



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
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March 21, 2018

Michael Yox  
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Southern Nuclear Operating Company  
7835 River Road, Bldg. 140, Vogtle 3 & 4  
Waynesboro, GA 30830

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT, UNITS 3 AND 4 - NRC  
INSPECTION of PREOPERATIONAL FACTORY ACCEPTANCE TESTING,  
REPORTS 05200025/2017010, 05200026/2017010

Dear Mr. Yox:

From December 11 through 15, and February 5 through 8, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your contractor, Westinghouse Electric Company, on factory acceptance testing which may be associated with future preoperational testing activities for the AP1000 Units 3 and 4 currently under construction at the Vogtle Electric Generating Plant. The enclosed inspection report documents the results of the inspection, which the inspectors discussed on February 8, 2018, with members of your staff.

The inspection examined a sample of construction activities conducted under your combined operating license as it relates to safety and compliance with the Commission's rules and regulations and with the conditions of these documents. These activities included a review of program and implementation activities for factory acceptance testing of digital instrument and control systems. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, no findings of significance were identified.

In accordance with Title 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any), will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system ADAMS. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Should you have any questions concerning this letter, please contact us.

Sincerely,

***/RA/***

Jamie Heisserer, Chief  
Construction Inspection Branch 1  
Division of Construction Oversight

Docket Nos.: 5200025, 5200026

License Nos: NPF-91, NPF-92

Enclosure: NRC Inspection Report (IR) 05200025/2017010, 05200026/2017010  
w/attachment: Supplemental Information

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Letter to Michael Yox from Jamie Heisserer dated March 21, 2018.

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT, UNITS 3 AND 4 - NRC  
INSPECTION of PREOPERATIONAL FACTORY ACCEPTANCE TESTING,  
REPORTS 05200025/2017010, 05200026/2017010

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**U.S. NUCLEAR REGULATORY COMMISSION  
Region II**

Docket Numbers: 5200025  
5200026

License Numbers: NPF-91  
NPF-92

Report Numbers: 05200025/2017010  
05200026/2017010

Licensee: Southern Nuclear Operating Company, Inc.

Facility: Westinghouse Electric Corporation

Location: Cranberry Township, PA.

Inspection Dates: December 11 through 15, 2017, and  
February 5 through 8, 2018

Inspectors: L. Castelli, Senior Construction Inspector, DCO  
C. Jones, Senior Construction Inspector, DCO  
C. Taylor, Senior Construction Inspector, DCO, (Lead)  
R. Mathis, Test Inspector, DCO  
C. Smith-Standberry, Construction Inspector, DCO

Accompanying Personnel: None

Approved by: Jamie Heisserer, Branch Chief  
Construction Inspection Branch 1  
Division of Construction Oversight

Enclosure

## **SUMMARY OF FINDINGS**

Inspection Report (IR) 05200025/2017010, 05200026/2017010; 12/11/2017 through 12/15, 2017 and 02/05/2018 through 02/08/2018; Vogtle Electric Generating Plant Units 3 and 4, Inspection of Preoperational Factory Acceptance Testing.

This report covers an announced two week team inspection at your contractor, Westinghouse Electric Company (WEC), for factory acceptance testing (FAT) of the AP1000 digital control systems by regional and resident inspectors. The factory acceptance test results may be used as prerequisites for future preoperational testing at Units 3 and 4 currently under construction at the Vogtle Electric Generating Plant. The Nuclear Regulatory Commission's (NRC's) program for overseeing the construction of commercial nuclear power reactors is described in Inspection Manual Chapter 2506, Construction Reactor Oversight Process General Guidance and Basis Document.

### **Preoperational Initial Test Program**

Based on a review of the administrative controls for the FAT, the inspectors determined WEC had established adequate administrative controls and measures for FAT. In addition, the inspectors also determined FAT activities were conducted in accordance with Title 10 Code of Federal Regulations (CFR) Part 50, Appendix B; WEC's commercial quality program; the Vogtle Updated Final Safety Analysis (UFSAR); and Regulatory Guide 1.68, Initial Test Programs for Water-Cooled Nuclear Power Plants, Revision (Rev.) 2.

