitor
TVA	Tennessee Valley Authority
V&V	Verification and Validation
WEC	Westinghouse Electric Company LLC
WBN	Watts Bar Nuclear Plant
<sup>5</sup> WINCISE™	Westinghouse In-Core Information Surveillance & Engineering

<sup>1</sup> Advant is registered trademark of ABB Automation Technology Products Management AG

<sup>2</sup> AP1000 is a registered trademark of the Westinghouse Electric Company LLC

<sup>3</sup> BEACON is a registered trademark of the Westinghouse Electric Company LLC

<sup>4</sup> IEEE is a registered trademark of the Institute of Electrical and Electronics Engineers Inc.

**Enclosure 1**  
**TVA Letter Dated June 10, 2011**  
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NOTE: The NRC can make arrangements to view documents in the WEC Rockville office by contacting Ms. Leslie Collins at 301-881-7040 (e-mail: collinlj@westinghouse.com).

**1. NRC Request (Item Number 362)**

*OI #331 requested TVA to provide information regarding how the Loose Parts Monitoring System (LPMS) in-containment components (e.g., Accelerometer ( including the integral insulated hardline cable), Softline cable, and Remote Charge Preamplifiers) were qualified for vibration as addressed in regulatory position C.1.g of RG 1.133, Rev. 1. TVA responded by stating that "TVA has reviewed the information provided by Westinghouse describing how the Loose Part Monitoring System (LPMS) sensor is qualified for normal operating conditions provided in Westinghouse letter WBT-D-2782, dated December 17, 2010 (Reference 11) as addressed in regulatory position C.1.g of Reg. Guide 1.133 and found it acceptable. Vibration qualification is not applicable to the softline cable. Due to the installation location (junction boxes mounted to the shield or fan room walls) and previous seismic qualification, vibration qualification of the charge converter/preamplifier is not required. This completes the response to this item."*

*However, the staff still desires further clarification on this response. (1) Specifically, please provide a documented basis that demonstrates the LPMS in-containment equipment is qualified for normal operating conditions (e.g., test results compared to the equipment qualification specification), including vibration qualification. (2) Also, provide justification for why vibration qualification if the Remote Charge Preamplifier is not required*

**TVA Partial Response to NRC Request**

TVA has previously provided responses on all in-containment hardware with the exception of vibration qualification of the accelerometer and integral hardline cable. Attachment 1 contains WEC non-proprietary document EQ-QR-79, Revision 0, "Summary Test Report Vibration Testing of the Westinghouse Digital Metal Impact Monitoring System (DMIMS-DX) In-Containment Sensor and Integral Hardline Cable 5357C52G01," dated May 2011. This completes the TVA response to this item.

**2. NRC Request (Item Number 372)**

*On 5/6/2010 (See Open Item No. 81) the NRC Staff requested an evaluation of the Common Q PAMS against the current staff position.*

*By letter dated 2/25/11 (ML110620219), TVA docketed a response.*

*The requirements in the SysRS and SRS are not traceable back to the design basis (e.g., IEEE Std 603-1991 Section 4) for the system. The SRS does not include any documented evidence that it was ever independently reviewed in accordance with the 10CFR50 Appendix B Criterion III, "Design Control." (Note: It appears that the only Common Q or WBN2 PAMS document that was independently reviewed in accordance with 10 CFR 50 Appendix B requirements is the SysRS.)*

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<sup>5</sup> WINCISE is a registered trademark of the Westinghouse Electric Company LLC

**Enclosure 1**  
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*Based upon the review of the SysRS and SRS, the staff finds that there is reasonable assurance that the systems fully conform to the applicable guidelines, except for the following open items:*

1. *TVA to produce an acceptable description of how the SysRS and SRS implement the design basis requirements of IEEE 603-1991 Clause 4.*
2. *TVA to produce a final SRS that is independently reviewed in accordance with 10 CFR 50 Appendix B, "Criterion III Design Control," requirements.*

