Exelon Generation®

Order No. EA-12-051

RS-14-195

August 28, 2014

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

Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Subject: Third 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, " Issuance of Order to Modify 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. Exelon Generation Company, LLC's 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 25, 2012
5. Exelon Generation Company, LLC 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), dated February 28, 2013 (RS-13-027)
6. Exelon Generation Company, LLC 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 28, 2013 (RS-13-112)
7. Exelon Generation Company, LLC Second 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 (RS-14-017)
8. NRC letter to Exelon Generation Company, LLC, Braidwood 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 4, 2013

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Exelon Generation Company, LLC (EGC). Reference 1 was immediately effective and directs EGC 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 the EGC initial status report regarding reliable spent fuel pool instrumentation. Reference 5 provided the Braidwood Station, Units 1 and 2 overall integrated plan.

Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 3 provides direction regarding the content of the status reports. References 6 and 7 provided the first and second six-month status reports, respectively, pursuant to Section IV, Condition C.2, of Reference 1 for Braidwood Station. The purpose of this letter is to provide the third 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. The enclosed report 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. The enclosed report also addresses the NRC Interim Staff Evaluation Request for Additional Information Items contained in Reference 8.

This letter contains no new regulatory commitments. If you have any questions regarding this report, please contact David P. Helker at 610-765-5525.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 28th day of August 2014.

Respectfully submitted,

Glen T. Kaegi
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Enclosure:
1. Braidwood Station, Units 1 and 2 Third Six-Month Status Report for the Implementation of Order EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation

cc: Director, Office of Nuclear Reactor Regulation
NRC Regional Administrator - Region III
NRC Senior Resident Inspector - Braidwood Station, Units 1 and 2
NRC Project Manager, NRR - Braidwood Station, Units 1 and 2
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Mr. Stephen R. Monarque, NRR/JLD/JPMB, NRC
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Mr. John Hughey, NRR/JLD/MSD, NRC
Illinois Emergency Management Agency - Division of Nuclear Safety

Enclosure

Braidwood Station, Units 1 and 2

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

(33 pages)

Braidwood Station, Units 1 and 2

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

1 Introduction

Braidwood Station, Units 1 and 2, developed an Overall Integrated Plan (Reference 1 in Section 8), documenting the requirements to install reliable Spent Fuel Pool Level Instrumentation (SFPLI), in response to Reference 2. This enclosure provides an update of milestone accomplishments since submittal of the second six-month status report 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 Second Six-Month status report (Reference 7), and are current as of August 28, 2014.

- Provided responses to all RAIs via ePortal on 7/1/2014
- Completed and Issued SFPI Modification Package

3 Milestone Schedule Status

The following provides an update to the milestone schedule to support 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.

The revised milestone target completion dates do not impact the order implementation date.

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Submit 60 Day Status Report	October 25, 2012	Complete	
Submit Overall Integrated Plan	February 28, 2013	Complete	
Submit Responses to RAIs	July 31, 2013	Complete	
Submit 6 Month Updates:			
Update 1	August 28, 2013	Complete	
Update 2	February 28, 2014	Complete	
Update 3	August 28, 2014	Complete with this submittal	

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Provide Final Safety Evaluation (SE) Info	September 30, 2014	Complete	
Update 4	February 28, 2015	Not Started	
Modifications:			
Conceptual Design	3Q2012	Complete	
Issue Exelon Fleet contract to procure SFPI Equipment	2Q2013	Complete	
Begin Detailed Design Engineering	4Q2013	Complete	
Complete and Issue SFPI Modification Package	2Q2014	Complete	3Q2014
Begin Installation	1Q2015	Not Started	
Complete SFPI Installation and Put Into Service	2Q2015	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

Braidwood Station, Units 1 and 2, 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

The following tables provide a summary of the open items documented in the Overall Integrated Plan (Reference 1) or the Draft Safety Evaluation (SE) and the status of each item.

Overall Integrated Plan Open Items		
OI#	**Description**	**Status**
1 (RAI-1a,	**For Level 1, specify how the identified location represents**	Complete.

Overall Integrated Plan Open Items		
OI#	**Description**	**Status**
Ref.4)	**the higher of the two points described in the NEI 12-02 guidance for this level.**	Level 1 is the level adequate to support operation of the normal fuel pool cooling system. It is the higher of the following two points: 1) The level at which reliable suction loss occurs due to uncovering the coolant inlet pipe or any weirs or vacuum breakers associated with suction loss. For Braidwood, this is the level at which suction loss occurs due to uncovering the inlet pipe strainer. This level, (1), is elevation 417'–9 3/4", not considering any required margin as a result of vortex formation. 2) The level at which the water height, assuming saturated conditions (boiling); above the centerline of the cooling pump shaft provides the required net positive suction head. This level is 422'-0" at 2,000 gpm per pump and corresponds to the high point elevation of the inside of the suction piping. Water level below this elevation will result in vapor void formation inside the piping for pool temperatures of 212 °F. The typical margin required to prevent vortex formation at Point 1 is estimated to be less than the difference between Point 1 and Point 2. Thus, the higher of the above points is (2). Therefore, LEVEL 1 is 422'-0" and is applicable to both units.
2 (Ref.1)	Open Item: **Continuous level indication will be provided by a guided wave radar system, submersible**	Complete. (Addressed in Reference 6)

Overall Integrated Plan Open Items		
OI#	**Description**	**Status**
	pressure transducer, or other appropriate level sensing technology that will be determined during the detailed engineering phase of the project.	
3 (RAI-1b, Ref. 4)	RAI Question: **A clearly labeled sketch depicting the elevation view of the proposed typical mounting arrangement for the portions of the instrument channel consisting of permanent measurement channel equipment (e.g., fixed level sensors and/or stilling wells, and mounting brackets). Indicate on this sketch the datum values representing Level 1, Level 2, and Level 3 as well as the top of the fuel. Indicate on this sketch the portion of the level sensor measurement range that is sensitive to measurement of the fuel pool level, with respect to the Level 1, Level 2, and Level 3 datum points.**	Complete. (Addressed in Reference 4)
4 (RAI-2, Ref.4)	RAI Question: **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 backup SFP level sensor, and the proposed routing of the cables that will extend from the sensors toward the location of the read-out/display device.**	Complete. The marked-up sketch is provided in Attachment 1, attached with this submittal.
5	RAI Question:	Complete.