### **Preoperational Test Performance**

Based on a review of the controls and implementation of FAT, the inspectors determined WEC had implemented and established adequate controls for FAT in accordance with Title 10 CFR Part 50, Appendix B, WEC's commercial quality program; the Vogtle's UFSAR; and Regulatory Guide 1.68. Rev 2.

#### **A. NRC-Identified and Self Revealed Findings**

None

#### **B. Licensee-Identified Violations**

None



## REPORT DETAILS

### Summary of Plant Construction Status

The NRC performed a two week inspection at your contractor, Westinghouse Electric Company (WEC), for factory acceptance testing (FAT) the week of December 11 through 15, 2017, and February 5 through 8, 2018. The preoperational inspection was performed in accordance with Inspection Manual Chapter (IMC) 2504, Construction Inspection Program: Inspection of Construction and Operational Programs, dated October 24, 2012.

A portion of the FAT was controlled under a Title 10 Code of Federal Regulations (CFR), Part 50, Appendix B program and was reviewed to verify administrative controls and test documentation conformed to Vogtle's UFSAR. Another portion of the FAT was controlled under a WEC commercial quality program. The FAT portion controlled under the commercial quality program was reviewed because these activities were material to the acceptance criteria of Inspection, Testing, Analysis, and Acceptance Criteria (ITAAC). The commercial quality program was evaluated to determine whether the program controls and conduct of test activities were sufficient to provide a reliable and complete record of testing. The test results from the FAT may be used as prerequisites for future preoperational testing at Vogtle Electric Generating Plant Units 3 and 4.

### 1. CONSTRUCTION REACTOR SAFETY

#### Cornerstones: Inspection and Testing

#### IMC 2504, Construction Inspection Program – Inspection of Construction and Operational Programs

##### 1P01 Pre-operational Testing

- 70367, Part 52, Inspection of Preoperational Test Program

##### a. Inspection Scope

The inspectors reviewed administrative controls and measures for FAT of the AP1000 digital control systems. The review evaluated whether administrative procedures for safety-related and commercial FAT were in accordance with the requirements of Title 10 CFR Part 50, Appendix B, WEC's commercial quality program, and Vogtle's UFSAR. In addition, the inspectors reviewed administrative procedures to determine whether guidance existed to incorporate performance attributes of the relevant systems, and whether procedures contained guidance to develop clearly identifiable acceptance criteria.

##### Test Program

The inspectors conducted a review of administrative procedures for FAT and conducted interviews with FAT managers and knowledgeable test personnel to verify that the scope and controls for FAT were addressed in administrative procedures for the overall testing program; in accordance with Title 10 CFR Part 50, Appendix B; WEC's commercial quality program; and Vogtle's UFSAR. Specifically, the inspectors reviewed

administrative procedures to verify procedures were formally reviewed and approved, by WEC, included a description of the factory test program, identified general areas of testing and responsibilities, and described test sequencing in accordance with your UFSAR and Regulatory Guide 1.68. In addition, inspectors reviewed the Protection Monitoring System (PMS) and Diverse Actuation System (DAS) test procedures to verify that test abstracts were consistent with the licensee's Initial Test Program (ITP) administrative control manual for preoperational testing and with Vogtle's UFSAR. Specifically, the inspectors reviewed the PMS and DAS test procedures to verify the following sections were included:

- scope of test and test objective;
- necessary prerequisites;
- test methods;
- significant parameters and plant performance; and,
- acceptance criteria.

### Test Organization

The inspectors reviewed procedure, W2-8.4-103, Design Testing, and WEC organization structure for both the safety-related and commercial testing program to verify that formal written administrative measures were established that clearly identified the responsibility for appointing key personnel in the test program, described lines of authority and responsibilities to test personnel, and identified organizational interfaces that occur during the conduct of the test in accordance with Title 10 CFR Part 50, Appendix B, WEC's commercial quality program, and Vogtle's UFSAR.

The inspectors reviewed qualification records to verify that the required responsibilities, qualifications, and training of management and staff who will develop factory test procedures and will conduct the tests are formally specified in writing in accordance with Title 10 CFR Part 50, Appendix B, WEC's commercial quality program, and Vogtle's UFSAR. Specifically, the inspectors reviewed WEC procedure QA 2.9, Qualification of Inspection and Testing Personnel, to verify if the responsibilities and qualifications for test procedure developers and conductors addressed test procedure preparation and approval, test performance and documentation, and test results review. In addition, the inspectors reviewed test personnel training records to verify if the training program addressed administrative controls and testing objectives in accordance with WEC procedure QA 2.9.

