

Charles R. Pierce
Regulatory Affairs Director

Southern Nuclear
Operating Company, Inc.
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, AL 35201

Tel 205.992.7872
Fax 205.992.7601



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Docket Nos.: 50-321
50-366

NL-15-0240

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

Edwin I. Hatch Nuclear Plant – Units 1 and 2
Fourth Six-Month Status Report of the Implementation of the
Requirements of the Commission Order with Regard to
Reliable Spent Fuel Pool Instrumentation (EA-12-051)

References:

1. NRC Order Number EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, dated March 12, 2012.
2. 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. Edwin I. Hatch Nuclear Plant – Units 1 and 2 Initial Status Report in Response to Commission Order with Regard to Reliable Spent Fuel Pool Instrumentation (EA-12-51), dated October 23, 2012.
5. Edwin I. Hatch Nuclear Plant – Units 1 and 2 Overall Integrated Plan in Response to Commission Order with Regard to Reliable Spent Fuel Pool Instrumentation (EA-12-051), dated February 27, 2013.
6. Interim Staff Evaluation and Request for Additional Information – Hatch Nuclear Plant, Units 1 and 2 (HNP) Regarding Overall Integrated Plan (OIP) for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051) (TAC Nos. MF0721 and MF0722), dated October 28, 2013.

Ladies and Gentlemen:

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued an order (Reference 1) to Southern Nuclear Operating Company. Reference 1 was immediately effective and directs the Edwin I. Hatch Nuclear Plant – Units 1 and 2 (HNP) to install reliable spent fuel pool 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.1.a of Reference 1. 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 HNP initial status report regarding spent fuel pool instrumentation strategies. Reference 5 provided the HNP original 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. The purpose of this letter is to provide the fourth 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 of this 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.

Enclosure 2 of this report includes the supplemental response to the NRC Interim Staff Evaluation and Request for Additional Information regarding the HNP Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation in accordance with Order Number EA-12-051 requested by Reference 6.

This letter contains no new NRC commitments. If you have any questions, please contact John Giddens at 205.992.7924.

Mr. C. R. Pierce states he is the Regulatory Affairs Director for Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and, to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

C. R. Pierce

C. R. Pierce
Regulatory Affairs Director

CRP/JMG/GLS

Sworn to and subscribed before me this 26 day of February, 2015.

Laura L. Croft
Notary Public

My commission expires: 10-8-2017



- Enclosures:
1. Edwin I. Hatch Nuclear Plant - Units 1 and 2 Fourth Six-Month Status Report Regarding Reliable Spent Fuel Pool Instrumentation (EA-12-051)
 2. Edwin I. Hatch Nuclear Plant - Units 1 and 2 Southern Nuclear Operating Company Supplemental Response to the Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)
 3. Hatch Unit 1 and Hatch Unit 2 Elevation View of Level 1, 2, 3 and Instrument Range
 4. Hatch Unit 1 and Hatch Unit 2 Proposed Sensor Locations and Conduit Routing on Elevation 228'
 5. Westinghouse Status of Spent Fuel Pool Level Instrumentation for the Edwin I. Hatch Nuclear Plant
 6. Hatch Unit 1 and Hatch Unit 2 Proposed System Design Configuration

