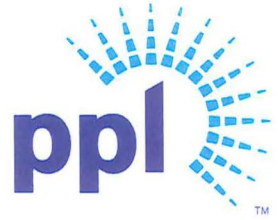


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FEB 27 2014

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

**SUSQUEHANNA STEAM ELECTRIC STATION
SECOND SIX-MONTH STATUS REPORT IN
RESPONSE TO MARCH 12, 2012 COMMISSION
ORDER MODIFYING LICENSES WITH REGARD
TO RELIABLE SPENT FUEL POOL
INSTRUMENTATION (NRC ORDER EA-12-051)
PLA-7138**

**Docket No. 50-387
and No. 50-388**

References:

1. NRC Order Number EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012
2. NRC Interim Staff Guidance JLD-ISG-2012-03, "Compliance with Order EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," Revision 0, dated August 29, 2012
3. NEI 12-02, Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," Revision 1, dated August 2012
4. PPL Letter (PLA-6925), "Initial Status Report 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 October 29, 2012
5. PPL Letter (PLA-6980), "Overall Integrated Plan in Response to March 12, 2012 Commission Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)," dated February 28, 2013
6. PPL Letter (PLA-7073), "First 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 August 26, 2013
7. PPL Letter (PLA-7026), "Response To Request For Additional Information On Overall Integrated Plan In Response To Order EA-12-051, 'Reliable Spent Fuel Pool Instrumentation,'" dated July 3, 2013
8. NRC Letter titled, "Susquehanna Steam Electric 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 (TAC NOS. MF0890 and MF0891)," dated November 6, 2013

The purpose of this letter is to provide PPL Susquehanna, LLC's (PPL) second six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. Enclosure 1 provides an update of milestone accomplishments since the last status report, including any

changes to the compliance method, schedule, or need for relief and the basis, if any. This letter also provides PPL's response in Enclosure 2 to the NRC's latest Request for Additional Information identified in Reference 8. Enclosure 2 of this letter contains sketches containing security-related information to be withheld from public notice in accordance with 10 CFR 2.390

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to PPL Susquehanna, LLC (PPL). Reference 1 was immediately effective and directed PPL to install reliable spent fuel pool level instrumentation. Specific requirements are outlined in Attachment 2 of Reference 1.

Reference 1 required submission of an initial status report 60 days following issuance of the final interim staff guidance (Reference 2) and an overall integrated plan pursuant to Section IV, Condition C. Reference 2 endorses industry guidance document NEI 12-02, Revision 1 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided PPL's initial status report regarding Spent Fuel Pool Level Instrumentation. Reference 5 provided PPL's overall integrated plan for Spent Fuel Pool Level Instrumentation.

Reference 1 requires submission of status reports at six-month intervals following submittal of the overall integrated plan. Reference 3 provides direction regarding the content of the status reports. Reference 6 provided PPL's first six-month update.

Reference 7 addressed the NRC's initial Request for Additional Information for the overall integrated plan submitted under Reference 5.

This letter contains no new or revised regulatory commitments.

If you have any questions regarding this report, please contact Mr. John L. Tripoli at 570-542-3100.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on: 2/27/14

Sincerely,


T. S. Rausch

Enclosures:

- 1) PPL Susquehanna, LLC's Second Six Month Status Report for the Implementation of NRC Order EA-12-051, Order Modifying Licenses with Regard to Requirements for to Reliable Spent Fuel Pool Instrumentation.
- 2) PPL Susquehanna, LLC's Response to Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, dated November 6, 2013.
Note: Attached sketches contain Security-Related Information – Withhold from Public Notice in Accordance with 10 CFR 2.390

Copy: NRC Region I

Mr. J. E. Greives, NRC Sr. Resident Inspector
Mr. J. A. Whited, NRC Project Manager
Mr. L. J. Winker, PA DEP/BRP

Enclosure 1 to PLA-7138

**PPL Susquehanna, LLC's Second Six Month
Status Report for the Implementation of NRC
Order EA-12-051, Order Modifying Licenses
with Regard to Requirements for to Reliable
Spent Fuel Pool Instrumentation**

**PPL Susquehanna, LLC's Second Six Month Status Report
for the Implementation of NRC Order EA-12-051,
Order Modifying Licenses with Regard to Requirements
for to Reliable Spent Fuel Pool Instrumentation**

1. Introduction

PPL Susquehanna, LLC (PPL) developed an Overall Integrated Plan (Reference 1), documenting the requirements to install reliable Spent Fuel Pool Level Instrumentation (SFP LI), in response to Reference 2. This attachment provides an update of milestone accomplishments since submittal of the Overall Integrated Plan, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

[NOTE: References cited in this enclosure are contained in Section 8]

2. Milestone Accomplishments

No milestone(s) have been completed since the first six-month update submitted under Reference 6, and are current as of January 31, 2014.