Overall Integrated Plan Open Items		
OI#	**Description**	**Status**
(RAI-3, Ref.4)	**Provide the following:** **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.** **b) 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.** **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.**	a) All Spent Fuel Pool Instrumentation System (SFPIS) equipment will be designed in accordance with the Braidwood Station Safe Shutdown Earthquake (SSE) design requirements. The vendor, Westinghouse, has evaluated the structural integrity of the mounting brackets in calculation CN-PEUS-13-24. The GTSTRUDL model, used by Westinghouse to calculate the stresses in the bracket assembly, considers load combinations for the dead load, live load and seismic load on the bracket. The reactionary forces calculated from these loads become the design inputs to design the mounting bracket anchorage to the refuel floor to withstand a Safe Shutdown Earthquake (SSE). <u>Seismic</u> The seismic loads are obtained from Braidwood Station's response spectra curves (Reference Updated FSAR Chapter 3 Figures for Braidwood Nuclear Generating Station). The following methodology was used in determining the stresses on the bracket assembly: • Frequency analysis, taking into account the dead weight and the hydrodynamic mass of the structure, is performed to obtain the natural frequencies of the structure in all three directions. • SSE (Safe Shutdown Earthquake) response spectra analysis is performed to obtain member stresses and support reactions. • Modal responses are combined using the Ten Percent Method per U.S. NRC Regulatory Guide 1.92,

Overall Integrated Plan Open Items		
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		Revision 1, "Combining Modal Responses and Spatial Components in Seismic Response Analysis". This method is endorsed per Appendix A of the Updated FSAR Revision 14 for Braidwood Nuclear Generating Station. • The seismic loads for each of the three directions are combined by the Square Root of the Sum of Squares (SRSS) Method. • Sloshing analysis is performed to obtain liquid pressure and its impact on bracket design. • The seismic results are combined with the dead load results and the hydrodynamic pressure results in absolute sum. These combined results are compared with the allowable stress values. <u>Sloshing</u> Sloshing forces were obtained by analysis. The TID-7024, Nuclear Reactors and Earthquakes, 1963, by the US Atomic Energy Commission, approach has been used to estimate the wave height and natural frequency. Horizontal and vertical impact force on the bracket components was calculated using the wave height and natural frequency obtained using TID-7024 approach. Using this methodology, sloshing forces have been calculated and added to the total reactionary forces that would be applicable for bracket anchorage design. The analysis also determined that the level probe can withstand a credible design basis seismic event. During the design basis event, the SFP water level is expected to rise and parts of the level

Overall Integrated Plan Open Items		
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		sensor probe are assumed to become submerged in borated water. The load impact due to the rising water and submergence of the bracket components has also been considered for the overall sloshing impact. Reliable operation of the level measurement sensor with a submerged interconnecting cable has been demonstrated by analysis of previous Westinghouse testing of the cable, and the vendor's cable qualification. Boron build up on the probe has been analyzed to determine the potential effects on the sensor in WNA-TR-03149-GEN. The following Westinghouse documents provide information with respect to the design criteria used, and a description of the methodology used to estimate the total loading on the device. a. CN-PEUS-13-24 – Pool-side Bracket Seismic Analysis b. LTR-SEE-II-13-47, WNA-TR-03149-GEN – Sloshing Analysis c. EQ-QR-269, WNA-TR-03149-GEN, EQ-TP-353 – Seismic Qualification of other components of SFPI Braidwood Station specific calculations 12.3.4-BRW-10-0021-S- Seismic Qualification of Instrument Mounting Details Associated with Plant Process Computer Replacement, and BRW-14-0109-M- Seismic Qualification of Weschler Indicator VX-252, are being developed to address the seismic qualification of the readout display (Weschler Instruments) in the main control room (MCR). The design

Overall Integrated Plan Open Items		
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		criteria used in this calculation meets the requirements to withstand a SSE and will meet the Braidwood Station safety related installation requirements. The methods used in the calculation follow IEEE Standard 344-2004 and IEEE Standard 323-2003 for seismic qualification of the instrument. b) The level sensor, which is one long probe, will be suspended from the launch plate via coupler/connector assembly. The launch plate is a subcomponent of the bracket assembly, which is mounted to the refuel floor via anchors. Attachment 2 shows a schematic of the level sensor with mechanical attachment points. c) The bracket assembly that supports the sensor probe and launch plate will be mechanically connected to the SFP structure. The mechanical connection consists of four concrete expansion anchors that will bolt the bracket assembly to the SFP structure via the base plate. The concrete expansion anchors will be designed to withstand SSE and will meet the Braidwood Station safety related installation requirements. The qualification details of the bracket are provided in Westinghouse's Pool-side bracket Seismic Analysis CN-PEUS-13-24 and the qualification of the anchorage to the floor is provided in Braidwood Station specific calculation BRW-14-0009-S and 12.3.4-BRW-14-0116-S, Evaluation of SFPI Sensor Mounting Detail Anchorage and Mounting for 0PL04J and 0PL06J.
6 (RAI-4,	RAI Question: **Provide the following:**	Complete. a) Beyond Design Basis Environment –