cc: Southern Nuclear Operating Company

Mr. S. E. Kuczynski, Chairman, President & CEO

Mr. D. G. Bost, Executive Vice President & Chief Nuclear Officer

Mr. D. R. Vineyard, Vice President – Hatch

Mr. M. D. Meier, Vice President – Regulatory Affairs

Mr. D. R. Madison, Vice President – Fleet Operations

Mr. B. J. Adams, Vice President – Engineering

Mr. G. L. Johnson, Regulatory Affairs Manager – Hatch

RTYPE: CHA02.004

U. S. Nuclear Regulatory Commission

Mr. W. M. Dean, Director of the Office of Nuclear Reactor Regulations

Mr. V. M. McCree, Regional Administrator

Mr. R. E. Martin, NRR Senior Project Manager – Hatch

Mr. D. H. Hardage, Senior Resident Inspector – Hatch

Mr. B. A. Purnell, NRR/JLD/PMB

Mr. S. R. Jones, NRR/DSS/SBPB

State of Georgia

Mr. J. H. Turner, Director – Environmental Protection Division

**Edwin I. Hatch Nuclear Plant – Units 1 and 2
Fourth Six-Month Status Report of the Implementation of the
Requirements of the Commission Order with Regard to
Reliable Spent Fuel Pool Instrumentation (EA-12-051)**

Enclosure 1

**Edwin I. Hatch Nuclear Plant – Units 1 and 2
Fourth Six-Month Status Report Regarding
Reliable Spent Fuel Pool Instrumentation (EA-12-051)**

**Edwin I. Hatch Nuclear Plant – Units 1 and 2
 Fourth Six-Month Status Report Regarding
Reliable Spent Fuel Pool Instrumentation (EA-12-051)**

1 Introduction

Edwin I. Hatch Nuclear Plant Units 1 and 2 developed an Overall Integrated Plan (Reference 1 of this enclosure), documenting the requirements to install reliable spent fuel pool instrumentation (SFPI), in response to Reference 2. This attachment provides an update of milestone accomplishments since submittal of the last status report, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

2 Milestone Accomplishments

In addition to the submittal of status reports, the following milestone(s) directly related to SFP instrumentation implementation have been completed since the previous 6-month update, and are current as of December 31, 2014:

- None

3 Milestone Schedule Status

The table 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.

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Submit 60 Day Status Report	Oct 2012	Complete	N/A
Submit Overall Integrated Plan	Feb 2013	Complete	N/A
Submit 6 Month Status Report	Aug 2013	Complete	N/A
Submit 6 Month Status Report	Feb 2014	Complete	N/A
Unit 1 1st RFO	Mar 2014	Complete	N/A
Develop Modifications Unit 1	Dec 2014	In Progress	Mar 2015
Submit 6 Month Status Report	Aug 2014	Complete	N/A
Submit 6 Month Status Report	Feb 2015	Complete	N/A
Receipt of Unit 1 SFP Instrument Channel	Feb 2015	In Progress	Jun 2015
Unit 2 1st RFO	Mar 2015	Not Started	
Develop Modifications Unit 2	Apr 2015	In Progress	
Submit 6 Month Status Report	Aug 2015	Not Started	
Complete Functional Test of Unit 1 SFP Instruments	3Q 2015	Not Started	
Receipt of Unit 2 SFP Instrument Channel	Nov 2015	In Progress	
Submit 6 Month Status Report	Feb 2016	Not Started	
Unit 1 Implementation Complete (2nd RFO)*	Mar 2016	Not Started	
Submit 6 Month Status Report	Aug 2016	Not Started	
Complete Functional Test of Unit 2 SFP Instruments	4Q 2016	Not Started	
Unit 2 Implementation Complete**	Dec 2016	Not Started	
Submit Completion Report	Dec 2016	Not Started	

*Full compliance after second listed refueling outage

** Full compliance by 12/31/2016 since second refueling outage is after 12/31/2016

4 Changes to Compliance Method

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

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

Edwin I. Hatch Nuclear Plant 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 Interim Staff Evaluation

The NRC has reviewed the Hatch Overall Integrated Plan for compliance with Order EA-12-051 and issued an Interim Staff Evaluation (ISE) (Reference 5) providing concurrence with the approach described in the Overall Integrated Plan. In the ISE, the NRC identified areas where additional information is required for its determination regarding the compliance with the Order. Accordingly, the additional information is provided in Enclosure 2.

