



Westinghouse Electric Company
Nuclear Power Plants
1000 Westinghouse Drive
Cranberry Township, PA 16066
USA

Document Control Desk
U S Nuclear Regulatory Commission
Two White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Direct tel: 412-374-3382
Direct fax: 724-940-8505
e-mail: delongra@westinghouse.com

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Your ref: NRC Vendor Inspection Report Number 99901043/2012-201

Subject: Reply to Westinghouse Electric Company Response to the Nuclear Regulatory Commission Inspection Report 99901043/2012-201, Notice of Nonconformance – Request for Additional Information dated July 25, 2012

Please find attached to our responses to for Requests for Additional Information related to the nonconformance issues from the April 9 through 13, 2012, Inspection 99901043/2012-201. If you need addition information or have any questions please contact Ronald P. Wessel at 412-374-4023 or wesselrp@westinghouse.com.

Very truly yours,

A handwritten signature in black ink, appearing to read "Richard A. DeLong", with a long, sweeping flourish extending to the right.

Richard A. DeLong
Acting Director, New Plant Licensing

cc: Richard A. Rasmussen - U.S. NRC
Jeffery Jacobson - U.S. NRC
George Lipscomb - U.S. NRC
Bruce Baval - U.S. NRC
Laura Goossen - WEC
Gary Ament - WEC
John Mallory - WEC
Thomas Ray - WEC
Paul Russ - WEC
Melita Osborne - WEC
Ronald Wessel - WEC
Terry Tuite - WEC
Pavel Tyrpak - WEC
Kyra Durinsky - WEC
Larissa Marple - WEC
Suresh Channarasappa - WEC

IE09
MRO

NRC Question 1:

Your response to NON 99901043/2012-201-01 indicated that the requisitioner inadvertently failed to include required supplier restrictions in purchasing documents, which were also missed by approving quality assurance personnel.

Please clarify if any procurement process changes were enacted to prevent future reoccurrence, and, if not, provide your rationale. Additionally, please provide the results of your evaluation of extent of condition and analysis of effects on other AP1000 components or testing activities (as requested in the cover letter to the IR 99901043/2012-201). Your response should include an analysis of potential missing supplier restrictions in purchasing documents beyond the inspector identified examples.

Westinghouse Response:

Procurement Process Changes:

WEC 7.5 adequately addresses the process for including vendor restrictions in purchase requisitions; proper implementation of WEC 7.5 will remedy the noncompliance.

A discussion with the applicable Supply Chain Management personnel was held on April 16, 2012 to make them aware of the issue and to request to monitor for additional occurrences. Additionally, discussions were held with the Equipment Qualification personnel generating the purchase requisitions to reinforce the requirements of WEC 7.5. Documentation of the latter is contained within CAP IR 12-241-M033.

Extent of Condition and Analysis of Potential Missing Supplier Restrictions:

All of the purchase requisitions written for AP1000-related EMC testing services performed by vendors contracted via the Commercial Dedication Instruction (CDI) process have been reviewed to determine if any failed to include the supplier restrictions in the purchase requisition (CAP commitment 12-241-M033.02). There were two restrictions identified as being omitted from the reviewed purchase requisitions: 1) vendor must utilize the QA program audited and approved by Westinghouse, and 2) vendor shall have available at the location where testing is performed, copies of calibration records, and equipment shall have an affixed calibration sticker that displays the calibration date and calibration due date.

With respect to the equipment calibration for programs that have already been completed, confirmation of the valid equipment calibration is documented in the final EMC laboratory reports. For those programs where testing is completed, but documentation has not been completed, the final laboratory report will be reviewed to ensure valid calibration for all equipment used in the testing. This action is being tracked as CAP commitments 12-241-M033.03, 12-241-M033.04, 12-241-M033.05, and 12-241-M033.06.

With respect to the restriction for the vendor to utilize the QA program audited and approved by Westinghouse, for those programs where this restriction was not included in the purchase requisitions, Westinghouse is verifying with the vendors that their QA program was not changed from the one audited and approved by Westinghouse. This action is being tracked as CAP commitment 12-241-M033.07.