**TVA Response to NRC Request:**

1. Response provided in TVA letter to NRC dated May 6, 2011, "Watts Bar Nuclear Plant (WBN) Unit 2 -Instrumentation and Controls (I&C) Staff Information Requests." (Reference 9)
2. The following request was made by the NRC staff during the WBN Unit 2 Common Q PAMS audit conducted at the WEC facility in Warrendale, PA the week of February 28, 2011:

*"For the WBN2 PAMS project, Westinghouse will provide documentation in their Rockville MD offices demonstrating that each document requiring independent review was in fact independently reviewed and CAPs No. 11-061-M047 will contain a commitment to provide documented evidence of appropriate independent reviews. "*

The following response to this item was provided by WEC:

The referenced WEC CAPS issue has been closed. To summarize the CAPS disposition:

All revisions of the Watts Bar NSSS Completion Program I&C Projects Post Accident Monitoring System "System Design Specification" (WNA-DS-O1 667-WBT-PINP, Revision 0 to Revision 4), "Software Requirements Specification" (WNA-SD-00239-WBT-PINP Revision 0 to Revision 4), "Software Design Description for the AC 160 Software" (WNA-SD-00250-WBT, Revision 0 to Revision 3), and "Software Design Description for the FPDS Software" (WNA-SD-00248-WBT, Revision 0 to Revision 3) documents have been independently reviewed (verified) per WEC procedure WEC 6.1 "Document Control." Please note that according to WEC procedure NSNP 3.3.3, "Design Verification by Independent Review or Alternate Calculations," the independent review is considered as an acceptable method of verification.



**Enclosure 1**  
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The above documents, for all revisions, include a verifier (an independent reviewer) who is a competent individual other than the document author to verify that the document is technically correct and satisfactorily meets the intended requirements.

The front page of each document lists the author, the independent reviewer (the first reviewer listed; second reviewer listed is the Project Manager verifying document's compliance to the program rules). The second page lists any contributors to the document. It is important to note that the document's independent reviewer (verifier) is NOT included within the list of contributors indicating their independence from the original work.

In summary, according to WEC 6.1 the Responsible Manager (also listed on the front page) must: 1) approve the document for issuance, 2) ensure that the verification method and design methodology are demonstrated appropriately, and 3) ensure that the qualifications of the originator and verifier are adequate. The manager(s) listed on the document attests to the fact that he or she has completed these responsibilities. Moreover, the manager has ensured that the verifier: 1) is competent to perform the independent review, 2) did not perform the original work even though they may be from the same organization or group, and 3) verified that the document is technically correct and satisfactorily meets the intended requirements.

**3. NRC Request (Item Number 373)**

*The SDDs do not include any documented evidence that they were independently reviewed in accordance with the 10 CFR 50 Appendix B Criterion III, "Design Control."*

*Based upon the review of the SDDs, the staff the following open item:*

1. *TVA to produce final SDDs that are independently reviewed in accordance with 10 CFR 50 Appendix B Criterion III, "Design Control," requirements.*

**TVA Response to NRC Request:**

1. See the response to Letter Item No. 2, Question No. 2. (NRC Matrix Item Number 372)

**4. NRC Request (Item Number 376)**

*Division of Component Integrity-Vessels and Internals Integrity Branch (DCI-CVIB) Input:*

*Reference: EDCR # 52321, Revision A, EDCR Unit Difference Form, Page 2 – Maintenance Difference*

*The proposed In-Core Instrument Thimble Assemblies (IITAs) which will replace Movable In-Core Detectable Systems (MIDs) have the following features:*

- (1) *IITAs are not fully extracted and they are held in a movable frame assembly.*
- (2) *IITAs exert lower vibration amplitude and therefore, aging degradation due to wear does not occur.*

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(3) *Loss of reactor coolant system pressure boundary due to breach of IITA outer sheath does not occur.*

*Question:*

*The staff believes that the licensee should provide an inspection program to confirm that the aforementioned attributes associated with IITAs are valid and this inspection program can be a part of a routine maintenance program.*

**TVA Response to NRC Request:**

TVA does not agree with this recommendation. The IITA assemblies cannot be inspected for wall thinning using internal eddy current methods that are used to inspect thimble tubes. In addition, after the IITAs are irradiated, inspection using external ultrasonic measurements that are used to detect pipe wall thinning would result in excessive personnel exposure. While visual inspection is possible, it cannot detect wall thinning and is limited to the section of the IITA that is not inserted into the reactor core.