3. Milestone Schedule Status

The following provides a milestone schedule that supports the Overall Integrated Plan. This section provides the activity status of each item, and the expected completion date noting any change. The dates are planning dates subject to change as design and implementation details are developed.

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Submit 60-Day Status Report	Oct 2012	Complete	
Submit Overall Integrated Plan	Feb 2013	Complete	
Submit 6 Month Updates:			
Update 1	Aug 2013	Complete	
Update 2	Feb 2014	Complete	
Update 3	Aug 2014	Not Started	
Update 4	Feb 2015	Not Started	
Update 5	Aug 2015	Not Started	

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Modifications:			
Modification Scoping Evaluation	July 2013	Complete	
Issue Unit 1 and Unit 2 Engineering Changes	March 2014	Started	
Implementation Outage	June 2015	Not Started	
Procedures:			
Create Procedures	March 2015	Not Started	
Training:			
Develop Training Plan	Dec 2014	Started	
Training Complete	March 2015	Not Started	
Full Site SFP LI Implementation	June 2015	Not Started	
Submit Completion Report	August 2015	Not Started	

4. Changes to Compliance Method

There are no changes to the compliance method as documented in the Overall Integrated Plan (Reference 1).

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

PPL 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 Draft Safety Evaluation

See Enclosure 2 for the current status of Susquehanna responses to NRC's Request for Additional Information (RAIs) in Reference 7.

7. Potential Draft Safety Evaluation Impacts

None - PPL Susquehanna has not received a draft Safety Evaluation at this time but has received Interim Staff Evaluation (Reference 7).

8. References

The following references support the updates to the Overall Integrated Plan described in this enclosure.

1. PPL Letter (PLA-6980), "Overall Integrated Plan in Response to March 12, 2012 Commission Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)," 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. NRC Interim Staff Guidance JLD-ISG-2012-03, "Compliance with Order EA-12-051, Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation, Rev 0," dated August 29, 2012
4. NEI 12-02, "Industry Guidance for Compliance with Order EA-12-051 to Modify Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation," Revision 1, August 2012
5. PPL Letter (PLA-7026), "Response to Request for Additional Information on Overall Integrated Plan in Response to Order EA-12-051, 'Reliable Spent Fuel Pool Instrumentation,'" dated July 3, 2013
6. PPL Letter (PLA-7073), "First 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 August 26, 2013
7. NRC Letter titled, "Susquehanna Steam Electric 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 (TAC NOS. MF0890 and MF0891)," dated November 6, 2013

Enclosure 2 to PLA-7138

**PPL Susquehanna, LLC's Response to Request
for Additional Information Regarding the
Overall Integrated Plan for Implementation of
Order EA-12-051, Reliable Spent Fuel Pool
Instrumentation, dated November 6, 2013.**

**Note: Attached sketches contain Security-Related
Information – Withhold from Public Notice in
Accordance with 10 CFR 2.390**

PPL Susquehanna LLC's Response to Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, dated November 6, 2013