NRC Question 2:

Your response to NON 99901043/2012-201-02 addressed the NON as follows: “Three restrictions from Commercial Grade Survey Report WES-2011-121 were entered into the Westinghouse Qualified Suppliers List (QSL) following the completion of the survey. A human error was made that caused one of the three restrictions to be replaced with a new restriction, rather than adding the new restriction. Corrective actions to avoid noncompliance included correcting the QSL to include all restrictions applicable to the supplier and making personnel aware of the potential for such human errors.” This response is unacceptable because your response did not address the failures mentioned in NON 99901043/2012-201-02. Please provide the details of how all the failures outlined in NON 99901043/2012-201-02 were addressed and what corrective actions are anticipated or were completed to prevent reoccurrence in each case. Additionally, please clarify the information provided in your response by providing the results of your evaluation of extent of condition and your analysis of effects on other AP1000 components or testing activities.

Westinghouse Response:

Details of Failures:

A technical specialist did not participate in the commercial grade survey. Washington Laboratories, Ltd. maintains ACLASS accreditation. The accreditation certifies that WLL has been assessed and meets the requirements of ISO/IEC 17025:2005. The accreditation also confirms that WLL is accredited for the performance of the specific scope of work (dated standards) included in the Westinghouse test programs. Verification of the appropriate accreditation in conjunction with direct oversight of each test program by a Westinghouse technical specialist was considered equivalent to evaluation during the commercial grade survey.

The following provides the reason for each specific deficiency identified during the inspection.

Compliance with required standards: Testing at a third party laboratory is defined by the Purchase Order, the Westinghouse-generated test procedure, and the applicable standards, as defined in the Westinghouse-generated test procedure. Third party vendors perform testing as specified in the Westinghouse-generated test procedure, including any referenced standards and/or exceptions to such standards. Westinghouse does not impose a requirement of redundant individual test procedures on third party vendors since a Westinghouse technical specialist oversees all test programs and has the applicable standards available for reference during the test program. As part of the oversight of EMC testing, the Westinghouse test engineer performs a review during the testing to verify that the testing is consistent with the prescribed test procedure and invoked standards.

Failure to Adequately Document all Required Data: Required design data such as the environmental conditions, rate of sweep of frequency, dwell time, and frequency steps were inadvertently omitted from the laboratory reports and the Westinghouse test logs. The Westinghouse test engineer also failed to identify the omissions during review of the laboratory report.

Failure to Document Evaluation of Certification: Because the WLL EMC test lab reports include the lab's accreditation certificate number, which documents the lab's accreditation and the accredited scope of work, the certificate was not requested from the laboratory at the time of testing. The current Westinghouse template used for the generation of final EMC qualification reports includes a reference to the lab EMC report and the documentation of the lab's accreditation for the test program in the final Westinghouse EMC qualification report.

Inadequate Personnel Training: The WLL training matrix, verifying that the WLL test engineer was qualified to perform the scope of testing, was not reviewed by the Westinghouse test engineer prior to testing because the Westinghouse test engineer expected that this requirement was being fulfilled as part of the quality assurance program.

Extent of Condition:

With respect to EMC Test Report WLL 12274-01, Westinghouse CAP 12-104-M022 has been opened to track the revision of WLL report 12274-01 to include the missing information. A review of a sampling of other laboratory reports and Westinghouse test reports was performed and additional documentation omissions with respect to IEC 61000-4-3 testing were identified (CAP commitment 12-241-M034.02). A review of the IEC and MIL standards is planned to identify the documentation requirements for each standard (CAP commitment 12-241 M034.03). Once the documentation requirements have been established under CAP commitment 12-241 M034.03, a review of the laboratory reports will be performed to determine if the reports contain all of the required information. This action is being tracked as CAP commitment 12-241-M034.04.

In order to address this nonconformance in programs currently in progress, discussions were held with all EMC technical specialists to reinforce the need for documentation consistent with the requirements provided in the standards. Documentation of this communication is contained within CAP IR 12-241-M034.

In order to avoid similar nonconformance issues, a review of each standard to identify all appropriate documentation requirements is planned, with the goal of producing checklists that can be used by the Westinghouse technical specialists to confirm the test parameters during the tests. This action is being tracked under CAP commitment 12-241-M034.03.

With respect to the laboratory certification, all of the AP1000-related EMC reports generated by Washington Laboratories were reviewed to confirm that the laboratory certification was included in the report. All reports identified the laboratory accreditation.

With respect to the vendor training records, all of the AP1000-related EMC reports generated by Washington Laboratories were reviewed to confirm that a management signature was included, confirming that the testing was performed by qualified personnel. All reports were confirmed to contain the appropriate management signature, indicating that all testing was performed by qualified personnel.