### Test Program Administration

The inspectors reviewed WEC procedures W2-8.4-103, WNA-WI-00180, WNA-WI-0550-GEN and WNA-PT-00058-GEN to verify that formal administrative measures were established governing the conduct of testing in accordance with Vogtle's UFSAR. The inspectors compared the requirements in W2-8.4-103 to a sample of safety-related and commercial program test plans to verify the following controls were included for the conduct of testing:

- test procedure is current before use;
- pretest briefings are conducted;
- test personnel are knowledgeable of the test procedure;

- requirements are defined for procedure use;
- test procedure provides for major and minor changes;
- criteria for termination or interruption of a test and continuation of an interrupted test is defined;
- methods to coordinate the conduct of testing includes test (shift) turnover, requirements for continuity, communication methods to be used, and clear identification of the test director;
- significant events, unusual conditions, or interruptions to testing is documented;
- deficiencies, documentation of their resolutions, and documentation for retesting is identified; and,
- marked-up drawings before test commencement are available.

The inspectors reviewed the WEC PMS Test Plan to verify formal methods were established to control scheduling of test activities in accordance with the WCAP-16096-P Software Program Manual for Common Q Systems, Rev.4. In addition, the inspectors reviewed publication WNA-PD-00283-WAPP to verify formal methods were identified to maintain and update a top-level project schedule in accordance with the Software Program Manual for Common Q Systems.

The inspectors reviewed WEC procedure W2-8.4-103 to verify that a formal program for evaluating the test results was established in accordance with Vogtle's UFSAR. Specifically, the inspectors reviewed safety-related and commercial program test reports to verify the following test controls were accomplished in accordance with WEC procedure W2-8.4-103:

- test data were properly verified;
- test results were checked against design;
- deficiencies were identified and appropriately dispositioned;
- affected tests were rerun as necessary; and,
- test result evaluations were reviewed and formally approved.

#### Document Control

The inspectors reviewed the WEC procedures W2-8.4-103, W01, Design Testing Work Control, and W2-6.1-101, Document Control, to verify that formal administrative measures for development of test procedures, including format and content, had been established to control the process for review, approval, and issuance of the procedures in accordance with Title 10 CFR Part 50, Appendix B, WEC's commercial quality program, and Vogtle's UFSAR. Specifically, the inspectors reviewed safety-related and commercial program test procedures to verify that the procedures were reviewed, approved and issued in accordance with W2-8.4-103 and W2-6.1-101. The inspectors also reviewed W2-8.4-103.W01 and W2-6.1-101 to verify that formal administrative controls were established for the revision of approved procedures in accordance with the UFSAR. Specifically, the inspectors reviewed safety-related and commercial program test procedures to verify that the revision of approved procedures followed the established controls including review and approval by same persons as the original procedure, issuance and control of revised procedures, and revisions screened to determine if a change to Vogtle's UFSAR was required.

The inspectors reviewed WEC procedures W2-8.4-103 and W2-8.4-103.W01 to verify that administrative controls were established to require the indexing and availability of current approved drawings at the test location during testing in accordance with Title 10 CFR Part 50, Appendix B, WEC's commercial quality program, and Vogtle's UFSAR. The inspectors reviewed test configuration records and configuration management release records to verify the availability of approved drawings in accordance with W2-8.4-103 and W2-8.4-103.W01. The inspectors also reviewed design control documents to verify that a mechanism existed to update affected test procedures when manual or drawing revisions occur.