As documented in WEC to TVA letter WBT-D-3072 "WINCISE Vibration Induced Wear Calculation Conclusion," dated April 6, 2011 (Reference 8) calculation CN-PO-09-15, "Westinghouse Incore Information Surveillance and Engineering (WINCISE) Incore Instrument Thimble Assembly (IITA) Vibration Analysis for Watts Bar Unit 2," M. J. Reho, September 22, 2010, demonstrates that the assemblies are not subject to vibration induced wear. Based on the above and the fact that the outer wall of the IITA is not a RCS pressure boundary, TVA does not agree to include an IITA inspection program in the plant maintenance program. The referenced proprietary letter and calculation are available for review at the WEC Rockville office.

**5. NRC Request (Item Number 378)**

*Make the following WEC proprietary documents available for NRC review at the Westinghouse Rockville office:*

- *WINCISE Functional Specification for Watts Bar Unit 2, 420A90, Rev. 2*
- *BEACON Data Processing Application Program Software Requirements Specification, WNA-DS-02196-WBT, Rev. 1*
- *Standard Fixed In-Core Detector Data Processing (PRLQFDO.2) Function Block Specification, WNA-DS-01400-GEN, Rev. 0*
- *Standard Vanadium Detector Filter (FBM.SPDO.2) Function Block Specification, WNA-DS-O 1402-GEN, Rev. 0*
- *IIS SPS Datalink Client Software Interface Specification, WNA-DS-02208-WBT, Rev. 1*
- *BEACON Datalink Interface Specification, WNA-DS-02194-WBT, Rev. 1*
- *ICS Datalink Interface Specification, WNA-DS-02193-WBT, Rev. 1*

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- *Watts Bar 2 Incore Instrument System (IIS) Signal Processing System (SPS) Isolation Requirements, WNA-CN-00IS7-WBT, Rev. 0*

**TVA Response to NRC Request:**

Per WEC letter WBT-D-3201 (Reference 1), the documents are available for NRC review at the WEC Rockville office.

**6. NRC Request (Item Number 379)**

*Provide proprietary and non-proprietary versions of the WINCISE slides from the May 12 public meeting.*

**TVA Response to NRC Request:**

The proprietary versions of the slides were provided in TVA letter to NRC dated May 20, 2011 (Reference 2). Attachment 2 contains WEC document WBT-D-3191-NP Attachment, non-proprietary version of the WINCISE slides from the May 12, 2011 public meeting.

**7. NRC Request (Item Number 380)**

*Provide a non-proprietary functional description of the WINCISE Application Server including discussion on redundancy for both the servers and the configuration of the Beacon A/B computers.*

**TVA Response to NRC Request:**

Attachment 3 contains the WEC non-proprietary functional description of the WINCISE Application Server.

**8. NRC Request (Item Number 381)**

*Provide a non-proprietary description of the qualification of the mineral insulated (MI) cable assemblies with references to any environmental qualification (EQ) report (if applicable)*

**TVA Response to NRC Request:**

Attachment 4 contains the WEC non-proprietary description of the qualification of the mineral insulated (MI) cable assemblies.

**9. NRC Request (Item Number 382)**

*Provide a non-proprietary description of the qualification of the Signal Processing System (SPS) cabinet with references to EQ report(s).*

**TVA Response to NRC Request:**

Attachment 5 contains the WEC non-proprietary description of the qualification of the Signal Processing System (SPS) cabinet.

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**10. NRC Request (Item Number 383)**

*Provide a non-proprietary description of the qualification of the IITA with references to EQ report(s).*

**TVA Response to NRC Request:**

Attachment 6 contains the WEC non-proprietary description of the qualification of the IITA.