Item #	NRC RAI and enhanced identifiers	PPL Response
1	<p><u>RAI-1</u> – Please explain how water at the selected elevation of 816 ft. 9 in., for Level 1, supports adequate operation of the normal fuel pool cooling system.</p>	<p>1 – Level 1 has been changed from Elevation 816 ft. 9 in. to Elevation 817 ft. 1 in. Elevation 817 ft. 1 in. is the elevation at the top of the Spent Fuel Pool (SFP) weir plates (See attached Sketch-SFPI-1). As long as water level is above the weir plate, water flows over the weir plates through the weirs into the skimmer surge tank. The spent fuel pool cooling pumps take suction from the skimmer surge tank. The discharge piping from the fuel pool cooling pumps enters the fuel pool above the water level, and is dispersed along the fuel pool floor through diffusers. The diffuser piping is equipped with anti-siphoning devices to prevent siphoning of the fuel pool through this piping. There are no connections to the fuel pool that would allow draining the pool.</p>
2	<p><u>RAI-2</u> – Please identify the final SFP level instrumentation measurement range.</p>	<p>2 – The final SFP level instrumentation (SFP LI) measurement range is from Elevation 818 ft. 0 in. to Elevation 794 ft. 4 in. (See attached Sketch-SFPI-1), pending vendor confirmation.</p>
3	<p><u>RAI-3.a</u> – Please provide a description of the operational circumstances under which the gates are expected to be installed, and describe how continuous backup monitoring (e.g., direct visual observation) is available when the gates are installed.</p> <p><i>Note - This information was previously requested as RAI-3.a in the NRC letter dated June 17, 2013.</i></p>	<p>3.a – A description of the operational circumstances under which the gates are installed is provided in the Susquehanna SES (SSES) Final Safety Analysis Report (FSAR) Section 9.1.3.3 and Technical Requirements Manual (TRO 3.7.10). The FSAR states, “The spent fuel pools are normally maintained in a cross-tied configuration during dual unit operation and refueling outages.” The FSAR also states, “Certain specific plant evolutions will require the pools to be isolated. These evolutions will be procedurally controlled to ensure that sufficient cooling systems are available given the plant configuration at the time of the evolution.” The procedural controls reside in maintenance and operating procedures and the TRO 3.7.10.</p>

PPL Susquehanna LLC's Response to Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, dated November 6, 2013

Item #	NRC RAI and enhanced identifiers	PPL Response
		<p>These gates have not been installed since 2006 when PPL implemented a new dry fuel storage process that precludes the need to install the gates.</p> <p>No operational circumstances have occurred since 2006 and none are anticipated that will warrant installation of the gates.</p> <p>Thus, maintaining the gates to both pools open is the normal plant configuration.</p>
4	<p><u>RAI-3.b</u> – Demonstrate that both the primary and backup instruments can simultaneously measure the same lower level when the gates are open by indicating the bottom elevation of the gate openings.</p> <p><i>Note - This information was previously requested as RAI-3.b in the NRC letter dated June 17, 2013.</i></p>	3.b – See attached Sketch-SFPI-1 that identifies the bottom of the probe and the bottom of the cask storage pool gate.
5	<p><u>RAI-3.c</u> – Update Sketches 2 and 3 as needed.</p> <p><i>Note - This information was previously requested as RAI-3.c in the NRC letter dated June 17, 2013.</i></p>	3.c – See attached Sketches-SFPI-2 and SFPI-3 that identify the routing and separation of the instrument channels.
6	<p><u>RAI-4</u> – Please describe the impact of the installation of the gate on the reliability of the SFP level instrumentation for each SFP, and what compensatory measures would be taken to ensure reliable level indication in each SFP when the gate is installed</p>	4 – The existing fuel pool level monitoring instrumentation, associated alarms and indications that is installed in each pool is not being removed. During normal operation, this instrumentation will provide an additional indication that the fuel pool levels are in the normal range whether the gates are removed or installed. As identified in the SSES FSAR Section 9.1.3.3, this instrumentation is designed to operate following an Operating Basis Earthquake and under boiling spent fuel pool conditions. While not classified as Class 1E equipment, the instruments receive power from

PPL Susquehanna LLC's Response to Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, dated November 6, 2013

Item #	NRC RAI and enhanced identifiers	PPL Response
		<p>independent Class 1E power supplies that are Diesel Generator backed.</p> <p>Given the robust design of the new fuel pool level instrumentation being installed, the robust design of the existing fuel pool instrumentation, the fact that the pools have been cross-tied since 2006 and are anticipated to remain cross-tied, no additional means to provide fuel pool level indication are warranted.</p>
7	<p><u>RAI-5</u> – Please provide clearly labeled sketch or marked-up plant drawing of the plan view of the SFP area, depicting the proposed routing of the cables that will extend from the sensors toward the location of the read-out/display device.</p> <p><i>Note - This information was previously requested as RAI-4 in the NRC letter dated June 17, 2013.</i></p>	<p>5 – See attached Sketches-SFPI-2 and SFPI-3 that identify the routing and separation of the instrument channels.</p>
8	<p><u>RAI-6</u> – Please provide additional information describing how the final arrangement of the SFP instrumentation and routing of the cabling between the level instruments, the electronics and the displays, meets the Order requirement to arrange the SFP level instrument channels in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the SFP.</p>	<p>6 – The design meets the Order requirements to arrange the SFP LI channels in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the SFP as follows:</p> <ul style="list-style-type: none"> • Locating the probes in opposite ends of the Spent Fuel Pool. In addition, each probe is located in a corner of the Spent Fuel Pool. • Routing the cables through different Units. Cable routing for Unit 1's SFP LI will be routed through the Unit 1 Reactor Building while Unit 2's SFP LI will be routed through the Unit 2 Reactor Building. In the Common Control Structure,