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Ref.4)	**a) A description of the specific method or combination of methods that will be applied to demonstrate the reliability of the permanently installed equipment under beyond-design basis ambient temperature, humidity, shock, vibration, and radiation conditions.** **b) 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 re-transmitting devices that will be employed to convey the level information from the level sensor to the plant operators or emergency responders.** **c) 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.**	Westinghouse qualified the components (probe, connector, cable) of the SFPIS located in the SFP area to the beyond design basis environment. Components of the system were subjected to beyond design basis conditions of heat and humidity, thermal and radiation aging mechanisms. This testing confirmed functionality of these system components under these beyond design basis environmental conditions. Westinghouse performed testing to ensure aging of the components in the SFP area will not have a significant effect on the ability of the equipment to perform following a plant design basis earthquake. Exelon has reviewed the documents and found acceptable. Reference Westinghouse documents EQ-TP-351, WNA-TR-03149-GEN, and EQ-TP-354 for description of specific qualification methods. Mild Environment – Westinghouse qualified the system components (display panel, sensor) that reside in the mild environment conditions to determine that the components can satisfactorily perform to those conditions. Westinghouse has determined that aging does not have a significant effect on the ability of the equipment to perform following a plant design basis earthquake. Exelon has reviewed the documents and found acceptable. Reference Westinghouse documents EQ-QR-269, WNA-TR-03149-GEN for description of specific methods. MCR Display – Braidwood Station specific calculation (12.3.4-BRW-10-0021-S & BRW-14-0109-M- Seismic Qualification of Weschler Indicator VX-252) includes a Report of Qualification Testing performed by the vendor (Weschler Instruments). The methods used by the vendor to qualify

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		the readout display follow IEEE Standard 344-2004 and IEEE Standard 323-2003 for seismic qualification of the instrument. For temperature and humidity qualification of the displays IEEE 344-2004, IEEE 323-2003, NRC Regulatory Guides 1.100, Revision 2; 1.209, March 2007; and EPRI TR-107330 guidance was followed. The habitability of the MCR will be maintained as part of the FLEX strategies, and therefore, the readout display in the MCR will not be subject to harsh environmental or radiological conditions. Shock and Vibration – SFPIS pool side brackets were analyzed for Safe Shutdown Earthquake design requirements per NRC order EA-12-051 and NEI 12-02 guidance. As provided by the NRC Order EA-12-051, the NEI 12-02 guidance and as clarified by the NRC interim staff guidance, the probe, coaxial cable, and the mounting brackets are "inherently resistant to shock and vibration loadings." As a result, no additional shock and vibration testing is required for these components. SFPIS pool side brackets for both the primary and backup Westinghouse SFP measurement channels will be permanently installed and fixed to rigid refuel floors, which are Seismic Category 1 structures. The SFPI system components, such as level sensor and its bracket, display enclosure and its bracket, were subjected to seismic testing, including shock and vibration test requirements. The results for shock and vibration tests were consistent with the anticipated shock and vibration expected to be seen by mounted equipment. The level sensor electronics are enclosed in a

Overall Integrated Plan Open Items		
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		NEMA-4X housing. The display electronics panel utilizes a NEMA-4X rated stainless steel housing as well. These housings will be mounted to a seismically qualified wall and will contain the active electronics, and aid in protecting the internal components from vibration induced damage. Reference Westinghouse reports WNA-DS-02957 and WNA-TR-03149-GEN for shock and vibration. b) The seismic adequacy of the SFPIS (all components) is demonstrated by vendor testing and analysis in accordance with below listed standards: • IEEE 344-2004, IEEE Recommended Practice for Seismic Qualification of Class 1E Electrical Equipment for Nuclear Power Generating Stations • IEEE-323-2003, Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations • USNRC Regulatory Guide 1.100, Rev. 2 • USNRC Regulatory Guide 1.92, Rev. 1 • Calculation 12.3.4-BRW-10-0021-S, Seismic Qualification of Instrument Mounting Details Associated with Plant Process Computer Replacement • BRW-14-0109-M - Seismic Qualification of Weschler Indicator VX-252 c) Westinghouse has seismically qualified

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		the SFPI instrument and its components. CN-PEUS-13-24 describes Pool-side Bracket Seismic Analysis, EQ-QR-269, WNA-TR-03149-GEN, EQ-TP-353 describe remaining seismic qualifications of the instrument components. With the instrument being seismically qualified and installed as described in RAI 6b response, including the readout display in the main control room, the instrument is assured to maintain reliable and accurate indication when required. Westinghouse report WNA-CN-00301-GEN and Braidwood Engineering Change 394935 provide the channel accuracy from measurement to display.
7 (RAI-5, Ref.4)	RAI Question: **Provide the following:** **a) 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 practicable.** **b) 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.**	Complete. The two channels of the proposed level measurement system will be installed such that: a) The level probes will be mounted on the west wall of the SFP and will be separated by a distance greater than the span of the shortest side of the pool. This meets the NEI 12-02 revision 1 guidance for channel separation. b) The level sensor enclosure and the electronics/ Uninterruptible Power Supply (UPS) enclosure for the primary instrument channel will be installed in the Auxiliary Building in Unit 1 Electrical Penetration Area. The level sensor enclosure and the electronics/ UPS enclosure for the backup instrument channel will be installed in Unit 2 Electrical Penetration Area. Independence, physical and spatial separation of the level sensors and electronics/UPS enclosures for primary and backup instrument channels is maintained

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		by routing the associated instrument channel cables through Unit 1 and Unit 2 respectively. The 120 VAC power to the primary instrument will be provided from a Unit 1 ESF-Division 2 MCC (132X2), and 120 VAC power to the backup level instrument will be provided from a Unit 2 ESF Division 2 MCC (232X2). The 120VAC distribution panels for the primary and backup instruments are powered by different 480V safety buses. Therefore the loss of any one bus will not result in the loss of ac power to both instrument channels. Attachment 1demonstrates the physical separation between the primary and backup power sources. An analog level indicator for each channel will be provided in the Main Control Room (MCR). The primary channel indicator will be located on the Unit 1 side of the MCR at panel 1PM06J. The backup channel indicator will be located on the Unit 2 side of the MCR at panel 2PM06J. These analog level indicators will be credited as the level indications used by operators to satisfy the NRC Order EA-12-051 requirements. Providing the 120VAC power to primary and backup instrument channels from separate MCCs will address the concerns regarding power supply independence. Also, installing the SFP level indicator displays for primary and backup channels in separate units (Unit 1 for primary and Unit 2 for backup channels) addresses the concerns regarding physical and spatial separation. All power and instrument cables associated with the primary channel will be routed on the Unit 1 side of Auxiliary Building and Fuel Handling Building; and all power and