**11. NRC Request (Item Number 384)**

*Provide a non-proprietary description of the differences between Unit 1 and Unit 2 core monitoring with references to Westinghouse documentation.*

**TVA Response to NRC Request**

The only similarities between the WBN Unit 1 and Unit 2 IIS are:

1. Unit 1 and Unit 2 will utilize the same version of the BEACON-TSM software.
2. The BEACON-TSM software will be installed on a computer utilizing a LINUX operating system.
3. Attachment 11 provides some non-proprietary details of the differences between the Unit 1 and Unit 2 IIS.

**12. NRC Request (Item Number 385)**

*Provide a non-proprietary description of the calculation note shown to the NRC at the meeting.*

**TVA Response to NRC Request**

Attachment 7 contains WEC non-proprietary description of the calculation note shown to the NRC at the May 12, 2011 meeting.

**13. NRC Request (Item Number 386)**

*Provide a description of the communications between the SPS and the ICS. This should include what data is transmitted to the ICS and what data comes from the ICS that is used by WINCISE. Also, how are the requirements for safety-to-non-safety isolation achieved.*

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**TVA Response to NRC Request**

There is no direct communication between the SPS cabinets and the ICS. The SPS cabinets communicate with the WINCISE Application Servers. The ICS sends data to the WINCISE Application Servers. The ICS receives data from the BEACON Servers via the WINCISE Application Servers. In addition to the BEACON data, the WINCISE Application Servers send system status information (SPS cabinet temperatures, etc.) to the ICS. The WINCISE Application Servers receive data from the WINCISE SPS cabinets and the ICS, package the data into a form useable by the BEACON TSM software and send the data to the BEACON Servers.

The data points sent by the ICS to the WINCISE Application Servers and the data points the BEACON Servers send to the ICS are listed in Attachment 8. For simplicity, the system status data points (which include the status of each individual detector, card power supply, etc.) are not included.

Since the WINCISE Application Servers, the BEACON Servers and the ICS are all non-safety-related, there is no safety-to-non-safety interface so no isolation is required. However, there is a firewall between the ICS network and the WINCISE/BEACON network to prevent a problem on one network from impacting the other.

**14. NRC Request (Item Number 387)**

*Provide a copy of the analysis which states how Westinghouse has met the Reg Guide 1.75/IEEE-384 requirements for isolation between safety and non-safety for the CETs and the SPS panels.*

**TVA Response to NRC Request**

As discussed in the WEC WINCISE presentation at the public meeting on May 12, 2011, the WBN Unit 2 IITA assemblies are the same in this regard to those used in the AP-1000. The information on how the AP-1000 IITAs meet IEEE 384 requirements is documented in WCAP-17226-P, Revision 2, "Assessment of Potential Interactions Between the Core Exit Thermocouple Signals and the Self-Powered Detector Signals in the AP1000™ In-Core Instrumentation System," dated July 2010 submitted to the NRC on WEC to NRC letter DCP\_NRC\_003021, "Submittal of AP1000™ Instrumentation and Control Documents to Support of the AP1000 Design Certification Amendment Application (Docket No. 52-006)," dated August 25, 2010 (ML102390520). The non-proprietary description of how the IITA meets IEEE 384 requirements is contained in Attachment 7.

**15. NRC Common Q PAMS Audit Action Item Response:**

*Provide responses to the generic issues cited in the Watts Bar Nuclear Plant, Unit 2-Audit Report of the Common Q Post-Accident Monitoring System (PAMS) (TAC NO. ME273I).*

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**TVA Response**

**Notes:**

1. The following non-proprietary responses are from WEC to TVA letter WBT-D-3154, dated May 4, 2011 (Reference 3).
2. The following responses are based on the fact that revision 1 of the Software Program Manual (SPM) is currently going through NRC review.
3. The WEC Corrective Action Process (CAP) and other supporting documents for each response are available for review at the WEC Rockville Office.

• **Commercial Grade Dedication:**

No Generic Action Items

• **Requirements Traceability:**

No Generic Action Items

• **Configuration Management:**

**Generic Action:** Revise the SPM to reflect the current media labeling process.

**Generic Response:** This issue has been captured in the WEC CAPS, under Issue Report # 11-071-M009. Closure is dependent on the NRC completing review of the revision 1 SPM.