PPL Susquehanna LLC's Response to Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, dated November 6, 2013

Item #	NRC RAI and enhanced identifiers	PPL Response
		<p>Unit 1's SFP LI will be located in the Unit 1 Control Room while Unit 2's SFP LI will be located in the Unit 2 Control Room.</p> <ul style="list-style-type: none"> • Using diverse power supplies. Unit 1's SFP LI will be powered by a Division I power supply while Unit 2's SFP LI will be powered by a Division II power supply. • Utilizing instrumentation that is continuously self-checking. A random failure in the electronics of the SFP LI of either Unit will be promptly reported by the instrumentation. The probability of a simultaneous failure of both SFP LI is very small. • The signal from each probe is not cross-connected at any point. • See attached Sketches -SFPI-2 and SFPI-3 for more information.
9	<p><u>RAI-7.a</u> – Please provide 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>7.a – The loading on the probe mount and probe body includes both seismic and hydrodynamic loading using seismic response spectra that bounds the site design basis maximum seismic loads applicable to the installation locations. The static weight load is accounted for in the modeling but is insignificant in comparison to seismic and hydrodynamic loads.</p> <p>Analytic modeling was performed in accordance with Institute of Electrical and Electronic Engineers (IEEE)-344 2004 methodology.</p>

PPL Susquehanna LLC's Response to Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, dated November 6, 2013

Item #	NRC RAI and enhanced identifiers	PPL Response
	<p><i>Note - This information was previously requested as RAI-5.a in the NRC letter dated June 17, 2013.</i></p>	<p>A detailed computational SFP hydrodynamic model was developed. The computational model accounts for multi-dimensional fluid motion, pool sloshing, and loss of water from the pool.</p> <p>Seismic loading response of the probe and mount was separately modeled using finite element modeling software. Fluid motion hydrodynamic load terms are added to the calculated seismic loading terms in the finite element model to provide a conservative estimate of the combined seismic and hydrodynamic loading terms for the probe and probe mount.</p>
10	<p><u>RAI-7.b</u> – Provide a description of the manner in which the level sensor (and stilling well, if appropriate) 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><i>Note - This information was previously requested as RAI-5.b in the NRC letter dated June 17, 2013.</i></p>	<p>7.b – The probe flange will be bolted to a rigid steel mounting bracket that will be welded to the SFP wall liner plate. The liner plate at this location is backed by a W6X20 steel embedment. The electrical connection will be located at the end of the level element's lead. See attached Sketches –SFPI-1 and SFPI-4.</p>

PPL Susquehanna LLC's Response to Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, dated November 6, 2013

Item #	NRC RAI and enhanced identifiers	PPL Response
11	<p>RAI-7.c – Provide 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><i>Note - This information was previously requested as RAI-5.c in the NRC letter dated June 17, 2013.</i></p>	7.c – See response to RAI-7.b (Item 10).
12	<p>RAI-8 – For RAI #7(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>	8 – The requested information does not currently exist and is being developed as part of our design process. The information will be provided as part of an upcoming required 6-month update to the Overall Integrated Plan, or as a separate transmittal, but is expected to be supplied no later than August 28, 2014.
13	<p>RAI-9 – 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.</p>	9 – The requested information does not currently exist and is being developed as part of our design process. The information will be provided as part of an upcoming required 6-month update to the Overall Integrated Plan, or as a separate transmittal, but is expected to be supplied no later than August 28, 2014.
14	<p>RAI-10.a – Please provide a description of the specific method or combination of methods you intend to apply to demonstrate the reliability of the permanently installed equipment under Beyond-Design-Basis (BDB) ambient temperature, humidity, shock, vibration, and radiation conditions.</p>	<p>10.a – Two NEMA 4X boxes (one for Unit 1 and one for Unit 2) for level display and electronics will be mounted in the Main Control Room.</p> <p>Temperature: Information provided by the vendor states that this box is suitable for an environment of approximately 15° F to approximately 130° F. Physical testing in an environmental chamber demonstrates normal operation at this operating</p>