Overall Integrated Plan Open Items		
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		instrument cables associated with the backup channel will be routed on the Unit 2 side of the Auxiliary Building and Fuel Handling Building to meet the physical and spatial separation requirements.
8 (RAI-6, Ref.4)	RAI Question: **Provide the following:** **a) A description of the electrical ac power sources and capabilities for the primary and backup channels.** **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 assured.**	Complete. a) The primary and backup SFPLI instrument channels will be normally powered from 120 VAC Unit 1 and Unit 2 ESF Division 2 MCC respectively. These are on different safety buses, which maintains power source independence. Upon loss of normal AC power, individual batteries installed in each channel's electronics/ UPS enclosure will automatically maintain continuous channel operation for at least three (3) days. The power cables will be routed on the Unit 1 side for the primary channel and on the Unit 2 side for the backup channel so that spatial and physical separation is maintained between the primary and backup channels. These ESF MCCs have also been identified as part of the FLEX strategy to ensure that the SFPLI will have ac power restored if a Beyond Design Basis External Event would occur. Additionally, a receptacle and a selector switch are installed in each channel electronics/ UPS enclosure to directly connect emergency power to the SFPLI. b) The Westinghouse Report, WNA-CN-00300-GEN, provides the results of the calculation depicting the battery backup duty cycle. This calculation demonstrates that battery capacity is 4.22 days to maintain the level indicating function to the display

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		location, located in the Electrical Penetration Area at Braidwood Station. The calculation also determines that the battery will last for 72 hours assuming the remote display in the MCR consumes a maximum of 0.064 Amps. Braidwood Station is crediting the MCR display as the primary display. The remote display vendor (Weschler's) data sheet indicates the readout display is self-contained. It will be calibrated to consume no more than 0.022 Amps, which is bounded by the 0.064 Amps assumed in the Westinghouse calculation above. Therefore, the Braidwood Station readout display of level indication in the MCR will be available for greater than 72 hours of operation. The results of the calculation meet the NEI 12-02 requirements.
9 (RAI-7, Ref.4)	RAI Question: **Provide the following:** **a) An estimate of the expected instrument channel accuracy performance under both (a) normal SFP level conditions (approximately Level1 or higher) and (b) at the beyond design-basis conditions (i.e., radiation, temperature, humidity, post-seismic and post-shock conditions) that would be present if the SFP level were at the Level2 and Level3 datum points.** **b) 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**	Started. a) The Westinghouse documents WNA-CN-00301 and WNA-DS-02957-GEN describe the channel accuracy under both (a) normal SFP level conditions and (b) at the Beyond Design Basis (BDB) conditions that would be present if SFP level were at Level 2 and Level 3 datum points. Each instrument channel will be accurate to within ±3"during normal spent fuel pool level conditions. The instrument channels will retain this accuracy after BDB conditions, in accordance with the above Westinghouse documents. The same channel accuracy requirements are applicable to the readout display in the main control room as the display enclosures are installed locally in the Electrical Penetration Area. Braidwood Station has analyzed the channel accuracy to the main control room

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	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.	indicators in the Engineering Change package 394935, Revision 0 for the normal operating conditions and determined that the displayed level is accurate to within ±5.06". Braidwood is in the process of analyzing the channel accuracy to the main control room indicators for the BDB conditions. Braidwood will complete the analysis by September 30, 2014. At this time Braidwood station believes the accuracy will be within the channel accuracy requirements of the Order (±1 foot) for BDB conditions. b) The Westinghouse document WNA-TP-04709-GEN describes the methodology for routine testing/calibration verification and calibration methodology. This document also specifies the required accuracy criteria under normal operating conditions. Braidwood Station calibration and channel verification procedures will follow the guidance and criteria provided in this document. Instrument channel calibration will be performed if the level indication reflects a value that is outside the acceptance band established in the Braidwood Station calibration and channel verification procedures. Instrument channel loop accuracy and set point deviation/error are determined using the Braidwood Station Engineering Standard NES-EIC-20.04 for safety related instruments. The methodology used to determine the set point deviation in this standard is consistent with ANSI/ISA-67.04.01-2000. Per this methodology, since drift value was not specified by the vendor, a default random drift value of ±1% of span (or ±1% of full scale, for conservatism) for mechanical

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		components were assigned. A setting tolerance of twice the reference accuracy, which is a typical value, was applied to the indicator to yield an overall setting tolerance of ± 2% of full scale. This value will be used for the calibration procedure being developed for this instrument loop. The resultant non-negligible terms (Reference Accuracy, Drift, Readability, Measurement and Test Equipment Effect, and Setting Tolerance) are all random terms, and will be combined using the Square Root Sum of Squares (SRSS) methodology given in Engineering Standard NES-EIC-20.04. Thus, the maximum deviation introduced by the indicator, in percent of full span, is computed. Calibration will be performed once per refueling cycle for Braidwood Station. Per Westinghouse document WNA-TP-04709-GEN calibration on a SFP level channel is to be completed within 60 days of a planned refueling outage considering normal testing scheduling allowances (e.g. 25%). This is in compliance with the NEI 12-02 guidance for Spent Fuel Pool Instrumentation.
10 (RAI-8, Ref.4)	RAI Question: **Provide the following:** **a) 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.** **b) A description of how such testing and calibration will enable the conduct of regular channel checks of each independent channel against the**	Started. a) Westinghouse calibration procedure WNA-TP-04709-GEN and functional test procedure WNA-TP-04613-GEN describe the capabilities and provisions of SFPI periodic testing and calibration, including in-situ testing. Westinghouse calibration and functional test procedures are acceptable for Braidwood. However, Braidwood must use a different in-situ test methodology to accommodate Braidwood's low profile bracket installation. Westinghouse provided letter LTR-SFPIS-14-55, Revision 0 (SFPIS 2

