

August 26, 2014

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

Serial No.: 14-391  
NL&OS/MAE: R1  
Docket Nos.: 50-338/339  
License Nos.: NPF-4/7

**VIRGINIA ELECTRIC AND POWER COMPANY**  
**NORTH ANNA POWER STATION UNITS 1 AND 2**  
**SIX-MONTH STATUS REPORT IN RESPONSE TO MARCH 12, 2012 COMMISSION**  
**ORDER MODIFYING LICENSES WITH REGARD TO RELIABLE SPENT FUEL POOL**  
**INSTRUMENTATION (ORDER NUMBER EA-12-051)**

References:

1. NRC Order Number EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012
2. Virginia Electric and Power Company's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated February 28, 2013 (Serial No. 12-166B)
3. Virginia Electric and Power Company's Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated February 28, 2014 (Serial No. 12-166E)

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued an order (Reference 1) to Virginia Electric and Power Company (Dominion). Reference 1 was immediately effective and directed Dominion to install reliable Spent Fuel Pool (SFP) Level Instrumentation.

Reference 1 required submission of an Overall Integrated Plan (OIP) (Reference 2) pursuant to Section IV, Condition C. Reference 1 also required submission of a status report at six-month intervals following submittal of the OIP.

The attachment to this letter provides the third six-month status report and an update of milestone accomplishments since the submittal of the second six-month status report (Reference 3), including any changes to the compliance method, schedule, or need for relief and the basis.

ADD  
NR

If you have any questions, please contact Ms. Margaret Earle at (804) 273-2768.

Sincerely,



Mark D. Sartain  
Vice President Nuclear Engineering  
Virginia Electric and Power Company

Attachment (1)

Commitments made by this letter: No new Regulatory Commitments

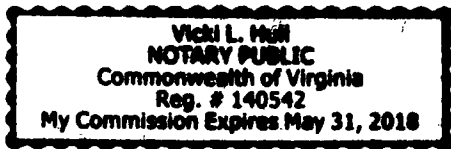
COMMONWEALTH OF VIRGINIA )  
 )  
COUNTY OF HENRICO )

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Mark D. Sartain who is Vice President Nuclear Engineering of Virginia Electric and Power Company. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of the Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 26<sup>TH</sup> day of August, 2014.

My Commission Expires: MAY 31, 2018

(SEAL)



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**Attachment**

**Six Month Status Report for the Implementation of Order EA-12-051,  
Order Modifying Licenses with Regard to Requirements for  
Reliable Spent Fuel Pool Instrumentation**

**August 2014**

**North Anna Power Station Units 1 and 2  
Virginia Electric and Power Company (Dominion)**

## Six Month Status Report for the Implementation of Order EA-12-051

### 1 Introduction

Dominion developed an Overall Integrated Plan (OIP) (Reference 1) documenting the requirements to install reliable Spent Fuel Pool (SFP) Level Instrumentation in response to Order EA-12-051 (the Order) (Reference 2). This attachment provides an update of milestone accomplishments since submittal of the last status report for North Anna Power Station (Reference 3) including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

### 2 Milestone Accomplishments

The following milestones have been completed since the development of the North Anna Power Station OIP for Order EA-12-051 and are current as of July 31, 2014.

- Submit OIP
- Commence Engineering and Design
- Complete Engineering and Design
- Commence Installation of SFP Instruments

### 3 Milestone Schedule Status

The following table provides an update to the milestone schedule supporting the North Anna Power Station Overall Integrated Plan. This table provides the activity status of each item and the expected completion date, noting any change. The target completion dates are subject to change as design and implementation details are developed.

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Submit OIP	February 2013	Complete	
Commence Engineering and Design	March 2013	Complete	
Complete Engineering and Design	May 2014	Complete	
Complete Procurement of SFP Instruments	May 2014	In-Progress	August 2014*

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Commence Installation of SFP Instruments	June 2014	Complete	
Level Measurement System Functional	September 2014	Started	

\* The components of the SFP Level Instrumentation system required for installation have been procured and delivered. However, as of the effective date of this status report (July 31, 2014), the calibration kit has not been delivered to the site, but will be available by the revised target completion date.