• **Verification and Validation:**

A. **Generic Action:** Programmatically, the SPM will be revised to clarify that the V&V team verifier does not perform the role of independent reviewer for the design team.

**Generic Response:** This issue has been captured in the WEC CAPS, under Issue Report # 11-071-M005. Closure is dependent on the NRC completing review of the revision 1 SPM.

B. **Generic Action:** See CAPS No. 11-061-M047: This issue will also be addressed programmatically, possibly providing additional templates, and specifying templates for specific categories of documents. (There currently exists one template that is used for both safety-related and non-safety-related documents.)

**Generic Response:** This issue has been captured in the WEC CAPS, under Issue Reports # 11-061-M047 and 11-062-M004. Closure of this issue is monitored through the CAPS as defined in WEC procedure WEC 16.2, "Westinghouse Corrective Actions Process."

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- C. **Generic Action:** This issue (QA audit insufficient) will also be addressed programmatically.

**Generic Response:** This issue has been captured in the WEC CAPS, under Issue Reports # 11-071-M008 and 11-045-M008. Closure of this issue is monitored through the CAPS as defined in WEC 16.2.

- D. **Generic Action:** WEC to ensure that consistent terminology is used in the SPM and QA implementing procedures.

**Generic Response:** This issue has been captured in the WEC CAPS, under Issue Report # 11-062-M004. Closure is dependent on the NRC completing review of the revision 1 SPM.

- E. **Generic Action:** WEC to ensure internal consistency of the next revision of the SPM.

**Generic Response:** This issue has been captured in the WEC CAPS, under Issue Report # 11-011-M027. Closure is dependent on the NRC completing review of the revision 1 SPM.

- F. **Generic Action:** The next revision of the SPM will be internally consistent and will specify that the design team is responsible for configuration management. The V&V team will issue software release records for software that has been issued from the Design Team to the V&V team and has successfully completed the associated V&V activities.

**Generic Response:** The revision 1 SPM, submitted to the NRC, addresses design team responsibility for configuration management. In addition, this issue has been captured in the WEC CAPS, under Issue Report # 11-071-M003. Closure is dependent on the NRC completing review of the revision 1 SPM.

- G. **Generic Action:** WEC to clarify in the next revision of the SPM. [V&V's review of the adequacy and completeness of the SCMP]

**Generic Response:** This issue has been captured in the WEC CAPS, under Issue Report # 11-071-M001. Closure is dependent on the NRC completing review of the revision 1 SPM.

- H. **Generic Action:** The requirement phase of the SCMP in the SPM will be revised to include a discussion on generic vs. project-specific requirements. The SPM will also be updated to include where these software items are defined.

**Generic Response:** This issue has been captured in the WEC CAPS, under Issue Report # 11-071-M002. Closure is dependent on the NRC completing review of the revision 1 SPM.

- I. **Generic Action:** The responsibilities for configuration management will consistently be defined as the Design Team activity and not a V&V activity in the next revision of the SPM.

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**Generic Response:** The revised SPM submitted to the NRC addresses design team responsibility for configuration management. In addition, this issue has been captured in the WEC CAPS, under Issue Report # 11-071-M003. Closure is dependent on the NRC completing review of the revision 1 SPM.

J. **Generic Action:** The SPM will be clarified. [V&V's review of Coding Standards]

**Generic Response:** This issue has been captured in the WEC CAPS, under Issue Report # 11-094-M032. Closure is dependent on the NRC completing review of the revision 1 SPM.

**16. NRC Common Q PAMS Audit Action Item Response:**

*Provide responses to the WBN2 specific issues cited in the Watts Bar Nuclear Plant, Unit 2 -Audit Report of the Common Q Post-Accident Monitoring System (PAMS) (TAC NO. ME273I).*

**TVA Response:**

WEC has resolved the Common Q Audit Report WBN2 specific actions. The responses to the individual items are documented in Proprietary WEC to TVA letter WBT-D-3212. (Reference 6) The results of the self assessment required by the WBN2 specific action, is documented in WEC Proprietary Internal Letter NA-IV&V-11-0005. Both letters are available for NRC review at the WEC Rockville office.