#### Design Change and Modifications

The inspectors reviewed design change control procedures for both PMS and DAS to verify that a formal process was established to initiate, review and approve requests for design changes and modifications to equipment turned over to the software test group in accordance with Title 10 CFR Part 50, Appendix B, WEC's commercial quality program, and Vogtle's UFSAR. The procedures reviewed included those related to the AP1000 program project quality plan, design change, change control, software problem reporting, and regression testing procedures. The inspectors conducted interviews with knowledgeable test program personnel to verify that a formal method was established to incorporate proposed or implemented design changes to the software test program. Inspectors also reviewed a sample of changes to verify software regression testing was documented in regression analysis change reports for the DAS Advanced Logic System Service Unit application and PMS software releases. Items reviewed by the inspectors included regression testing issues tracked in the Automation Tracking System (RITS), On-Time Ticket System, and the corrective action program. Inspectors reviewed the licensing impact determination procedures in order to verify that the design review process and established procedures required that all proposed design changes were reviewed for potential UFSAR impact in accordance with the design change control and licensing impact determination procedures.

#### Temporary Test Modifications, Jumpers, and/or Bypasses

The inspectors reviewed safety-related administrative procedures for controlling temporary test modifications, jumpers, and bypasses, to verify written procedures were established in accordance with Title 10 CFR Part 50, Appendix B and Vogtle's UFSAR. The review of the safety-related program controls was described in the project quality plan and procedures for design change, change control, and licensing impact. Test configuration record WNA-TC-01959-VS3 was selected as an inspection sample to verify procedure requirements were met for handling of temporary test modifications, and for designating responsibility of those conducting independent verifications. The inspectors evaluated PMS test procedures and interviewed applicable test personnel to verify that the review process required that proposed temporary modifications, jumpers, and bypasses were reviewed for potential impact to the UFSAR. The inspectors also reviewed the test configuration record in test report, VS3-PMS-T2R-008, along with the redlined test data sheets and test signature logs, to verify signatures were provided for those that implement and verify temporary changes are consistent with approved design change control procedures.

The review of the commercial program administrative controls examined test plans to verify that written guidance was established for controlling temporary modifications,

jumpers, and bypasses in accordance with WEC's commercial quality program. The inspectors reviewed applicable test plans and test procedures to verify that controls included maintaining a log to document the status of temporary modifications, assigning responsibility for maintaining the log, and identifying installed jumpers and leads. The inspectors also interviewed responsible test personnel to verify that controls were in place for assigning responsibility for determining when independent verification is required for temporary modifications and for determining when functional testing is required following temporary modifications.

#### Test and Measurement Equipment

The inspectors reviewed procedure, W2-9.8-100, to verify controls and measures were established for measurement and test equipment (MT&E) in accordance with Title 10 CFR Part 50, Appendix B, WEC's commercial quality program, and Vogtle's UFSAR. Specifically, the procedure described controls and measures for instrumentation used to provide data for acceptance criteria or required that significant limitations were not exceeded for MT&E. The inspectors reviewed W2-9.8-100 to verify the existence of the following administrative controls for MT&E:

- listing of controlled test equipment;
- controls for storage and issuance;
- requirements for recording test equipment;
- controls for ensuring equipment calibrated before use; and,
- controls for out of calibration, lost or stolen MT&E.

The inspectors evaluated implementation of procedure, W2-9.8-100, by reviewing the list of M&TE calibration history record contained in test report VS3-PMS-T2R-008.

#### b. Findings

No findings were identified.

#### 1P02 Pre-operational Testing

- 70702, Part 52, Inspection of Preoperational Test Program, Appendix A

##### a. Inspection Scope

The inspectors observed the conduct of tests on commercial FAT for selected AP1000 digital control systems. The inspection was conducted to determine whether the program controls and conduct of test activities were sufficient to provide a reliable and complete record of testing in accordance with WEC commercial quality program. In addition, the inspectors reviewed test procedures and test results for safety-related FAT to determine whether the program was adequately implemented in accordance with Title 10 CFR Part 50, Appendix B and Vogtle's UFSAR.

#### Procedure Review

The inspectors reviewed selected safety-related test procedures for logic system testing of the PMS. The adequacy of the test procedures was evaluated, in part, by confirming

the following attributes were addressed in accordance with Title 10 CFR Part 50, Appendix B and Vogtle's UFSAR:

- evidence of procedure review, verification, and approval;
- identification of prerequisites for testing;
- identification of clear acceptance criteria;
- requirement to record details of the conduct of the test;
- requirement to record test anomalies or observed deficiencies, their resolution, and any necessary retesting;
- identification of test performers and persons evaluating the test data;
- requirement to document acceptability of test data;
- verification of critical steps or test parameters; and,
- calibration of MT&E.