Although not identified by Reference 5 as an open item, SNC stated its intent in Reference 4 to provide: (1) a clearly labeled sketch depicting the elevation view of the proposed typical mounting arrangements for the portions of instrument channel equipment (e.g., fixed level sensors and/or stilling wells, and mounting brackets), (2) datum values representing Level 1, Level 2, and Level 3 as well as the top of the fuel racks, and (3) 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. This information is provided in Enclosure 3.

7 Potential Interim Staff Evaluation Impacts

There are no potential impacts to the Interim Staff Evaluation identified at this time.

8 References

The following references support the updates to the Overall Integrated Plan described in this attachment:

1. Edwin I. Hatch Nuclear Plant Units 1 and 2 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 27, 2013.
2. NRC Order Number EA-12-051, “Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,” dated March 12, 2012.
3. Edwin I. Hatch Nuclear Plant, Units 1 and 2 – Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051) (TAC Nos. MF0721 and MF0722), dated August 1, 2013.
4. Edwin I. Hatch Nuclear Plant - Units 1 and 2 Southern Nuclear Operating Company Response to the Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated August 29, 2013.
5. Interim Staff Evaluation and Request for Additional Information – Hatch Nuclear Plant, Units 1 and 2 (HNP) Regarding Overall Integrated Plan (OIP) for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051) (TAC Nos. MF0721 and MF0722), dated October 28, 2013.

9 Other Additional Information

The following information provides clarity or corrections to the Overall Integrated Plan but does not constitute a change in strategy:

- The Edwin I. Hatch Nuclear Plant Units 1 and 2 SFPI will not involve use of a stilling well.

**Edwin I. Hatch Nuclear Plant – Units 1 and 2
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Enclosure 2

**Interim Staff Evaluation and Request for Additional
Information – Hatch Nuclear Plant, Units 1 and 2 (HNP)
Regarding Overall Integrated Plan (OIP) for Reliable
Spent Fuel Pool Instrumentation (Order Number EA-12-051)**

NRC RAI 1

Please provide additional information describing how the proposed arrangement of the routing of the cabling between the level probes and the electronics cabinets that process the signal 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.

SNC Response to RAI 1

By letter NL-13-0172 dated February 27, 2013, SNC provided the Hatch Overall Integrated Plan (OIP) required by Order EA-12-051. Attachment 1 of the OIP provided a probe layout sketch depicting the Spent Fuel Pool Level Instrument (SFPLI) probe locations and corresponding cable routing associated with each based on available information. SNC has chosen to relocate the SFPLI probes to eliminate the need to route both instrument channels in close proximity of one another. A plan view sketch of the Unit 1 and Unit 2 SFP areas is provided in Enclosure 4, depicting the location/placement of the primary and alternate level sensors, and the routing of cables that extend toward the location of the electronics. To provide reasonable protection of the level indication function against missiles that may result from damage to the structure over the SFP, the primary and alternate channel cabling will be routed in flex conduit inside steel plate-covered trenches and physically separated to the extent practicable.

NRC RAI 2

Please provide additional information describing how the proposed arrangement of the SFP level instrumentation 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.

SNC Response to RAI 2

As stated in response to RAI #1 above, SNC has relocated the SFPLI probes from the location depicted in the OIP dated February 27, 2013. Enclosure 4 provides the revised location for the Unit 1 and Unit 2 SFPLI probes. Physical separation of the primary and alternate channels, to the extent practicable and comparable to the short side of the pool, is used to provide reasonable protection of the level indication function against missiles that may result from the damage to the structure over the SFP.