**17. NRC Commitment Closure:**

*In TVA to NRC letter dated December 10, 2010 (Reference 4 ), TVA committed to provide a non-proprietary version of Thermo Fisher Scientific Qualification Report No. 864, "Class 1E Qualification of the Source Range, Intermediate Range and Wide Range Channels."*

**TVA Response:**

Attachment 9 contains Thermo Fisher Scientific Qualification Report No. 864RD, "Class 1E Qualification of the Source Range, Intermediate Range and Wide Range Channels - Redacted Version," dated February, 2011.

**18. NRC Verbal Request:**

*The NRC inspector requested a non-proprietary summary of the Common Q PAMS datastorm test to reference in the SER.*



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**TVA Response to NRC Request:**

The following non-proprietary response was provided in WEC to TVA letter WBT-D-3149 (Reference 5).

**Data Storm Test**

Watts Bar Unit 2 Post Accident Monitoring System went through a Data Storm Test to verify that the safety related functions of the system driven by the Advant Controller 160 (AC 160) and the safety related indications monitored on the Operator Module (OM) located in the Main Control Room (MCR) are not affected when the Ethernet network interface of the Maintenance and Test Panel (MTP) is under data storm conditions. This test was requested by TVA.

The purpose of the data storm test was to test the ability of the MTP to handle the possible volume of traffic generated by a broadcast storm without impacting the safety functions. A broadcast storm occurs when a large number of broadcast packets are received. Forwarding these packets can cause the network to slow down or to time out.

Another objective of the data storm test was to test the ability of the MTP to handle malformed packets possibly generated by a data storm without impacting the safety functions.

The following pass/fail criteria were used to evaluate the success of the data storm test results:

1. During the data storm test, the OM shall continue trending the selected input signal smoothly on the data trend display. The smooth trending was verified by creating a data trend of the point being monitored and comparing it to the data trend observed during the data storm.
2. During the data storm test, the OM shall respond to screen touches (navigation) normally. This was determined by navigating several different screens during the execution of the test.
3. During the data storm, the AC 160 user-selectable analog output channel shall generate the analog signal without interruption. The output of the analog channel was captured using a calibrated recording device. A recording of the analog output point being monitored was created before the data storm and this recording was compared to a recording observed during the data storm.

During the data storm, it was acceptable to have the MTP stop responding because it does not perform a safety function. When this occurred, the following pass/fail criteria were used:

1. The System Trouble Annunciator (digital output from the AC 160) to alarm (open contact).
2. The System Trouble Alarm Block on the OM display to indicate alarm (turn to red).

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3. The MTP icon on the OM System Health page to indicate alarm or a failure (turn to red or turn to magenta) depending on the type of failure of the MTP.

**Test Execution and Test Results**

After collecting baseline data, the broadcast storm was applied to the system. While the broadcast storm was in progress the following was observed:

- The OM was operational throughout the broadcast storm. The trend signal was smooth and all screens were navigational from the directory via touches on the touch screen.
- The MTP stopped responding for several minutes, and then returned to operational status. While the MTP was inoperable, the system trouble alarm occurred on the OM and annunciator output, and the MTP status was red on the OM. Once the data storm was halted, the MTP began to respond again.
- The analog output from the AC 160 remained operational during the broadcast storm.

The results of the testing determined that the system met the acceptance criteria outlined above.

**19. NRC Commitment Closure**

*In TVA to NRC letter dated October 29, 2010 (Reference 7), TVA committed to provide final EDCR 55385 excerpts including Scope, Intent, Unit Difference and Technical Evaluation*

**TVA Response to NRC Request:**

Attachment 10 contains EDCR 55385 excerpts including the Scope, Intent, Unit Difference and Technical Evaluation.

**20. NRC Commitment Closure**

*In TVA to NRC letter dated October 29, 2010 (Reference 7), TVA committed to provide final EDCR 52351 excerpts including Scope, Intent, Unit Difference and Technical Evaluation*

**TVA Response to NRC Request:**

Attachment 12 contains EDCR 52351 excerpts including the Scope, Intent, Unit Difference and Technical Evaluation.