PPL Susquehanna LLC's Response to Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, dated November 6, 2013

Item #	NRC RAI and enhanced identifiers	PPL Response
	<p><i>Note - This information was previously requested as RAI-6.a in the NRC letter dated June 17, 2013.</i></p>	<p>temperature.</p> <p>Humidity: The boxes, as described above are designed as NEMA 4X boxes and are defined as Type 4 Enclosures. The boxes are constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); and that will be undamaged by the external formation of ice on the enclosure. The Main Control Room is an indoor location and the NEMA 4X enclosure provides more than adequate protection against the effects on normal humidity. The Main Control Room is located in the Control Structure and not the Reactor Building where the Spent Fuel Pool is located. The Main Control Room is environmentally controlled normally and not subject to temperature or humidity excursions. If the Spent Fuel Pool were to boil, the Main Control Room is not in close proximity to the Spent Fuel Pool therefore, a humidity excursion will not occur.</p> <p>The probe assemblies are located in the Spent Fuel Pool. These probes are constructed of materials with properties and have a usage history, which have been used in steam generator applications at significantly higher temperatures and pressures, as well as a saturated steam environment, than those of a boiling spent fuel pool. A boiling spent fuel pool is under normal atmospheric</p>

PPL Susquehanna LLC's Response to Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, dated November 6, 2013

Item #	NRC RAI and enhanced identifiers	PPL Response
		<p>conditions and thus the temperature could be no more than 212° F and 100% humidity.</p> <p>Shock:</p> <ul style="list-style-type: none"> • Signal processor: Physical testing to commercial and/or military standards using shake-table and shock/vibration testing. • Probe assembly: Finite element analysis in conjunction with seismic modeling described above. <p>Vibration:</p> <ul style="list-style-type: none"> • Signal processor: Physical testing to applicable commercial and/or military standards using shake-table and drop testing. • Probe assembly: The probe assembly and bracket together form a simple static uni-body structure with intrinsic vibration resistance that is additionally subject to substantial damping due to the surrounding water medium. This was modeled using finite element modeling in conjunction with seismic modeling described above. <p>Radiation:</p> <ul style="list-style-type: none"> • Signal processor: The EFP signal processor is installed in a mild environment with radiation levels similar to background radiation, with the acknowledgement that the radiation limit for the EFP is similar to other commercial-grade complementary-metal-oxide-semiconductor (CMOS)-based electronics. Radiation testing is not planned. It should be noted that the instrument performs self-diagnostics before

PPL Susquehanna LLC's Response to Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, dated November 6, 2013

Item #	NRC RAI and enhanced identifiers	PPL Response
		<p>measurements are obtained and the electronics are easily accessible for periodic replacement.</p> <ul style="list-style-type: none"> • Probe assembly: The probe will be analyzed for a Total Integrated Radiation Dose. The probe's primary material make-up has minimal degradation from radiation being composed primarily of stainless steel. The insulators in the probe are also subject to long-term radiation exposure. The insulator material is less susceptible to radiation degradation than other materials.
15	<p><u>RAI-10.b</u> – Please provide 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.</p> <p><i>Note - This information was previously requested as RAI-6.b in the NRC letter dated June 17, 201.</i></p>	10.b – See response to RAI-10.a (Item 14).
16	<p><u>RAI-10.c</u> – 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 re-transmitting devices that will be employed to convey the level information from the level sensor to the plant operators or emergency responders.</p> <p><i>Note - This information was previously requested as RAI-6.c in the NRC letter dated June 17, 2013.</i></p>	<p>10.c – <u>Level Sensor mounted in the SFP:</u></p> <p>Seismic and hydrodynamic finite element analysis will be performed in accordance with IEEE-344 2004 methodology (using enveloping conditions) applicable to the mounting locations.</p> <p>This analysis will demonstrate that the probe waveguide's geometric dimensions do not change and cause system</p>

PPL Susquehanna LLC's Response to Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, dated November 6, 2013