NRC RAI 3

Please provide the following:

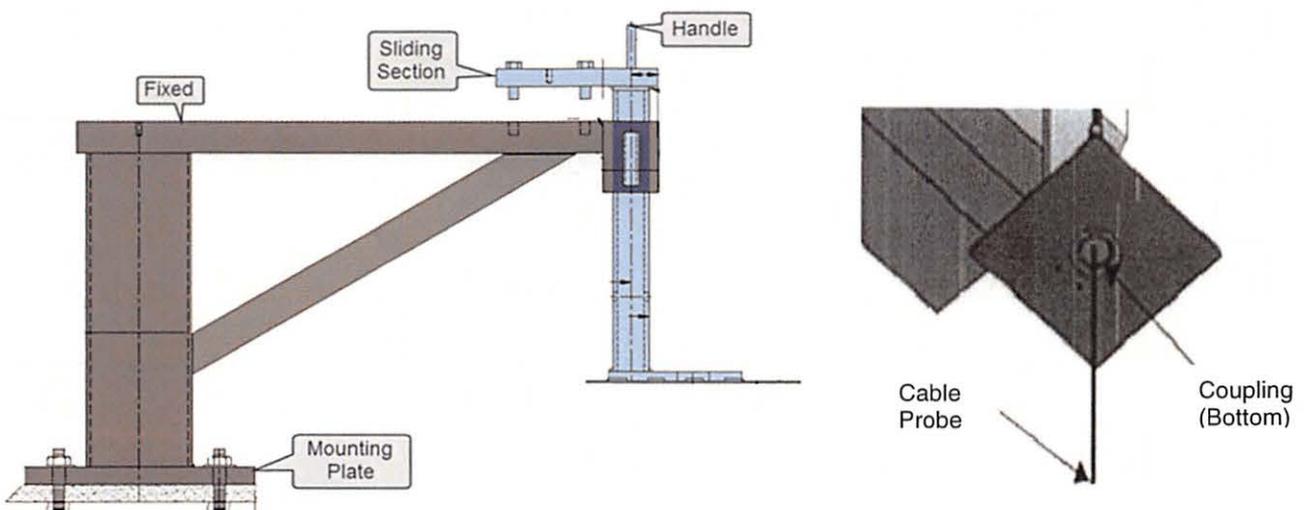
- a) The design criteria that will be used to estimate the total loading on the mounting device(s), including static weight loads and dynamic loads. Describe the methodology that will be used to estimate the total loading, inclusive of design basis maximum seismic loads and the hydrodynamic loads that 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.

SNC Response to RAI 3

- a) 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 are provided in Enclosure 5.
- b) The simplified drawing shown below provides a basic representation of the attachment of the probe and the sensor cable to the mounting sliding bracket (launch plate), and mounting bracket attachment to the SFP structure. The mounting bracket will be attached to the SFP concrete floor utilizing expansion-type concrete anchor bolts. The level sensor consists of a stranded stainless steel cable level probe that is threaded on the top end. The probe attaches (threads) into a coupling that is secured to the mounting bracket launch plate and extends down into the pool. The attachment to the signal cable is via a coaxial connection on the top side of the launch plate coupling. The Edwin I. Hatch Nuclear Plant Units 1 and 2 SFPI will not involve use of a stilling well.
- c) The simplified drawing below shows a representation of the attachment of the probe and the sensor cable to the mounting bracket (launch plate), and mounting bracket attachment to the SFP structure.

The level sensor (probe) is designed to be attached near its upper end to the mounting bracket. The mounting bracket will be attached to the SFP concrete floor utilizing expansion-type concrete anchor bolts. The mounting bracket to the SFP concrete floor anchorage is designed to meet the requirements of the Hatch design and licensing basis for Seismic Category I components including seismic loads, static weight loads and hydrodynamic loads.



NRC RAI 4

For RAI 3(a) above, please provide the analyses used to verify the design criteria and methodology for seismic testing of the SFP instrumentation and the electronics units, including design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces.

SNC Response to RAI 4

The analysis 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, are provided in Enclosure 5.

NRC RAI 5

For each of the mounting attachments required to attach SFP Level equipment to plant structures, please describe the design inputs, and the methodology that was used to qualify the structural integrity of the affected structures/equipment.