Overall Integrated Plan Open Items		
OI#	**Description**	**Status**
	other, and against any other permanently-installed SFP level instrumentation. **c) 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.** **d) A discussion as to how these surveillances will be incorporated into the plant surveillance program.** **e) A description of the preventive maintenance tasks required to be performed during normal operation, and the planned maximum surveillance interval that is necessary to assure that the channels are fully conditioned to accurately and reliably perform their functions when needed.**	Point Verification Methodology) describing the new in-situ test methodology to accommodate low profile bracket. Exelon has reviewed the letter and found it acceptable. b) The level displayed by the channels will be verified per the Braidwood Station administrative and operating procedures, as recommended by Westinghouse vendor technical manual WNA-GO-00127-GEN. If the level is not within the required accuracy per Westinghouse recommended tolerance in WNA-TP-04709-GEN, channel calibration will be performed. c) Functional checks will be performed per Westinghouse functionality test procedure WNA-TP-04613-GEN at the Westinghouse recommended frequency. Calibration tests will be performed per Westinghouse calibration procedure WNA-TP-04709-GEN at the Westinghouse recommended frequency. d) In accordance with Braidwood Station maintenance and operating programs, Braidwood Station will develop calibration, functional test, channel verification procedures per Westinghouse recommendations to ensure reliable, accurate and continuous SFPI functionality by June 1, 2015. e) Braidwood Station will develop preventive maintenance tasks for the SFPI per Westinghouse recommendation identified in the technical manual WNA-GO-00127-GEN to assure that the channels are fully conditioned to accurately and reliably perform their functions when needed by June 1, 2015.
11 (RAI-9,	RAI Question: **Please provide the following:**	Complete. (Addressed in Reference 6)

Overall Integrated Plan Open Items		
OI#	**Description**	**Status**
Ref.4)	**a) The specific location for each of the primary and backup instrument channel displays.** **b) If the primary and backup display location is other than the main control room, provide justification for prompt accessibility to displays including primary and alternate route evaluation, habitability at display location(s), continual resource availability for personnel responsible to promptly read displays, and provisions for communications with decision makers for the various SFP drain down scenarios and external events.** **c) The reasons justifying why the locations selected enable the information from these instruments to be considered "promptly accessible" to various drain-down scenarios and external events.**	
12 (RAI-10, Ref.4)	RAI Question: **Please provide the following:** **a) A list of the operating (both normal and abnormal response) procedures, calibration/test procedures, maintenance procedures, and inspection procedures that will be developed for use of the SFP instrumentation in a manner that addresses the order requirements.** **b) A brief description of the specific technical objectives to be achieved within each procedure. If your plan incorporates the use of portable spent fuel level monitoring**	Replaced by Interim SE RAI #13.

Overall Integrated Plan Open Items		
OI#	**Description**	**Status**
	components, please include a description of the objectives to be achieved with regard to the storage location and provisions for installation of the portable components when needed	
13 (RAI-11, Ref.4)	RAI Question: **Provide the following:** **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. 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.** **b) 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.** **c) 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.**	Complete. a) Performance tests (functional checks) and Operator performance checks will be described in detail in the vendor operator's manual, and the applicable information is planned to be contained in plant operating procedures. Operator performance tests are planned to be performed periodically as recommended by the equipment vendor. Channel functional tests per operations procedures with limits established in consideration of vendor equipment specifications are planned to be performed at appropriate frequencies established equivalent to or more frequently than existing SFPI. Manual calibration and operator performance checks are planned to be performed in a periodic scheduled fashion with additional maintenance on an as-needed basis when flagged by the system's automated diagnostic testing features. Channel calibration tests per maintenance procedures with limits established in consideration of vendor equipment specifications are planned to be performed at frequencies established in consideration of vendor recommendations. SFPI channel/equipment maintenance/preventative maintenance and testing program requirements to ensure design and system readiness are planned to be established in

<table>
<tr><th colspan="3">Overall Integrated Plan Open Items</th></tr>
<tr><th>OI#</th><th>Description</th><th>Status</th></tr>
<tr><td></td><td></td><td>accordance with Exelon's processes and procedures and in consideration of vendor recommendations to ensure that appropriate regular testing, channel checks, functional tests, periodic calibration, and maintenance is performed (and available for inspection and audit). Subject maintenance and testing program requirements are planned to be developed during the SFPI modification design process.

Response for b, c:

Both primary and backup SFPI channels incorporate permanent installation (with no reliance on portable, post-event installation) of relatively simple and robust augmented quality equipment. Permanent installation coupled with stocking of adequate spare parts reasonably diminishes the likelihood that a single channel (and greatly diminishes the likelihood that both channels) is (are) out-of-service for an extended period of time. Planned compensatory actions for unlikely extended out-of-service events are summarized as follows:

<table>
<tr><th># Channel(s) Out-of-Service</th><th>Required Restoration Action</th><th>Compensatory Action if Required Restoration Action not completed within Specified Time</th></tr>
<tr><td>1</td><td>Restore channel to functional status within 90 days (or if channel</td><td>Immediately initiate action in accordance with Note below</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th colspan="3">Overall Integrated Plan Open Items</th></tr>
<tr><th>OI#</th><th>Description</th><th>Status</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td></td><td>restoration not expected within 90 days, then proceed to Compensatory Action)</td><td></td></tr>
<tr><td>2</td><td>Initiate action within 24 hours to restore one channel to functional status and restore one channel to functional status within 72 hours</td><td>Immediately initiate action in accordance with Note below</td></tr>
</table>

Note: Present a report to the on-site Plant Operations Review Committee (PORC) within the following 14 days. The report shall outline the planned alternate method of monitoring, the cause of the non-functionality, and the plans and schedule for restoring the instrumentation channel(s) to functional status.
</td></tr>
</table>