**21. NRC Commitment Closure**

*In TVA to NRC letter dated April 15, 2011 (Reference 10), TVA committed to provide the application for withholding for the WINCISE Technical Manual.*

**Enclosure 1**  
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**TVA Response to NRC Request:**

Attachment 13 contains WEC document CAW-11-3141, dated April 15, 2011, "Application for Withholding Information from Public Disclosure for NO-WBT-002, Rev. 0, 'Westinghouse Incore Information Surveillance & Engineering (WINCISE™) System' (Proprietary)."

**Enclosure 2**  
**TVA Letter Dated June 10, 2011**  
**Responses to Licensee Open Items to be Resolved for SER Approval**

**List of Attachments**

1. WEC non-proprietary document EQ-QR-79, Revision 0, "Summary Test Report Vibration Testing of the Westinghouse Digital Metal Impact Monitoring System (DMIMS-DX) In-Containment Sensor and Integral Hardline Cable 5357C52G01," dated May 2011 [Letter Item #1 (NRC Request #362)]
2. WEC document WBT-D-3191- NP Attachment, non-proprietary version of the WINCISE slides from the May 12, 2011 public meeting [Letter Item #6 (NRC Request #379)]
3. Non-proprietary functional description of the WINCISE Application Server [Letter Item #7 (NRC Request #380)]
4. Non-proprietary description of the qualification of the mineral insulated (MI) cable assemblies [Letter Item #8 (NRC Request #381)]
5. Non-proprietary description of the qualification of the Signal Processing System (SPS) cabinet [Letter Item #9 (NRC Request #382)]
6. Non-proprietary description of the qualification of the IITA [Letter Item #10 (NRC Request #383)]
7. Non-proprietary description of the calculation note shown to the NRC at the May 12, 2011 meeting [Letter Item #12 (NRC Request #385)] [Letter Item #14 (NRC Request #387)]
8. List of BEACON to/from ICS datapoints [Letter Item #13 (NRC Request #386)]
9. Thermo Fisher Scientific Qualification Report No. 864RD, "Class 1E Qualification of the Source Range, Intermediate Range and Wide Range Channels - Redacted Version," dated February 2011 [Letter Item #17]
10. EDCR 55385 excerpts including Scope, Intent, Unit Difference and Technical Evaluation [Letter Item #19]
11. Non proprietary description of the differences between the Unit 1 and Unit 2 IIS [Letter Item #11 (NRC Request #384)]
12. EDCR 52351 excerpts including Scope, Intent, Unit Difference and Technical Evaluation [Letter Item #20]
13. WEC document CAW-11-3141, dated April 15, 2011, "Application for Withholding Information from Public Disclosure for NO-WBT-002, Rev. 0, 'Westinghouse Incore Information Surveillance & Engineering (WINCISE™) System' (Proprietary)" [Letter Item #21]

**Enclosure 3**  
**TVA Letter Dated June 10, 2011**  
**Responses to Licensee Open Items to be Resolved for SER Approval**