In addition, with respect to review of the laboratory certification and vendor training records, the EQ purchase requisition template has been updated to request these items as part of the purchase requisitions.

NRC Question 3 - Parts 1 and 2:

Please clarify information provided in your response to NON 99901043/2012-201-03 as follows:

“Better acceptance criteria should have been defined by performing better procedure Dry-running. Seeing that the steady state voltages across the DC loads, with the circuit breakers open, are very small (< 0.2 VDC), + or $- 1$ VDC could have been arbitrarily chosen as acceptance criteria, since it is known that this voltage would not be sufficient to energize any DAS DC loads.” A better defined acceptance criteria would still not address the original issue as described in NON 99901043/2012-201-03. A test anomaly outside the proposed acceptance range was noted due to the test configuration. Please outline how you evaluated the steps and changes made by the design engineer to the original test configuration so that the noted test anomaly fell within the proposed acceptance criteria range. Your response should also provide how the change in test configuration does not invalidate the original design requirements.

Westinghouse Response:**Details of the Failure:**

It should be noted that the identified test anomaly was observed in a draft test log that had not been officially released at the time of the inspection and, therefore, had not been through the official review process yet. As part of the review and archival process, all datasheets and test logs are reviewed and verified to ensure the test met the requirements and is accurately documented. The official released test results for the Cabinet Hardware Test (CHT) in question are documented in WNA-TD-00833-WAPP, “Diverse Actuation System Equipment Qualification Unit Cabinet Hardware Test Data Record,” Revision 0, Dated July 16, 2012.

No modifications to the test configuration or the test procedure were made during this test anomaly. A summary of the sequence of events concerning the test anomaly are provided below for better understanding.

- 1. The first step in taking the measurement was to place the measurement leads on the equipment per the procedure.*
- 2. The breaker was placed in the open position.*
- 3. A measurement was recorded almost immediately after the breaker was opened. The resulting measurement was -21 V.*
- 4. After a few seconds, the measured value settled on -0.2 V. Note that the acceptance criterion for this step is 0 V.*

Based on these results, it was determined that the -21 V measurements were prematurely recorded before the circuit discharged. Following the test, a line was drawn through the -21 V value with a note reading “See anomaly in test log. Initially -21 VDC, then discharged to -0.2 VDC.” was made on the datasheet with the appropriate initial and date. In addition, the discrepancy between the -0.2 V that was measured and the 0 V that was required per the acceptance criterion were addressed in the finalized test log with the explanation below:

"In electrical circuits, parasitic capacitance or stray capacitance is an unavoidable and usually unwanted capacitance that exists between the parts of an electronic component or circuit simply because of their proximity to each other. All actual circuit elements such as wires, inductors, diodes, and transistors have internal capacitance, which can cause their behavior to depart from that of ideal circuit elements.

Parasitic capacitance is causing non-zero voltage readings across these DC loads with the circuit breakers open for steps 9.2.19.1, 9.2.20.1, 9.2.21.1, 9.2.22.1, and 9.2.23.1.

The following steady-state values were recorded which did not match the 0 VDC acceptance criteria:

<i>Step Number</i>	<i>120VAC Configuration VDC</i>	<i>230VAC Configuration VDC</i>
<i>9.2.19.1</i>	<i>-0.15</i>	<i>-0.16</i>
<i>9.2.20.1</i>	<i>0.04</i>	<i>0.05</i>
<i>9.2.21.1</i>	<i>0.12</i>	<i>0.12</i>
<i>9.2.22.1</i>	<i>0.00</i>	<i>-0.02</i>
<i>9.2.23.1</i>	<i>-0.2</i>	<i>0.2</i>

An analytically determined expected 0 voltage range cannot be easily determined, due to the complexity of determining parasitic capacitance levels. However, the procedure does verify that loads turn off and on as expected by changing the applicable breaker position. Therefore, the breaker function is verified successfully.

Better acceptance criteria should have been defined by performing better procedure dry-running. Seeing that the steady-state voltages across the DC loads, with the circuit breakers open, are very small (< 0.2 VDC), + or - 1 VDC could have been arbitrarily chosen as acceptance criteria, since it is known that this voltage would not be sufficient to energize any DAS DC loads."

Based on the above engineering evaluation, it was determined that the initial test anomaly (-21 V) was a result of a measurement error due to not allowing the circuit to discharge before recording the reading. In addition, the gap between the steady state measured value (-0.2 V) and the acceptance criterion (0 V) was determined to result from parasitic capacitance in the circuit. Since the functionality under test was verified using a separate method during testing, the functionality of the equipment was verified, and therefore, there is no impact on the CHT or qualification.

