

April 2, 2014

Mr. Rick Davis, Quality Manager  
Wyle Laboratories  
7800 Highway 20 West  
Huntsville, AL 35806

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION OF WYLE  
LABORATORIES REPORT NO. 99900905/2014-201

Dear Mr. Davis:

On March 4 to March 6, 2014, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the Wyle Laboratories (Wyle) facility in Huntsville, Alabama. The purpose of this limited-scope inspection was to assess Wyle's compliance with provisions of selected portions of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities."

This inspection was performed as part of the NRC's program to provide enhanced oversight of the manufacturing and testing of key safety related components being supplied as part of the AP1000 reactor design. During this inspection, the NRC inspectors observed the setup and reviewed procedures associated with the submergence testing of the explosive cartridges, a subcomponent of the 8-inch squib valves, which are used in safety related applications for the AP1000 reactor design. The submergence testing is part of the overall equipment qualification program for these valves and is associated with inspections, tests, analyses, and acceptance criteria (ITAAC) 2.2.03.12a.i. and 2.2.03.12a.ii of Appendix C, from the Combined License for Vogtle Units 3 and 4 and V.C. Summer Units 2 and 3. The NRC inspectors did not identify any findings associated with these ITAACs during this inspection. Also, within the scope of this inspection, no violations or nonconformances were identified. The enclosed report presents the results of the inspection. This NRC inspection report does not constitute the NRC endorsement of your overall QA program.

In accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response, (if applicable), should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material is withheld from public disclosure, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim (e.g., explain why the

R. Davis

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disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If Safeguards Information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

Sincerely,

**/RA/**

Richard A. Rasmussen, Chief  
Electrical Vendor Inspection Branch  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

Docket No.: 99900905

Enclosure:

1. Inspection Report No. 99900905/2014-201  
and attachment

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Sincerely,

**/RA/**

Richard A. Rasmussen, Chief  
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and attachment

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ASakadales  
rick.davis@wylelabs.com

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**U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NEW REACTORS  
DIVISION OF CONSTRUCTION INSPECTION & OPERATIONAL PROGRAMS  
VENDOR INSPECTION REPORT**

Docket No.: 99900905

Report No.: 99900905/2014-201

Vendor: Wyle Laboratories  
7800 Highway 20 West  
Huntsville, Alabama 35806

Vendor Contact: Mr. Rick Davis, Quality Manager  
416-716-4483  
rick.davis@wylelabs.com

Nuclear Industry Activity: Wyle Laboratories performs testing services to support the seismic, environmental, and functional qualification of safety-related components currently being supplied as part of the Westinghouse AP1000 design. Wyle Laboratories also performs testing services for NRC licensees and vendors that supply safety-related replacement components to U.S. nuclear power plants.

Inspection Dates: March 4 -6, 2014

NRC inspectors: Jeffrey Jacobson NRO/DCIP/MVIB Team Leader  
Tim Steadham R-II/DCI/CIB3  
Qin Liwei China National Nuclear Safety Authority (NNSA), observer  
He Kai NNSA, observer

Approved: Richard A. Rasmussen, Chief  
Electrical Vendor Inspection Branch  
Division of Construction Inspection & Operational Programs  
Office of New Reactors

Enclosure

## **EXECUTIVE SUMMARY**

Wyle Laboratories  
99900905/2013-201

The U. S. Nuclear Regulatory Commission (NRC) staff conducted this limited scope vendor inspection to verify that Wyle Laboratories, (Wyle), implemented an adequate quality assurance program that complies with the requirements of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities." The NRC inspectors reviewed Wyle's implementation of the Appendix B criteria related to test control, and measuring and test equipment, as related to the submergence testing of the explosive actuators, which are a subcomponent of the 8-inch squib valves being supplied as part of the Westinghouse Electric Corporation (WEC) AP1000 reactor design. The NRC conducted this inspection at Wyle's facility in Huntsville, AL.

The following regulations served as the bases for this NRC inspection:

- Section 50.49 of 10 CFR, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants"
- Appendix B to 10 CFR Part 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants"
- Part 21 of 10 CFR "Reporting of Defects and Noncompliance"

The NRC inspectors used portions of Inspection Procedures (IP) 43002, "Routine Inspections of Nuclear Vendors," dated July 15, 2013, IP 35034, "Design Certification Testing Inspection," dated January 27, 2010, and IP 65001.E, "Inspection of the ITAAC-Related Qualification Program," dated August 19, 2008, as applicable to the scope of the inspection.

The results of the inspection are summarized below.