#### 4 Changes to Compliance Method

There are no changes to Dominion's compliance method with NEI 12-02 (Reference 4).

#### 5 Need for Relief/Relaxation and Basis for the Relief/Relaxation

Dominion expects to comply with the Order implementation date and no relief/relaxation is required at this time.

#### 6 Open Items from Overall Integrated Plan and Interim Staff Evaluation

No open items were identified in the North Anna Power Station Overall Integrated Plan. However, the Requests for Additional Information (RAIs) identified in the Interim Staff Evaluation (Reference 5) are considered as Open Items. The following table provides a summary of these RAI Open Items from the North Anna Power Station Interim Staff Evaluation and the status of each item.

Interim Staff Evaluation Open Items (RAIs)		
RAI #	Description	Status
1	Please specify which of the two identified values is the correct elevation for Level 1.	The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).

Interim Staff Evaluation Open Items (RAIs)		
RAI #	Description	Status
2	<p>Please provide a clearly labeled sketch or marked-up plant drawing of the plan view of the SFP area, depicting the SFP inside dimensions, the planned locations/placement of the primary and back-up SFP level sensor, and the proposed routing of the cables that will extend from these sensors toward the location of the read-out display device.</p>	<p>The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).</p>
3	<p>Provide the following:</p> <p>a) The design criteria that will be used to estimate the total loading on the mounting device(s), including static weight loads and dynamic loads. Describe the methodology that will be used to estimate the total loading, inclusive of design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces.</p> <p>b) A description of the manner in which the level sensor will be attached to the refueling floor and/or other support structures for each planned point of attachment of the probe assembly. Indicate in a schematic the portions of the level sensor that will serve as points of attachment for mechanical/mounting or electrical connections.</p> <p>c) A description of the manner by which the mechanical connections will attach the level instrument to permanent SFP structures so as to support the level sensor assembly.</p>	<p>The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).</p>
4	<p>For RAI 3(a) above, please provide the analyses used to verify the design criteria and methodology for seismic testing of the SFP instrumentation and the electronics units, including, design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces.</p>	<p>The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).</p>

Interim Staff Evaluation Open Items (RAIs)		
RAI #	Description	Status
5	For each of the mounting attachments required to attach SFP Level equipment to plant structures, please describe the design inputs, and the methodology that was used to qualify the structural integrity of the affected structures/equipment.	The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).
6	Please provide analysis of the maximum expected radiological conditions (dose rate and total integrated dose) to which the equipment (including transmitters, control boxes, and display panels) will be exposed. Also, please provide documentation indicating how it was determined that the electronics for the SFP level instrumentation is capable of withstanding a total integrated dose of $1 \times 10^4$ Rads. Please discuss the time period over which the analyzed total integrated dose was applied.	The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).
7	Please provide information indicating (a) what are the temperature ratings and whether the temperature ratings for the system electronics (including transmitters, control boxes, and display panels) are continuous duty ratings; and, (b) what will be the maximum expected ambient temperature in the rooms in which the system electronics will be located under BDB conditions in which there are no AC power available to run Heating Ventilation and Air Conditioning (HVAC) systems?	The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).
8	Please provide information indicating the maximum expected relative humidity in the rooms in which the system electronics will be located under BDB conditions, in which there are no AC power available to run HVAC systems, and whether the sensor electronics are capable of continuously performing its required functions under this expected humidity condition.	The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).



Interim Staff Evaluation Open Items (RAIs)		
RAI #	Description	Status
9	Please provide information describing the evaluation of the comparative sensor design, the shock test method, test results, and forces applied to the sensor applicable to its successful tests demonstrating that the referenced previous testing provides an appropriate means to demonstrate reliability of the sensor under the effects of severe shock.	The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).
10	Please provide information describing the evaluation of the comparative sensor design, the vibration test method, test results, and the forces and their frequency ranges and directions applied to the sensor applicable to its successful tests, demonstrating that the referenced previous testing provides an appropriate means to demonstrate reliability of the sensor under the effects of high vibration.	The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).
11	Please provide information describing the evaluation of the comparative system electronics (including transmitters, control boxes, and display panels) ratings against postulated plant conditions. Also provide results of the manufacturer's shock and vibration test methods, test results, and the forces and their frequency ranges and directions applied to the system electronics and display panel associated with its successful tests.	The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).