In addition, the inspectors reviewed commercial program test procedures for the DAS and the plant control system (PLS) to verify the test procedures adequately incorporated WEC's commercial quality program guidance. The inspectors reviewed the adequacy of the commercial test procedures, in part, by confirming the procedures identified the following:

- acceptance criteria;
- a review and approval by the responsible organization;
- the current procedure version;
- guidance for performance of testing;
- evaluation of test results; and,
- identification, evaluation, and disposition of unexpected results and test anomalies.

### Test Witnessing

#### Plant Control System

The inspectors witnessed plant maneuverability testing of the PLS under procedure APP-PLS-T1P-390. Specifically, test observations included reviews of test documents and interviews with test personnel to assess whether the non-safety related program controls for the PLS factory tests were performed and documented in accordance with WEC's commercial quality program requirements. A series of ten simulated plant evolutions and upsets affecting the plant control system were witnessed by the inspectors. The scope of review included an assessment whether the test performance supported program objectives to show nuclear steam supply system functions were correctly integrated with the rest of the PLS by demonstrating that the distributed control and information system successfully met design goals.

The inspectors also evaluated whether WEC commercial quality program controls for testing of PLS incorporated attributes outlined in Vogtle's UFSAR by determining whether the pretest requirements were performed; the tests were conducted in accordance with the approved procedure; test changes, anomalies, problems, interruptions, and deficiencies were identified and controlled; and observed data was accurately and legibly recorded.

## Test Results

### Plant Control System

For the PLS, the inspectors reviewed test report APP-PLS-T2R-009 and conducted interviews with knowledgeable test program personnel. The inspection sample selected for the review included a test series of ten logic system evolutions and upsets that were documented using the PLS plant maneuverability test procedure. The inspectors reviewed the test records to verify testing of the PLS control interfaces for control functions identified in the plant license bases demonstrated the operability of the control functions. The specific functions inspected included functions identified in Vogtle's UFSAR for reactor power control, feed water control, and turbine control.

The inspectors reviewed instances where testing was aborted and where acceptance criteria or quality assessment goals were not met. The issues were reviewed to verify measures were implemented to document the issues and to assure follow-up evaluations would be performed to specify dispositions. To evaluate control of unresolved issues, the inspectors reviewed the WNA-PC-00005-WAPP, Projects Configuration Management Plan, to confirm that prior to issuance of final test reports, a mechanism was in place to identify and disposition elements of testing that were incomplete or which had open corrective action issues.

### Diverse Actuation System

The inspectors reviewed test results of the DAS as documented in test data sheets APP-DAS-T1D-300, and discussed in interviews with knowledgeable test program personnel. The reviews and interviews were performed to verify testing of the DAS logic software demonstrated functionality of a sample of automatic actuations identified in your UFSAR. The actuations sampled included reactor and turbine trips, passive residual heat removal heat exchanger actuations, and core makeup tanks and reactor coolant pump trips.

To assess the completeness of the records contained in the test data sheets, the inspectors also reviewed the records to confirm they contained evidence that occurrences of unexpected conditions and deviations from specified functional requirements were recorded and received appropriate evaluations and dispositions in accordance with Title 10 CFR Part 50, Appendix B and Vogtle's UFSAR.

### PMS Reactor Trip Channel Integration

The inspectors reviewed test results report for the PMS Reactor Trip Channel Integration Test (CIT). The inspectors reviewed the Reactor Trip CIT report to verify the testing identified the reactor trip functions in accordance with the requirements of Vogtle's UFSAR. The inspectors reviewed the documented test anomalies found during execution of the test to verify they were appropriately assigned an Automated Tracking System (RITS) number. In addition, the inspectors reviewed the items in the report associated with test failures for the System-Level reactor trip functionality at the end of the testing to verify there were no open items. The inspectors conducted interviews with contractor personnel to verify the Reactor Trip CIT report included testing to validate the PMS reactor trip functions in accordance with the PMS test plan. These functions included reactor trip functions, first out indicator and sequence of event points.