**List of References**

1. WEC letter to TVA, WBT-D-3201, dated May 23, 2011, "NRC Access to WINCISE Documents at the Westinghouse Rockville Office" [Letter Item #5 (NRC Request #378)]
2. TVA letter to NRC, dated May 20, 2011, "Watts Bar Nuclear Plant (WBN) Unit 2 - Instrumentation and Controls (I&C) Staff Information Requests - Presentation Package for Public Meeting Held On May 12, 2011" [Letter Item #6 (NRC Request #379)]
3. WEC letter to TVA, WBT-D-3154, dated May 4, 2011, "Non-Proprietary Responses to April 27, 2011 NRC Audit Report of Common Q PAMS (TAC No ME2731)" [Letter Item #15]
4. TVA letter to NRC, dated December 10, 2010, "Watts Bar Nuclear Plant (WBN) Unit 2 - Final Safety Analysis Report (FSAR) - Response to Requests for Additional Information," (T02 101210 001), [Letter Item #17]
5. WEC letter to TVA, WBT-D-3149, dated May 2, 2011, "Non-proprietary Response to TVA Request for Information on PAMS Datastorm Test" [Letter Item #18]
6. WEC letter to TVA, WBT-D-3212, dated May 26, 2011, "NRC Common Q PAMS Audit Report - Comments" [Letter Item #1 (NRC Request #362)]
7. TVA letter to NRC, dated October 29, 2011, "Watts Bar Nuclear Plant (WBN) Unit 2 - Instrumentation and Controls (I&C) Staff Information Requests," [Letter Item #19]
8. WEC letter to TVA, WBT-D-3072, dated April 6, 2011, "WINCISE Vibration Induced Wear Calculation Conclusion," [Letter Item #4 (NRC Request #376)]
9. TVA letter to NRC, dated May 6, 2011, "Watts Bar Nuclear Plant (WBN) Unit 2 - Instrumentation and Controls (I&C) Staff Information Requests" [Letter Item #1 (NRC Request #362)]
10. TVA letter to NRC, dated April 15, 2011, "Watts Bar Nuclear Plant (WBN) Unit 2 - Instrumentation and Controls (I&C) Staff Information Requests" [Letter Item #21]

**Attachment 1  
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**Westinghouse Non-Proprietary Document EQ-QR-79, Revision 0,  
“Summary Test Report Vibration Testing Of The Westinghouse Digital  
Metal Impact Monitoring System (DMIMS-DX) In-Containment Sensor  
And Integral Hardline Cable 5357C52G01,” Dated May 2011**

**Attachment 2**  
**TVA Letter Dated June 10, 2011**  
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**Westinghouse Document WBT-D-3191- NP Attachment, Non-Proprietary Version**  
**Of The WINCISE Slides From The May 12, 2011 Public Meeting**

**Attachment 3**  
**TVA Letter Dated June 10, 2011**  
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**Non-Proprietary Functional Description Of The WINCISE Application Server**



**Attachment 4**  
**TVA Letter Dated June 10, 2011**  
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**Non-Proprietary Description Of The Qualification Of The**  
**Mineral Insulated (MI) Cable Assemblies**

**Attachment 5**  
**TVA Letter Dated June 10, 2011**  
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**Non-Proprietary Description Of The Qualification Of The**  
**Signal Processing System (SPS) Cabinet**

**Attachment 6**  
**TVA Letter Dated June 10, 2011**  
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**Non-Proprietary Description Of The Qualification Of The IITA**

**Attachment 7**  
**TVA Letter Dated June 10, 2011**  
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**Non-Proprietary Description Of The Calculation Note Shown To The NRC**  
**At The May 12, 2011 Meeting**

**Attachment 8**  
**TVA Letter Dated June 10, 2011**  
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**List Of BEACON To/From ICS Datapoints**

**Attachment 9**  
**TVA Letter Dated June 10, 2011**  
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**Thermo Fisher Scientific Qualification Report No. 864RD, "Class 1E Qualification  
Of The Source Range, Intermediate Range And Wide Range Channels -  
Redacted Version," Dated February, 2011**

**Attachment 10**  
**TVA Letter Dated June 10, 2011**  
**Responses to Licensee Open Items to be Resolved for SER Approval**

**EDCR 55385 Excerpts Including Scope, Intent, Unit Difference And Technical Evaluation**

**Attachment 11**  
**TVA Letter Dated June 10, 2011**  
**Responses to Licensee Open Items to be Resolved for SER Approval**

**Non Proprietary Description Of The Differences Between The Unit 1 And Unit 2 IIS**



**Attachment 12**  
**TVA Letter Dated June 10, 2011**  
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**EDCR 52351 Excerpts Including Scope, Intent, Unit Difference And Technical Evaluation**

**Attachment 13**  
**TVA Letter Dated June 10, 2011**  
**Responses to Licensee Open Items to be Resolved for SER Approval**

**Westinghouse Document CAW-11-3141, Dated April 15, 2011,**  
**“Application For Withholding Information From Public Disclosure For**  
**NO-WBT-002, Rev. 0, ‘Westinghouse Incore Information Surveillance &**  
**Engineering (Wincise™) System’ (Proprietary)”**