SNC Response to RAI 5

The design inputs and methodology used to qualify the structural integrity of the affected structures/equipment for each of the mounting attachments required to attach SFP Level equipment to plant structures are provided in Enclosure 5.

NRC RAI 6

Please provide the following:

- 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 BDB 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.

SNC Response to RAI 6

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 is addressed in the design. Included is a discussion of this seismic reliability demonstration as it applies to:

1. The level sensors mounted in the SFP area and are provided in Enclosure 5.
2. 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 are installed per DCP, utilizing Site SSE, and ASME & IEEE codes per the UFSAR.

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 is provided in Enclosure 5.

NRC RAI 7

For RAI #6 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.

SNC Response to RAI 7

The results from the analysis and testing are provided in Enclosure 5.

NRC RAI 8

Please 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.

SNC Response to RAI 8

- a) Physical separation, of the primary and backup channels to the extent practical and comparable to the short side of the pool, is used to minimize the potential for a common cause event to adversely affect both channels in the pool. Sensor cable from each probe will be installed in flex conduit, in separate trenches, covered by steel plate.
- b) Each level measurement system is designed and installed independently of the others. The primary and backup channels have separate power sources, cabling, conduit, electronics, and displays. See Enclosure 6 for the proposed U1 and U2 design configuration.

NRC RAI 9

Please 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 is reasonably assured.

SNC Response to RAI 9

- a) Normal electrical AC power will be provided by different sources from the 120V AC Distribution System for each level measurement channel as shown in Enclosure 6.
U1 Primary and U2 Primary: 1R25-S125
U1 Backup and U2 Backup: 2R25-S102
- b) 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 are provided in Enclosure 5.

NRC RAI 10

Please provide the following:

- a) An estimate of the expected instrument channel accuracy performance under both (a) normal SFP level conditions (approximately Level 1 or higher) and (b) at the BDB conditions (i.e., radiation, temperature, humidity, post-seismic and post-shock conditions) that would be present if the SFP level were at the Level 2 and Level 3 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 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.

SNC Response to RAI 10

Analysis verifying that the proposed instrument performance is consistent with the estimated accuracy normal and BDB values along with demonstration that the channels will retain these accuracy performance values following a loss of power and subsequent restoration of power is provided in Enclosure 5.

NRC RAI 11

Please 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.

Enclosure 2 to NL-15-0240
SNC Response to NRC ISE Request for Additional Information

- b) 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.
- 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 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.

SNC Response to RAI 11

While the SFP is operating within design basis and at normal level, the indicators may be compared to fixed marks within the SFP by visual observation to confirm indicated level. The periodic calibration verification will be performed within 60 days of a refueling outage considering normal testing scheduling allowances (i.e., 25%). Calibration verification will not be required to be performed more than once per 12 months. These calibration requirements are consistent with the guidance provided in NEI 12-02, Section 4.3. Periodic calibration verification procedures will be in place based on information provided by Westinghouse in WNA-TP-04709-GEN, "Spent Fuel Pool Instrumentation System Calibration Procedure." Preventive maintenance procedures to include tests, inspection and periodic replacement of the backup batteries will be developed based on recommendations from Westinghouse.

NRC RAI 12

Please provide the following:

- a) The specific location for the primary and backup instrument channel displays.
- b) For any displays located outside the main control room, please describe the evaluation used to validate that the display location can be accessed without unreasonable delay following a BDB event. Include the time available for personnel to access the display as credited in the evaluation, as well as the actual time (e.g., based on walk-throughs) that it will take for personnel to access the display. Additionally, please include a description of the radiological and environmental conditions on the paths personnel might take. Describe whether the display location remains habitable for radiological, heat and humidity, and other environmental conditions following a BDB event. Describe whether personnel are continuously stationed at the display or monitor the display periodically.

SNC Response to RAI 12

The proposed location of the U1 and U2 Primary display panels is in Stairwell 1R208 on EL 164' of the Reactor Building. The proposed location of the U1 and U2 Backup display panels is in Stairwell 2R208 on EL 164' of the Reactor Building.