Item #	NRC RAI and enhanced identifiers	PPL Response
		<p>inaccuracies.</p> <p><u>Control boxes, electronics, or read-out and re-transmitting devices:</u></p> <p>Triaxial shake-table testing will be performed using IEEE-344 2004 methodology.</p> <p>The accuracy of system electronics will be demonstrated following seismic excitation as part of the seismic testing protocol previously discussed.</p>
17	<p><u>RAI-10.d</u> – Please provide a description of the specific method or combination of methods that will be used to confirm the reliability of the permanently installed equipment such that following a seismic event the instrument will maintain its required accuracy.</p> <p><i>Note - This information was previously requested as RAI-6.d in the NRC letter dated June 17, 2013.</i></p>	10.d – See response to RAI-10.c (Item 16).
18	<p><u>RAI-11</u> – For RAI #10 above, please provide the results from the selected methods, tests and analyses used to demonstrate the qualification and reliability of the installed equipment in accordance with the Order requirements.</p>	11 – The requested information does not currently exist and is being developed as part of our design process. The information will be provided as part of an upcoming required 6-month update to the Overall Integrated Plan, or as a separate transmittal, but is expected to be supplied no later than August 28, 2014.

PPL Susquehanna LLC's Response to Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, dated November 6, 2013

Item #	NRC RAI and enhanced identifiers	PPL Response
19	<p><u>RAI-12.a</u> – Please provide a description of how the two channels of the proposed level measurement system meet this requirement so that the potential for a common cause event to adversely affect both channels is minimized to the extent practical.</p> <p><i>Note - This information was previously requested as RAI-7.a in the NRC letter dated June 17, 2013.</i></p>	12.a – See response to RAI-6 (Item 8).
20	<p><u>RAI-12.b</u> – Further information on how each level measurement system, consisting of level sensor electronics, cabling, and readout devices will be designed and installed to address independence through the application and selection of independent power sources, the use of physical and spatial separation, independence of signals sent to the location(s) of the readout devices, and the independence of the displays.</p> <p><i>Note - This information was previously requested as RAI-7.b in the NRC letter dated June 17, 2013.</i></p>	12.b – See response to RAI-6 (Item 8).
21	<p><u>RAI-13.a</u> – Please provide a description of the electrical ac power sources and capabilities for the primary and backup channels.</p>	13.a – The two Spent Fuel Pool Level instruments use two separate Safety Related power supplies to power the two units. One power supply is from Division I and the other from Division II. The sources are breakers located in the two separate Units, respectively. One source being from Unit 1 and one being from Unit 2. These power supplies are backed by the station's Emergency Diesel generators and will be backed by the FLEX Generators.

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Item #	NRC RAI and enhanced identifiers	PPL Response
22	<p>RAI-13.b – 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.</p>	<p>13.b – The requested information does not currently exist and is being developed as part of our design process. The information will be provided as part of an upcoming required 6-month update to the Overall Integrated Plan, or as a separate transmittal, but is expected to be supplied no later than August 28, 2014.</p>
23	<p>RAI-14.a – Please provide an estimate of the expected instrument channel accuracy performance under both (i) normal SFP level conditions (approximately Level 1 or higher), and (ii) at the BDB conditions (i.e., radiation, temperature, humidity, and post-seismic and post-shock conditions) that would be present if the SFP level were at the Level 2 and Level 3 datum points.</p> <p><i>Note - This information was previously requested as RAI-9.a in the NRC letter dated June 17, 2013.</i></p>	<p>14.a – The requested information does not currently exist and is being developed as part of our design process. The information will be provided as part of an upcoming required 6-month update to the Overall Integrated Plan, or as a separate transmittal, but is expected to be supplied no later than August 28, 2014.</p>
24	<p>RAI-14.b – Please provide 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.</p> <p><i>Note - This information was previously requested as RAI-9.b in the NRC letter dated June 17, 2013.</i></p>	<p>14.b – The requested information does not currently exist and is being developed as part of our design process. The information will be provided as part of an upcoming required 6-month update to the Overall Integrated Plan, or as a separate transmittal, but is expected to be supplied no later than August 28, 2014.</p>