### PMS Abnormal Conditions

The inspectors reviewed the test results of PMS as documented in test report APP-PMS-T2R-014. As part of the review, the inspectors conducted interviews with knowledgeable test program personnel to verify testing of abnormal conditions occurring in the PMS demonstrated functionality for a sample of test cases identified in Vogtle's UFSAR. The test cases sampled included the presence of bad quality in the qualified data processing system, component interface module wiring disruption, and instrument faults. The inspection sample included an instance where a test acceptance criterion was not met. The inspectors evaluated the issue to confirm measures were implemented to document the failure to meet the acceptance criteria and implementation of corrective actions including subsequent retests in accordance with Title 10 CFR Part 50, Appendix B and Vogtle's UFSAR.

### PMS System-Level Engineered Safety Features (ESF)

The inspectors reviewed test results as documented in test report, VS3-PMS-T2R-008. As part of review, the inspectors conducted interviews with knowledgeable test program personnel to verify testing of the ESF demonstrated functionality for a sample of test cases identified in Vogtle's UFSAR. Specifically, the inspectors evaluated two channel integration test cases to determine whether testing demonstrated the PMS ESF functioned to actuate the Chemical Volume System Letdown Isolation Valve as described in Vogtle's UFSAR.

To assess the completeness of the records in the test data sheets, the inspectors reviewed information to confirm they contained evidence that occurrences of unexpected conditions and deviations from specified functional requirements were recorded and received appropriate evaluations and dispositions. In addition, test results were reviewed to verify test acceptance criteria were met, and that test anomalies were properly dispositioned in the RITS, corrective actions, and test log in accordance with the Title 10 CFR Part 50, Appendix B and Vogtle's UFSAR.

#### b. Findings

No findings were identified.

## **4. OTHER INSPECTION RESULTS**

### 4OA6 Meetings, Including Exit

On February 8, 2018, the inspectors presented the inspection results to Steve Waldrop, SNC ITP Manager, along with other licensee and contractor staff members. The inspectors stated that no proprietary information would be included in the inspection report.



## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licenses and Contractor Personnel**

B. Hirmanpour, SNC Manager  
R. Carlson, WEC Licensing Engineer  
G. Glenn, WEC Licensing Engineer  
T. Kitchen, WEC Configuration Control Manager  
M. Mamo, SNC Engineering Supervisor  
B. Miller, WEC Principal Engineer  
S. Miller, WEC Principal Engineer  
J. Monahan, WEC License Manager  
J. Perine, WEC Principal Engineer  
E. Pitschke, WEC DCIS Product Manager  
G. Turk, WEC Principal Engineer  
S. Waldrop, SNC, ITP Manager  
J. Wiseman, WEC PMS Product Manager  
S. DiTommaso, WEC Licensing Engineer  
M. Drudy, WEC Manager  
Q. Nguyen, WEC Director  
A. Pugh, SNC Licensing Director  
T. Tuite, WEC Technical Lead  
P. Tyrpak, WEC Testing Director  
D. Harmon, WEC Quality Assurance  
D. Mickinac, SNC Licensing  
D. Nguyen, SNC ITP  
M. Mamo, SNC ITP  
K. Corbin, WEC Principal Engineer  
D. Malarik, WEC Manager  
B. Domitrovich, WEC Principal Engineer  
E. Pitschke, WEC DCIS Manager  
R. Wessel, WEC Licensing  
S. Radomski, WEC Program Manager  
S. Waldrop, SNC ITP Manager  
J. Wiessmann, WEC Project Manager  
M. Washington, SNC Licensing  
G. Osborne, WEC Quality Assurance  
C. Perego, WEC Sr. Engineer  
A. Miller, WEC Engineer

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Item Number</u>	<u>Type</u>	<u>Status</u>	<u>Description</u>
None			