NRC Question 3 - Parts 3, 4 and 5:

Please provide the evaluation of extent of condition for the deficiency described in NON 99901043/2012-201-03. Your response should include an evaluation of other design engineering test logs that were used in other qualification packages to ensure that original design test requirements and acceptance criteria have been met. Your response should provide sufficient detail to allow inspectors to conclude that test anomalies in test logs have been adequately documented and evaluated. Your response

should also outline the process used when design engineers work with test engineers, as it appeared that the test engineers were not cognizant of the inspector identified test anomaly.

Westinghouse Response:

An Extent of Condition will be performed where the scope of the review will focus on any AP1000 project cabinet hardware tests performed on EQ equipment before and/or after EQ testing by the design team. The scope of the review will be to identify if there are any discrepancies between the test log (if it exists) and the datasheets/report, specifically to ensure the acceptance criteria was met and any modifications were evaluated for their impact on the design/setup. This Extent of Condition evaluation will be performed as part of CAP commitment 12-241-M035.02.

NRC Question 3 - Part 6:

Your response should also outline the process used when design engineers work with test engineers, as it appeared that the test engineers were not cognizant of the inspector identified test anomaly.

Westinghouse Response:

Stage Gate Process:

Qualification engineer's interface with design engineers using the stage gate process identified in NA 11.5, EQ TESTING STAGE GATE REVIEW PROCESS, Revision 0, dated August 31, 2012 and the EQ type test checklist identified in NA 4.38, I&C Equipment Design/Equipment Qualification Process, Revision 0, dated November 15, 2011. DAS EQ testing commenced before the results of the CHT were formalized with the assumption that the CHT results were acceptable. If a gap was identified when the CHT results were finalized, a CAP IR would have been issued and the CAP IR would have been dispositioned to determine the impact on the qualification testing.

NRC Question 4:

Your response to NON 99901043/2012-201-04 indicated that you are tracking implementation of two corrective actions (relating to analysis of sensitive “frequencies” and “operating and climate conditions”) that will assure inspector identified failures to conform to Regulatory Guide 1.180 are “documented in the EMC [Electromagnetic Compatibility] qualification report.” Please provide the Corrective Action Program tracking numbers. Additionally, please provide the results of your evaluation of extent of condition and analysis of effects on other AP1000 EMC activities. Your response should include an analysis of other potential failures to conform to the provisions of RG 1.180 beyond the inspector identified examples. Please clarify if any Westinghouse or WLL process changes were enacted to prevent future reoccurrence, and, if not, provide your rationale.

Westinghouse Response:

Corrective Action Program Tracking Numbers:

Westinghouse CAP commitment 12-104-M026.01 has been opened to track the inclusion of the relevant sensitive frequency information and the applicable temperature and humidity information in the final DAS reports.

Extent of Condition and Other Potential Failures:

With respect to the missing information in the EMC test documentation, Westinghouse CAP commitment 12-241-M034.03 has been opened to track the planned review of the IEC and MIL standards that is being performed to identify the data documentation requirements. Additionally, CAP commitment 12-241-M034.04 has been opened to track the subsequent review of the laboratory reports and/or Westinghouse test reports to identify any data omissions, based on the requirements identified from CAP commitment 12-241-M034.03, that require revision to the reports.

Process Changes:

Discussions were held with all EMC technical specialists providing direction that all programs in progress and all future test procedures should explicitly address the requirements elucidated in each standard, including sensitive frequencies and the expected plant operating conditions for the EUT. Documentation of this communication is contained within CAP IR 12-241-M032.

A review of each standard to identify all appropriate documentation requirements is planned (CAP commitment 12-241-M034.03), with the end product being checklists to be used by the Westinghouse technical specialists to confirm the test parameters during the tests. Additional training for all Westinghouse Equipment Qualification EMC technical specialists is planned once the review is complete and all documentation requirements have been adequately identified. Westinghouse CAP commitment 12-241-032.03 has been opened to track completion of this training.

In advance of the completion of the checklists for all of the standards, an EMC testing checklist for IEC 61000-4-3 was supplied to all Westinghouse Equipment Qualification EMC technical specialists

(CAP commitment 12-241-M032.02) that provides guidance to use when performing IEC 61000-4-3 testing to confirm that the cables and antennas used during testing, as well as their location, was consistent with the calibration setup.