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25	<p>RAI-15.a – Please provide a description of the capability and provisions the proposed level sensing equipment will have to enable periodic testing and calibration, including how this capability enables the equipment to be tested in-situ.</p> <p><i>Note - This information was previously requested as RAI-10.a in the NRC letter dated June 17, 2013.</i></p>	<p>15.a – The instrument automatically monitors the integrity of the installed level measurement system using built-in diagnostic capability. Periodic calibration checks of the signal processor electronics will be achieved through the use of standard measurement and test equipment.</p> <p>The probe itself is a perforated tubular coaxial waveguide with defined geometry and need not be calibrated. It will be periodically visually inspected to demonstrate that the probe assembly has not experienced any mechanical deformation.</p> <p>Each instrument electronically logs a record of measurement values over time in a non-volatile memory that can be compared to demonstrate constancy, including any changes in pool level, such as that associated with the normal evaporative loss/refilling cycle. The channel level measurements are able to be directly compared to each other (i.e., regular cross-channel comparisons) and existing SFP level instrumentation.</p>
26	<p>RAI-15.b – Please provide a description of how such testing and calibration will enable the conduct of regular channel checks of each independent channel against the other, and against any other permanently-installed SFP level instrumentation.</p> <p><i>Note - This information was previously requested as RAI-10.b in the NRC letter dated June 17, 2013.</i></p>	<p>15.b – Each instrument electronically logs a record of measurement values over time in non-volatile memory that can be compared to demonstrate constancy, including any changes in pool level, such as that associated with the normal evaporative loss/refilling cycle. The channel level measurements can be directly compared to each other (i.e., regular cross-channel comparisons) and existing SFP level instrumentation.</p>

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27	<p><u>RAI-15.c</u> – Please provide a description of how functional checks will be performed, and the frequency at which they will be conducted. Describe how calibration tests will be performed, and the frequency at which they will be conducted. Provide a discussion as to how these surveillances will be incorporated into the plant surveillance program.</p> <p><i>Note - This information was previously requested as RAI-10.c in the NRC letter dated June 17, 2013.</i></p>	<p>15.c – Functional checks are automated and/or semi-automated (requiring limited operator interaction) and will be performed through the instrument menu software. There are a number of other internal system tests that are performed by system software on an essentially continuous basis without user intervention but can also be performed on an on-demand basis with diagnostic output to the display for the operator to review. Other tests such as menu button tests, level alarm, and alarm relay tests can also be performed. Functional checks are described in detail in the Vendor Operator's Manual.</p> <p>Functional tests will be performed periodically based on the recommendations of the equipment vendor and in accordance with station processes and procedures.</p>
28	<p><u>RAI-15.d</u> – Please provide a description of what preventative maintenance tasks are required to be performed during normal operation, and the planned maximum surveillance interval that is necessary to ensure that the channels are fully conditioned to accurately and reliably perform their functions when needed.</p> <p><i>Note - This information was previously requested as RAI-10.d in the NRC letter dated June 17, 2013.</i></p>	<p>15.d – Preventative maintenance tasks and associated performance intervals will be performed based on the vendor recommendations for applicable system components and station processes and procedures.</p>

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29	<p>RAI-16 – 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.</p>	<p>16 – The requested information does not currently exist and is being developed as part of our design process. The information will be provided as part of an upcoming required 6-month update to the Overall Integrated Plan, or as a separate transmittal, but is expected to be supplied no later than August 28, 2014.</p>
30	<p>RAI-17.a – Please provide 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. Include a description of your 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><i>Note - This information was previously requested as RAI-12.a in the NRC letter dated June 17, 2013.</i></p>	<p>17.a – The maintenance and testing program requirements that will ensure design and system readiness will be established in accordance with procedures and design processes considering vendor recommendations to ensure that appropriate regular testing, channel checks, functional tests, periodic calibration, and maintenance is performed, as appropriate.</p> <p>The necessary channel checks, functional tests and periodic calibration will be implemented, tracked and the results addressed as defined by station processes and procedures.</p>
31	<p>RAI-17.b – Please provide a description of how the guidance in NEI 12-02 section 4.3 regarding compensatory actions for one or both non-functioning channels will be addressed.</p> <p><i>Note - This information was previously requested as RAI-12.b in the NRC letter dated June 17, 2013.</i></p>	<p>17.b – The guidance contained in NEI 12-02 Section 4.3 regarding compensatory actions for one of both non-functioning channels will be addressed in accordance with station processes and procedures.</p>

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32	<p><u>RAI-17.c</u> – Please provide a description of what compensatory actions are planned in the event that one of the instrument channels cannot be restored to functional status within 90 days.</p> <p><i>Note - This information was previously requested as RAI-12.c in the NRC letter dated June 17, 2013.</i></p>	17.c – The requested information does not currently exist and is being developed as part of our design process. The information will be provided as part of an upcoming required 6-month update to the Overall Integrated Plan, or as a separate transmittal, but is expected to be supplied no later than August 28, 2014.