Draft Safety Evaluation Open Items		
OI#	**Description**	**Status**
1 (RAI-1, Ref. 5)	RAI Question: **Provide the results of the calculation used to determine the water elevation necessary for the SFP cooling pump required NPSH to confirm that Level 1 has been adequately identified.**	Complete. Level 1 is the level adequate to support operation of the normal fuel pool cooling system. It is the higher of the following two points: 1) The level at which reliable suction loss occurs due to uncovering the coolant inlet pipe or any weirs or vacuum breakers associated with suction loss. For Braidwood, this is the level at which suction loss occurs due to uncovering the inlet pipe strainer. This level, (1), is elevation 417'–9 3/4", not considering any required margin as a result of vortex formation. 2) The level at which the water height, assuming saturated conditions (boiling); above the centerline of the cooling pump shaft provides the required net positive suction head. This level is 421'-6" at 2,000 gpm per pump and corresponds to the high point elevation of the inside of the suction piping. Water level below this elevation will result in vapor void formation inside the piping for pool temperatures of 212 °F. The typical margin required to prevent vortex formation at Point 1 is estimated to be less than the difference between Point 1 and Point 2. Thus, the higher of the above points is (2). Therefore, LEVEL 1 is 422'-0" and is applicable to both units.
2 (RAI-3, Ref. 5)	RAI Question: **Provide additional information describing how the final arrangement of the SFP instrumentation and routing of the cabling**	Complete. Two independent primary and backup instrument channels will be installed as part of this modification with indication for both channels at an operator accessible location. The location of the level sensors on the top of the west wall of the SFP, separated by a distance greater than the span of the shortest wall, provides adequate separation between the two channels. The

	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.	level transmitter and level indication display for the primary and backup channels will be installed in the Auxiliary Building in Unit 1 Penetration Area 5 and Unit 2 Penetration Area 7, respectively. The 120 VAC power to the primary and backup level indication display will be provided from Unit 1 and Unit 2 ESF MCCs, respectively. An additional analog level indicator for each channel will also be provided in the MCR at panels 1PM06J and 2PM06J, which will be credited as the level indication used to satisfy NRC Order EA-12-051. The power and instrument cables will be routed on the Unit 1 side for primary channel and on the Unit 2 side for the backup channel. Therefore, adequate separation is maintained between the primary and backup channels.
3 (RAI-5, Ref. 5)	RAI Question: **For RAI 4(a) above, 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.**	Complete. The following Westinghouse documents provide the analyses used to verify the design criteria and describe the methodology for seismic testing of the SFP instrumentation and electronics units, inclusive of design basis maximum seismic loads and hydrodynamic loads that could result from pool sloshing and other effects that could accompany such seismic forces: a. CN-PEUS-13-24 – Pool-side Bracket Seismic Analysis b. LTR-SEE-II-13-47, WNA-TR-03149-GEN – Sloshing Analysis c. EQ-QR-269, WNA-TR-03149-GEN, EQ-TP-353 – Seismic Qualification of other components of SFPI No equipment failures were noted as a result of seismic test runs. Seismic test data has been documented in the seismic test reports, referenced above. Braidwood Station specific calculations 12.3.4-BRW-10-0021-S - Seismic Qualification of Instrument Mounting Details Associated with Plant Process Computer Replacement, BRW-14-0009-S SFPI Sensor Mounting Detail Anchorage and BRW-14-0109-M - Seismic Qualification of Weschler Indicator VX-252, address the seismic qualification of the main control room indicators. The design criteria used in this calculation satisfies the requirements to withstand a SSE and will meet the Braidwood Station safety related installation requirements for mounting the readout displays in the main control room.
4 (RAI-6,	RAI Question: **For each of the mounting**	Complete. The structural integrity and mounting of SFP level equipment is based on formal calculations, plant drawings, and approved

Ref. 5)	**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 .**	work plans per Exelon procedures and processes. Design Inputs include, but not limited to, the following: 1. Component weights and dimensions, core hole locations and support details. 2. The capability of concrete expansion anchors. 3. The loads (dynamic and static) for the probe mounting bracket. 4. Concrete properties 5. Seismic accelerations requirements for electrical equipment 6. Allowable stresses for structural bolts. Methodology to qualify the safety related structural integrity includes, but not limited to, following: 1. Structural Weldments – Qualifying the weld design entails the selection of a weld's physical attributes, such as type, configuration and size, which will make it suitable for transferring the prescribed loads within appropriate limits. This process involves determining the maximum unit forces on the weld and comparing them with the weld capacity. The methodology determines weld design forces by assuming nominal linear stress/strain distribution. For each design, the engineer must confirm that the distribution of stiffness within the joint is consistent with this assumption. In some cases more refined techniques may be required to predict appropriate distribution of weld forces. 2. Concrete Expansions - The design methodology of concrete expansion anchor assemblies involves 1) application of component attachment loads to the plate, 2) analysis of the assembly to determine the resultant tension and shear forces on individual anchors, 3) evaluation of the anchor forces relative to anchor allowables and 4) computation and evaluation of bending stresses in the CEA plate. Reactions for the attached component (applied to the plate at the centroid of the attachment weld) shall be resolved into moments, shears and axial loads (about the major axes of the expansion anchor plate). 3. Local Stress Effects – The member local stresses for open sections are computed according to specific procedures for flange attachments, web attachments, attachments to flanges of beams supporting concrete, and attachments to webs of beams supporting concrete.

		4. Existing Embedment Plate Evaluation - Embedment plates for mechanical/electrical component support attachments (i.e., pipe supports, conduit supports, HVAC supports, etc.) are evaluated as follows: Determine embedment plate detail based on the component support design drawing and appropriate structural drawings. Determine an allowable load for the embedment plate detail per plant design tables. Ensure that the attachment location satisfies the location tolerances used in determining the embedment plate allowables. Calculate reactions at face of embedment plate. Determine if the embedment plate can be qualified per criteria. 5. Conduit and Conduit Supports - Structural adequacy of rigid conduit is evaluated by determining the critical span condition, loads, checking conduit stresses and verifying structural adequacy of conduit clamps. Structural adequacy of Conduit, Junction Boxes and Junction Box supports is evaluated by determining loads, calculating member forces and joint reactions, checking member stresses, checking connections, checking expansion anchor assemblies, checking attachments to structure and resolving overstresses. 6.Cable Tray Loading Violations (CTLVs) - The structural evaluation of cable tray supports for potential increase in design basis loading will be performed by identifying the hangers affected by the routing point. For each affected hanger controlling routing point will be determined. Then actual load associated with the routing point will be computed. Then the actual load will be compared to the load used in the hanger design. An evaluation of cable tray hanger for any increased load will be performed. 7. Category I Partition Walls - When qualifying a wall for a new/revised attachment, the following method is utilized: • If the loads on the existing critical design strip are larger in magnitude than the loads on the design strip containing the new attachment, then the wall can be qualified by this comparison. • If the wall cannot be qualified by comparison of loading, moment and shear due to the attachment shall be calculated

<table>
<tr><td></td><td></td><td>and their effects added to the critical design strip. New stresses or moment and shear will be compared to the allowable stresses/capacities.