### **Test Control**

The NRC inspection team reviewed the applicable test procedures and inspected portions of the submergence test set-up of the AP1000 8-inch squib valve actuators. The inspection team concluded that Wyle had developed adequate test procedures that encompassed the design basis requirements for the actuators. During the inspection, the submergence test was postponed by the customer, WEC, so the team was not able to actually witness the testing. No findings of significance related to Wyle test control activities were identified.

### **Control of Testing Equipment**

The NRC inspectors concluded that Wyle's control of test equipment was adequate to meet the requirements of Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. No findings of significance were identified.

## **REPORT DETAILS**

### **1. Test Control**

#### **a. Inspection Scope**

The Nuclear Regulatory Commission (NRC) inspectors reviewed applicable equipment qualification plans and test procedures associated with the planned submergence testing of the 8-inch squib valve actuators. The team also inspected aspects of the test set up and equipment being utilized by Wyle Laboratories (Wyle) to conduct the test. Specific emphasis was put on ensuring that Wyle had properly enveloped the required time, temperature, pressure, and submergence profiles for the valves, as detailed in the Westinghouse Electric Company (WEC) supplied specifications. The inspectors assessed the methods being utilized by Wyle to confirm that the test specimens had been properly submerged in the test chamber during the test.

#### **Functional Test Activities**

The NRC inspectors observed pre-test activities, including a Wyle control room operator and technicians in the field, performing portions of a simulated submergence test. The NRC inspectors observed the Wyle personnel maintaining readings consistent with test requirements in the Wyle qualification plan.

#### **Qualification Plan and Test Procedure**

The NRC inspectors reviewed Wyle's test plan for conformance to the applicable design requirements of the actuators as described in the certified AP1000 DCD, Tier 2, Revision 19, and applicable WEC design documents. The NRC inspectors performed independent calculations to verify the adequacy of the selected test conditions to ensure that the test would sufficiently bound the maximum design basis environmental qualification requirements.

#### **b. Observations and Findings**

Although the NRC inspectors determined that Wyle had appropriately translated the qualification requirements provided by WEC into the Wyle test plan, the inspectors identified that the test plan was not clear with regard to how submergence levels inside the test chamber would be measured. Also, the team raised some questions regarding the margins applied to the test profiles. As a result of the team's questions, Wyle revised the test plan during the inspection and added additional guidance on how the submergence verification level would be demonstrated. The revised guidance was determined by the inspectors to be adequate to address the concerns raised. This issue was determined by the team to be a minor issue. During the inspection, the submergence test was postponed by the customer, WEC, so the team was not able to actually witness the submergence testing.

#### **c. Conclusions**

The NRC inspectors determined that the intended set-up and procedures for performing the environmental qualification submergence test at Wyle appropriately modeled the postulated accident conditions for the AP1000 8-inch squib valve actuators to

demonstrate the design-basis capability of squib valves for use in the AP1000 reactor. The NRC inspectors concluded that Wyle was implementing its test control program in accordance with the regulatory requirements of Criterion XI, "Test Control," of Appendix B to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50. Based on the samples reviewed, the NRC inspectors determined that Wyle's test control was adequate to meet the requirements committed to in their test control documentation.

No findings of significance related to Wyle's test control activities were identified.

## 2. Control of Testing Equipment

### a. Inspection Scope

The NRC inspectors reviewed calibration records for selected measurement and test equipment that Wyle intended to utilize to perform the submergence testing of the 8-inch squib valve actuators to verify compliance with the requirements of Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50, to ensure that the instruments were properly calibrated, accurate, and reliable.

#### Calibration of Test Equipment

The NRC inspectors reviewed a sample of six inspection and testing instruments to verify that the equipment was being properly calibrated and controlled. The specific instruments sampled were associated with the submergence testing of the 8-inch squib valve actuators. The NRC inspectors confirmed the instruments were calibrated and appropriate for the range of operation for the test. The NRC inspectors reviewed the Wyle Instrument Sheet and confirmed that all equipment was identified, recorded, and verified to be within the calibration frequency and the calibration range. The NRC inspectors confirmed that all test instrumentation was appropriate for the test use and was capable of conducting measurements to the precision required in the test plan.

### b. Observations and Findings

No findings of significance were identified.

### c. Conclusions

The NRC inspectors determined that Wyle was implementing its measurement and test equipment program in accordance with the regulatory requirements of Criterion XII of Appendix B to 10 CFR Part 50. The NRC inspectors also determined that Wyle was implementing its own policies and procedures associated with the Measurement and Testing Equipment program. No findings of significance were identified.

## 3. Exit Meeting

On March 6, 2014, the NRC inspectors presented their inspection scope and findings during an exit meeting with Mr. Tom Brewington, Senior Director Nuclear Engineering and Test, other Wyle management and staff, and selected WEC personnel.