## LIST OF DOCUMENTS REVIEWED

### Section 1P01

9006-01501, Defect Management Work Instruction, Revision (Rev.) 6  
 APP-DAS-J1-001, AP1000 Diverse Actuation System Functional Requirements, Rev. 8  
 APP-DAS-T1D-300, AP1000 Diverse Actuation System Factory Acceptance Test Data Sheets, Rev. 7  
 APP-DAS-T1P-300, AP1000 Diverse Actuation System Factory Acceptance Test Procedure, Rev. 7  
 APP-GW-GAP-147, AP1000 Current Licensing Basis Review, Rev. 8  
 APP-GW-GAP-341, AP1000 Plant Program Design Control, Rev. 4  
 APP-GW-GAP-420, AP1000 Engineering and Design Coordination Reports, Rev. 14  
 APP-GW-T5-001, AP1000 I&C System Design Validation and Integration Test Plan, Rev. 1  
 APP-PMS-GEF-181, Change to PMS Scaling Resistor for Differential Pressure Transmitter Signals, Rev.0  
 APP-PMS-T1P-050, Rev. 5, AP1000 Protection and Safety Monitoring System Fuel Load Regression Test Procedure, Rev. 5  
 QA-2.9, Qualification of Inspection and Testing Personnel, Rev. 1  
 QMS-A, Westinghouse Electric Company Quality Management System, Rev. 7  
 QAM, Nuclear Development Quality Assurance Manual, Rev, 17  
 Report, Regression Analysis for the Diverse Actuation System ALS Service Unit Software 1.07 Release, Rev. 0, dated December 2014  
 SV3-DAS-T2R-300, Vogtle Unit 3 AP1000 Diverse Actuation System Factory Acceptance Test Report, Rev. 2  
 W2-2.5-100, Competence, Awareness, and Training, Rev.0.2  
 W2-6.1-101, Document Control, Rev. 0  
 W2-8.4-103, Design Testing, Rev 0.0  
 W2-8.4-103.W01, Design Testing Work Instruction, Rev. 0.2  
 W2-8.5-100, Design Change Control Process, Rev. 0  
 W2-8.5-106, Design Change Control Process, Rev. 0.1  
 W2-8.6-104, Software Problem Reporting, Rev. 0.1  
  
 W2-9.8-100, Control of Inspection, Measuring, and Test Equipment, Rev.1  
 WCAP-16096-P, Software Program Manual for Common Q Systems, Rev. 4  
 WEC 3.4.1, Change Control for the AP1000 Plant Program, Rev. 3  
 WEC 3.6.4, Software Problem Reporting, Rev. 0.2  
 Westinghouse Organizational Charts (Control & Information Systems and Global Instrumentation & Control) dated November 1, 2017  
 WNA-AR-00363-WAPP, AP1000 Protection and Safety Monitoring System Regression Analysis Change Report, Rev. 7  
 WNA-PD-00283-WAPP, U.S. AP1000 I&C Protection and Safety Monitoring System, Rev.5  
 WNA-PQ-00252-SV0, Vogtle 3&4 I&C Project Quality Plan, Rev. 3  
 WNA-PQ-00283-WAPP, AP1000 I&C Programs Project Quality Plan, Rev. 6  
 WNA-PT-00058-GEN, Testing Process for Common Q Safety Systems, Rev. 5

WNA-RL-03374-VS3, V.C. Summer Unit 3 AP1000 Protection and Safety Monitoring System Hardware Configuration Management Release Report, Rev. 2  
 WNA-RL-03934-SV3, Vogtle Unit 3 AP1000 Diverse Actuation System Configuration Management Release Report, Rev. 4  
 WNA-TC-00777-SV3, Diverse Actuation System Factory Acceptance Test Configuration Record, Rev. 0  
 WNA-TC-01959-VS3, V.C. Summer Unit 3 AP1000 Protection and Safety Monitoring System Test Configuration Record, Rev. 30  
 WNA-WI-0550-GEN, Test Documentation Work Instructions and Accepted Practices, Rev. 0