If this results in an unacceptable overstress condition, detailed evaluation of the design strip containing the attachment is required. All existing attachments and core holes in the strip will be accounted for in this evaluation.</td></tr>
<tr><td>5

(RAI-8, Ref. 5)</td><td><u>RAI Question:</u>

For RAI #7 above, 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.</td><td><u>Started</u>.

Below is a summary of the test conditions used by Westinghouse to qualify the SFPIS. Environmental Conditions for SFPIS Components installed in the Spent Fuel Pool Area at Braidwood Station are bounded by below test conditions, except for radiation TID 12" above top of fuel rack for beyond design basis conditions (BDB). The BDB radiation TID, 12" above top of fuel rack for Braidwood is 4.E07 R γ, per calculation BYR13-051, "NEI 12-02 Spent Fuel Pool Doses." The BDB radiation value to which the Westinghouse equipment is qualified to is 1.E07 R γ, per Section 5.1.1 of WNA-TR-03149-GEN. The radiation value of 4.E07 R γ is higher than 1.E07 R γ to which Westinghouse qualified the instrument to. However, this value of 4.E07 R γ is applicable only when the water is at Level 3. At Level 2 the TID reduces to 2.E07 R γ and it further reduces to 8.E06 at Level 1 and above. With SFP water level at Level 3 the only components of SFPI that are exposed to high radiation are the stainless steel probe and the stainless steel anchor. The materials with which the probe and the anchor are manufactured are resistant to radiation effects. The stainless steel anchor and stainless steel probe can withstand 40 year dose. Westinghouse updated the design specification (WNA-DS-02957-GEN) and LTR-SFPIS-13-35, Revision 1 documentation to include the above technical justification.

Environmental Conditions for SFPIS Components in the Spent Fuel Pool Area

Level sensor probe, coax coupler and connector assembly, launch plate and pool side bracket assembly, coax cable are designed and qualified to operate reliably in the below specified environmental conditions.
<table>
<tr><th>Parameter</th><th>Normal</th><th>BDB</th></tr>
<tr><td>Temperature</td><td>50-140°F</td><td>212°F</td></tr>
</table>
</td></tr>
</table>

Pressure	Atmospheric	Atmospheric
Humidity	0-95% RH	100% (saturated steam)
Radiation TID γ (above pool)	1E03 Rads	1E07 Rads
Radiation TID γ (12" above top of fuel rack)	1E09 Rads (probe and weight only)	1E07 Rads

Environmental Conditions Outside of the Spent Fuel Pool Area

The level sensor transmitter and bracket, electronics display enclosure and bracket are designed and qualified to operate reliably in the below specified environmental conditions.

Parameter	Normal	BDB	BDB (Level Sensor Electronics Only)
Temperature	50-120°F	140°F	140°F
Pressure	Atmospheric	Atmospheric	Atmospheric
Humidity	0-95% RH	0-95% (non-condensing)	0-95% (non-condensing)
Duration	3 days	3 days	3 days
Radiation TID γ	≤ 1E03 R γ	≤ 1E03 R	≤ 1E03 R

		Braidwood Station specific calculation (BRW-14-0109-M-Seismic Qualification of Weschler Indicator VX-252) describes the results of the qualification testing of the MCR readout display to the design basis temperature, humidity, and vibration to demonstrate its reliability. The display was also tested to demonstrate that it performed accurately under extreme heat and humidity conditions. Thermal and Radiation Aging – organic components in SFP area Westinghouse documents EQ-QR-269, EQ-TP-354, WNA-TR-03149-GEN provide thermal and radiation aging program details for the SFPI components. Westinghouse completed their thermal and radiation aging testing programs to qualify the SFPI components to 1.25 years. Exelon has reviewed the documents and found acceptable. Additionally, Westinghouse is continuing their aging tests to age the system components to 10 years. These tests are projected to be completed towards end of Summer 2014. Final test reports are scheduled to be provided to Exelon by September 4, 2014. Exelon will complete the test report reviews by September 30, 2014. Seismic Category I Testing Seismic qualification testing performed by Westinghouse along with the technical evaluations performed by Westinghouse confirm that the SFPIS meets the seismic requirements of the vendor's design specification. Westinghouse's design specification satisfies the Braidwood Station installation requirements to withstand a SSE. Vibration Justification As specified in RAI-6, components of the system (i.e., bracket, transmitter enclosure, display enclosure, and readout display in the MCR) will be permanently installed to meet the

		requirements to withstand a SSE and will meet the Braidwood Station safety related installation requirements. Westinghouse has analyzed the pool side bracket to withstand design basis SSE. Other components of the SFPIS were subjected to shock and vibration during the seismic testing and met the requirements necessary for mounted equipment. Sloshing Justification The sloshing calculation performed by Westinghouse was reviewed for a design basis seismic event and found acceptable. Sloshing forces were taken into consideration for the anchorage design of the pool side bracket to ensure the bracket is rigidly mounted to include sloshing affects.
6 (RAI-13, Ref. 5)	RAI Question: **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 spent SFP instrumentation. Provide a brief description of the specific technical objectives to be achieved within each procedure.**	Complete. Appropriate quality measures will be selected for the SFPIS required by Order EA-12-051, consistent with Appendix A of NEI 12-02. Site procedures will be developed for system inspection, calibration and test, maintenance, repair, operation and normal and abnormal responses, in accordance with Exelon's procedure control process. Technical objectives to be achieved in each of the respective procedures are described below: Procedure Objectives to be achieved 1. System Inspection: To verify that system components are in place, complete, and in the correct configuration, and that the sensor probe is free of significant deposits of crystallized boric acid. 2. Calibration and Test: To verify that the system is within the specified accuracy is functioning as designed, and is appropriately indicating SFP water level. 3. Maintenance: To establish and define scheduled and preventive maintenance requirements and activities necessary to minimize the possibility of system interruption. 4. Repair: To specify troubleshooting steps and component repair and replacement activities in the event of system malfunction. 5. Operation: to provide sufficient instructions for operation and use of the system by plant operation staff.