## ATTACHMENT

### 1. EXIT MEETING ATTENDEES AND INDIVIDUALS INTERVIEWED

Name	Title	Affiliation	Exit	Interviewed
Tom Brewington	Sr. Director, Nuclear	Wyle	X	
E. Reilly Schum	Engineering Manager, EQ and TPQ	Wyle	X	
Cameron Muelling	Staff Engineer	Wyle	X	X
Rick Davis	Quality Assurance /Safety Manager	Wyle	X	
John B. Hardy, PE	Sr. Instrumentation and Controls Engineer	Wyle	X	X
Steve Feder	Senior Engineer	WEC	X	X
Ronald P. Wessel	Principal Engineer, AP 1000 Licensing	WEC	X	X
Jeffrey Jacobson	Inspection Team Leader	NRC	X	
Tim Steadham	Inspector	NRC	X	
Qin Liwei	Inspector	NNSA/China	X	
He Kai	Inspector	NNSA/China	X	

### 2. INSPECTION PROCEDURES USED

- Inspection Manual Chapter (ICM) 2507, "Construction Inspection Program Vendor Inspections," dated October 3, 2013
- IP 35034, "Design Certification Testing Inspection," dated January 27, 2010
- IP 43002, "Routine Inspections of Nuclear Vendors," dated July 15, 2013
- IP 65001.E, "Inspection of the ITAAC-Related Qualification Program," dated August 19, 2008



### 3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

The U.S. Nuclear Regulatory Commission (NRC) inspectors identified the following inspections, tests, analyses, and acceptance criteria (ITAAC) related to components being tested by Wyle. At the time of the inspection, Wyle was involved in the submergence testing of the 8-inch squib valve actuators, used as injection and recirculation valves in the passive core cooling system for the AP1000 reactor design. This testing is part of the overall equipment qualification program for the squib valves and will be used to demonstrate that the below ITAAC acceptance criteria have been met. The ITAAC's design commitment referenced below are for future use by the NRC staff during the ITAAC closure process; the listing of these ITAAC design commitments does not constitute that they have been met and/or closed. The NRC inspectors did not identify any findings associated with the ITAAC identified below.

<b>Source Document</b>	<b>ITAAC Reference No.</b>	<b>ITAAC</b>	<b>Acceptance Criteria</b>
Appendix C from the Combined License for Vogtle Units 3 and 4 and V.C. Summer Units 2 and 3	No. 214	2.2.03.12a.i	A test report exists and concludes that each squib valve changes position as indicated in Table 2.2.3-1 under design conditions.
Appendix C from the Combined License for Vogtle Units 3 and 4 and V.C. Summer Units 2 and 3	No. 215	2.2.03.12a.ii	A report exists and concludes that the as-built squib valves are bounded by the tests or type tests.

### 4. Documents Reviewed

#### Westinghouse Documents

DCP APP-GW-GEE-1145, IRWST Screen Modifications and Squib Valve Qualification Changes to address GSI-191 Issues, dated 11/11/2009

E&DCR APP-PV70-GEF-013, Submergence Requirements for Squib Valves inside PXS Rooms, dated 7/2/2013

APP-PV70-Z0Y-001, Plant and System Transients Applicable to PV70 Valves, dated 8/1/2011  
APP-SSAR-GSC-774, AP1000 PXS Compartment Environmental Conditions Due to a DVI Line Break, dated 8/23/2012

APP-GW-VPC-012, AP1000 Equipment Qualification Submergence Pressure Envelope Calculation, dated 2/26/2010

APP-PV70-Z0-001, Squib Valves Design Specification, dated 7/24/2013

E&DCR APP-PV70-GEF-022, Submergence Test Condition Revisions, dated 2/13/2014

APP-PV70-VPH-001, AP1000 Squib Valve Equipment Qualification Plan, dated 10/10/2013

Wyle Documents

Wyle Instrumentation Certificate, Data System, Wyle Instrument Number 01829, dated 3/25/2013

Wyle Instrumentation Certificate, pH Indicator, Wyle Instrument Number 114683, dated 12/10/2013

Wyle Instrumentation Certificate, Pressure Gage, Wyle Instrument Number 04975, dated 1/3/2014

Wyle Instrumentation Certificate, Pressure Transmitter, Wyle Instrument Number 01757, dated 10/15/2013

Wyle Instrumentation Certificate, Signal Conditioner, Wyle Instrument Number 01904, dated 9/19/2013

Wyle Instrumentation Certificate, Multimeter, Wyle Instrument Number 04895, dated 3/12/2013

Qualification Plan Number 56354QP09, Qualification Plan for Safety-Related Squib Valve Actuators, Revision E