## Section 1P02

APP-PLS-ITH-002, Rev. 1, Standard Plant ITAAC 2.5 03.02 Performance and Documentation Plan  
 APP-PLS-T1P-390, Rev. 1, Plant Control System Plant Maneuverability Level 3 Control Software Integration Test Procedure  
 APP-PLS-T2R-009, Rev. 1, AP1000 Plant Control System NSSS Level 3 Control Software Integration Test Report  
 APP-PLS-T5-001, Rev. 2, AP1000 Plant Control System/Data Display and Processing System Test Plan  
 APP-PMS-J3-335, AP1000 Protection and Safety Monitoring System System-Level ESF Channel Integration Logic Diagram  
 APP-PMS-J3-375, AP1000 Protection and Safety Monitoring System System-Level ESF Channel Integration Logic Diagram  
 APP-PMS-T1D-008, Rev. 7, AP1000 Protection and Safety Monitoring System System-Level ESF Channel Integration Tests Datasheets  
 APP-PMS-T1P-007, Rev. 4, AP1000 Protection and Safety Monitoring System Reactor Trip Channel Integration Test Procedure  
 APP-PMS-T1P-008, Rev. 3, AP1000 Protection and Safety Monitoring System System-Level ESF Channel Integration Test Procedure  
 APP-PMS-T2R-014, Rev. 0, AP1000 Protection and Safety Monitoring System - System Integration Test Abnormal Conditions Test Report  
 APP-PMS-T5-001, Rev. 5, AP1000 Protection and Safety Monitoring System Test Plan  
 NSNP 3.1.2, Rev. 3, Project Planning  
 VS2-PMS-T2R-007, Rev. 0, V.C. Summer Unit 3 AP1000 Protection and Safety Monitoring System System-Level Reactor Trip Channel Integration Test Report  
 VS3-PMS-T2R-008, Rev. 0, Protection and Safety Monitoring System System-Level ESF Channel Integration Test Report  
 WNA-PC-00005-WAPP, Rev. 6, AP1000 I&C Projects Configuration Management Plan  
 WNA-RL-05786-SV3, Rev. 3, Vogtle Unit 3 AP1000 Plant Control System and Data Display and Processing System Configuration Management Release Report, Release 8.4.1 for Baseline  
 SVO-ISIP-J0R-008, Rev. 4  
 WNA-RL-06158-SV3, Rev. 1, SV3 OCS/PLS/DDS Integrated BL8 Ovation Stimulated Environment System Configuration Record  
 WNA-TC-01959-VS3, Rev. 30, VC Summer Unit 3 AP1000 Protection and Safety Monitoring System Test Configuration Record  
 WNA-WI-00180-WAPP, Rev. 7, Issue Tracking System Use  
 WNA-WI-00223-WAPP, Rev. 3, Release Process Work Instruction  
 CAPAL 100037514, AP1000 DAS ASU – Error in Multi-point Reference Calibration Parameters  
 CAPAL 100506551, Add Plant Maneuverability Test Procedure to DCIS Test Plan  
 RITS 41713, DAS ASU DOC: Incorrect parameter values used in ASU software

RITS 62576, Issue with Turbine Power/Load Unbalance Transient

RITS 62705, Failures Observed with running APP-PLS-T1P-390 Section 9.1 (10% Step Load Increase)

RITS 62706, Failures Observed with running APP-PLS-T1P-390 Section 9.2 (10% Step Load Decrease)

RITS 62707, Failures Observed when running APP-PLS-T1P-390 Section 9.5 ("Ramp Load Decrease at 5%/min)

RITS 62708, Failure observed when running APP-PLS-T1P-390 Section 9.6 (Normal Reactor Trip)

RITS-62711 Failures Observed when running APP-PLS-T1P-390 Section 9.7 (Normal Turbine Trip)

RITS 62715, Failures observed when running APP-PLS-T1P-390 Section 9.4 (Ramp Load Increase at 5%/min)

RITS 63088, Procedure Markups

**LIST OF ACRONYMS**

10 CFR	Title 10 of the Code of Federal Regulations
CAPAL	Corrective Action Prevention and Learning
CFR	Code of Federal Regulations
CITS	Channel Integration Testing
COL	Combined License
CVS	Chemical Volume System
DAS	Diverse Actuation System
ESF	Engineered Safety Function
FAT	Factory Acceptance Testing
ITAAC	Inspection, Test, Analysis, and Acceptance Criteria
IMC	Inspection Manual Chapter
IP	Inspection Procedure
I&C	Instrumentation and Control
ITP	Initial Test Program
M&TE	Measuring and Test Equipment
NRC	Nuclear Regulatory Commission
NSSS	Nuclear Steam Supply System
PLS	Plant Control System
PMS	Protection and Safety Monitoring System
Rev	Revision
RITS	Automation Tracking System
UFSAR	Updated Final Safety Analysis Report
WEC	Westinghouse Electric Company