		6. Responses: To define the actions to be taken upon observation of system level indications, including actions to be taken at the levels defined in NEI 12-02.

7 Potential Draft Safety Evaluation Impacts

There are no potential impacts to the Draft Safety Evaluation identified at this time.

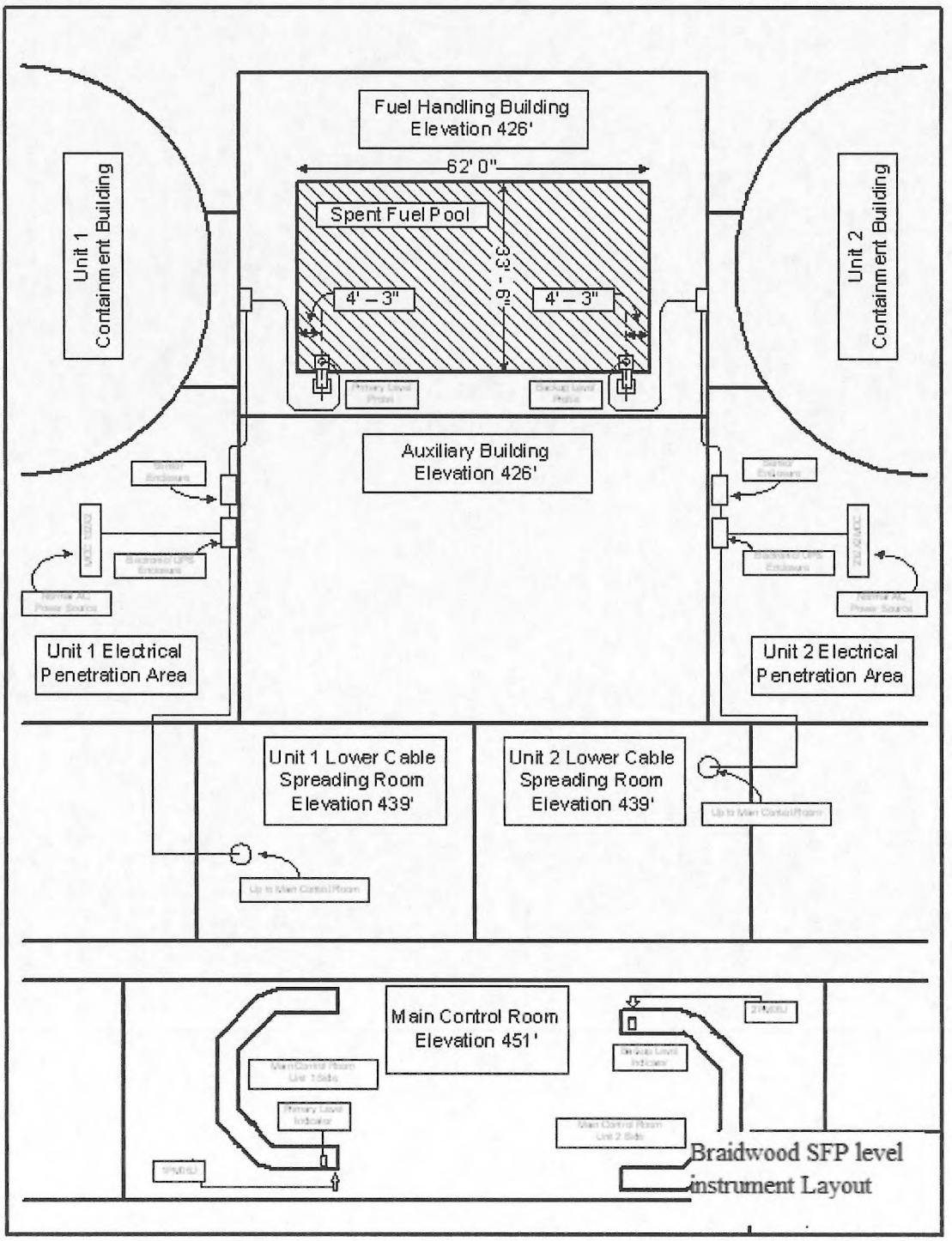
8 References

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

1. Exelon Generation Company, LLC, letter to USNRC, "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 (RS-13- 027)
2. NRC Order Number EA-12-051, "Issuance of Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012.
3. USNRC letter to Exelon Generation Company, LLC, Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation, dated July 11, 2013.
4. Exelon Generation Company, LLC, letter to USNRC, "Response to Request for Additional Information – Overall Integrated Plan in Response to Commission Order Modifying License Requirements for Reliable Spent Fuel Pool Instrumentation (Order No. EA-12-051)", dated July 31, 2013 (RS-13-194).
5. USNRC letter to Exelon Generation Company, LLC, "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 4, 2013.
6. First Six-Month Status Report for the Implementation of Order EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, dated August 28, 2013 (RS-13-112).
7. Second Six-Month Status Report for the Implementation of Order EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, dated February 28, 2014 (RS-14-017).

ATTACHMENT – 1

Braidwood Station, Units 1 and 2 SFPI LAYOUT IN PLAN VIEW



ATTACHMENT – 2

Braidwood Station Schematic of the Level Sensor with Mechanical Attachment Points