Interim Staff Evaluation Open Items (RAIs)		
RAI #	Description	Status
12	<p>Please provide the following:</p> <p>a) A description of the testing and/or analyses that will be conducted to provide assurance that the equipment will perform reliably under the worst-case credible design basis loading at the location where the equipment will be mounted. Include a discussion of this seismic reliability demonstration as it applies to (a) the level sensor mounted in the SFP area, and (b) any control boxes, electronics, or read-out and retransmitting devices that will be employed to convey the level information from the level sensor to the plant operators or emergency responders.</p> <p>b) A description of the specific method or combination of methods that will be used to confirm the reliability of the permanently installed equipment during and following seismic conditions to maintain its required accuracy.</p>	<p>The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).</p>
13	<p>For RAI #12 above, please provide the results for the selected methods, tests and analyses used to demonstrate the qualification and reliability of the installed equipment in accordance with the Order requirements.</p>	<p>The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).</p>
14	<p>Please provide the following:</p> <p>a) A description of the electrical AC power sources and capabilities for the primary and backup channels.</p> <p>b) Please provide the NRC staff with the final configuration of the power supply source for each channel so that the staff may conclude that the two channels are independent from a power supply assignment perspective.</p>	<p>The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).</p>

Interim Staff Evaluation Open Items (RAIs)		
RAI #	Description	Status
15	Please provide the results of the calculation depicting the battery backup duty cycle requirements demonstrating that its capacity is sufficient to maintain the level indication function until offsite resource availability is reasonably assured.	The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).
16	Provide the following:  a) A description of the methodology that will be used for determining the maximum allowed deviation from the instrument channel design accuracy that will be employed under normal operating conditions as an acceptance criterion for a calibration procedure to flag to operators and to technicians that the channel requires adjustment to within the normal condition design accuracy.  b) Please provide analysis verifying that the proposed instrument performance is consistent with these estimated accuracy normal and BDB values. Please demonstrate that the channels will retain these accuracy performance values following a loss of power and subsequent restoration of power.	The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).
17	Please provide a list of the procedures addressing operation (both normal and abnormal response), calibration, test, maintenance, and inspection procedures that will be developed for use of the SFP instrumentation. The licensee is requested to include a brief description of the specific technical objectives to be achieved within each procedure.	The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).

Interim Staff Evaluation Open Items (RAIs)		
RAI #	Description	Status
18	<p>Please provide the following:</p> <p>a) Further information describing the maintenance and testing program the licensee will establish and implement to ensure that regular testing and calibration is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. Please include a description of the plans for ensuring that necessary channel checks, functional tests, periodic calibration, and maintenance will be conducted for the level measurement system and its supporting equipment.</p> <p>b) Information describing compensatory actions when both channels are out-of-order, and the implementation procedures.</p> <p>c) Additional information describing expedited and compensatory actions in the maintenance procedure to address when one of the instrument channels cannot be restored to functional status within 90 days</p>	<p>The response to this RAI was provided in Attachment 2 to the February 28, 2014 Six-Month Status Report letter (Reference 3).</p>

## 7 Potential Interim Staff Evaluation (ISE) Impacts

In the second Six Month Status Report letter (Reference 3), Dominion reported a change in the SFP Level Instrumentation vendor and reported conclusions of a comparison between the Westinghouse SFP Level Instrumentation design and the details that were previously provided to the staff and included in the ISE (Reference 5).

## 8 References

The following references support the update to the North Anna Power Station SFP Level Instrumentation Overall Integrated Plan described in this attachment:

1. "Virginia Electric and Power Company's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)," Serial No. 12-166B, dated February 28, 2013.

2. NRC Order Number EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012.
3. Virginia Electric and Power Company's Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated February 28, 2014 (Serial No. 12-166E).
4. NEI 12-02 (Revision 1), Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated August 2012.
5. "North Anna Power Station, Units 1 and 2: Interim Staff Evaluation and Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation," dated November 1, 2013.