The locations are being evaluated considering the accident conditions described in NEI 12-02 and NEI 12-06, using design inputs from Westinghouse and existing Station Blackout evaluations. The results of the evaluation are expected to demonstrate the displays can be accessed without unreasonable delay and without placing station personnel at undue risk with regards to temperature, humidity, and radiation levels.

Enclosure 2 to NL-15-0240
SNC Response to NRC ISE Request for Additional Information

The selected location of the U1 and U2 Primary display panels in Stairwell 1R208 is approximately 230 feet from the U1 and U2 Control Room. The selected location of the U1 and U2 Backup display panels in Stairwell 2R208 is approximately 250 feet from the U1 and U2 Control Room. Using a conservative walking pace of 1 mph, Primary & Backup display locations would each require less than 10 minutes to access the display location, perform local function and return to the Control Room. The substantial structures between the SFP and the pathways to the display, combined with the short transit duration, personnel traveling the pathways are not expected to require heroic means with the SFP at Level 3 or above. The display location remains habitable considering the minimal time required to access the displays, distance from the SFP, presence of substantial intervening structures, and the lack of heat producing equipment within the room during accident conditions. Both locations are expected to allow for prompt, non-heroic access to the displays from the Control Room.

SNC intends to periodically monitor the display at one to two hour intervals during accident conditions.

NRC RAI 13

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 spent SFP instrumentation. Please provide a brief description of the specific technical objectives to be achieved within each procedure.

SNC Response to RAI 13

Procedures have been developed to ensure the following objectives:

Procedure	Objectives to be achieved
1) System Inspection	Verify system components are in place, complete, and configured correctly.
2) Calibration and Test	Verify the system is within the specified accuracy, functioning as designed, and indicating SFP water level.
3) Maintenance	Establish and define maintenance requirements (both scheduled and preventative) and activities necessary to minimize possibility of system interruption.
4) Repair	Specify steps for problem identification, repair, and replacement activities in the event of system malfunction.
5) Operation	Provide sufficient instructions for operation by the plant operations staff.
6) Responses	Define actions to be taken upon observation of system level indications, including actions to be taken at the levels defined in NEI 12-02.

NRC RAI 14

Please 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. Please 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) Further information on how the guidance in NEI12-02 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.

SNC Response to RAI 14

- a) See SNC response to RAI 11.
- b) A Condition Report will be initiated and addressed through SNC's Corrective Action Program and eSOMS Action Tracking application. Provisions associated with out of service (OOS) or non-functional equipment, including allowed outage times and compensatory actions, will be consistent with the guidance provided in Section 4.3 of NEI 12-02. If one OOS channel cannot be restored to service within 90 days, appropriate compensatory actions, including the use of alternate suitable equipment, will be taken. If both channels become OOS, actions would be initiated within 24 hours to restore one of the channels to operable status and implement appropriate compensatory actions, including the use of alternate suitable equipment and/or supplemental personnel, within 72 hours.
- c) If both channels are OOS, a Condition Report will be initiated and addressed through SNC's Corrective Action Program and eSOMS Action Tracking application. SNC will maintain sufficient spare parts for the SFPIIS, taking into account the lead time and availability of spare parts, to provide assurance that a channel can be restored to service within 90 days.

NRC RAI 15

Please provide a description of the in-situ calibration process at the SFP location that will result in the channel calibration being maintained at its design accuracy.

SNC Response to RAI 15

As stated in response to NRC RAIs 11 and 14 above, SNC will develop periodic calibration procedures, consistent with the guidance of NEI 12-02, Section 4.3, based on Westinghouse recommendations contained in WNA-TP-04709-FEN, Spent Fuel Pool Instrumentation System Calibration Procedures. A listing of applicable procedures will be included in the completion letter for EA-12-051 for Edwin I. Hatch Units 1 and 2.

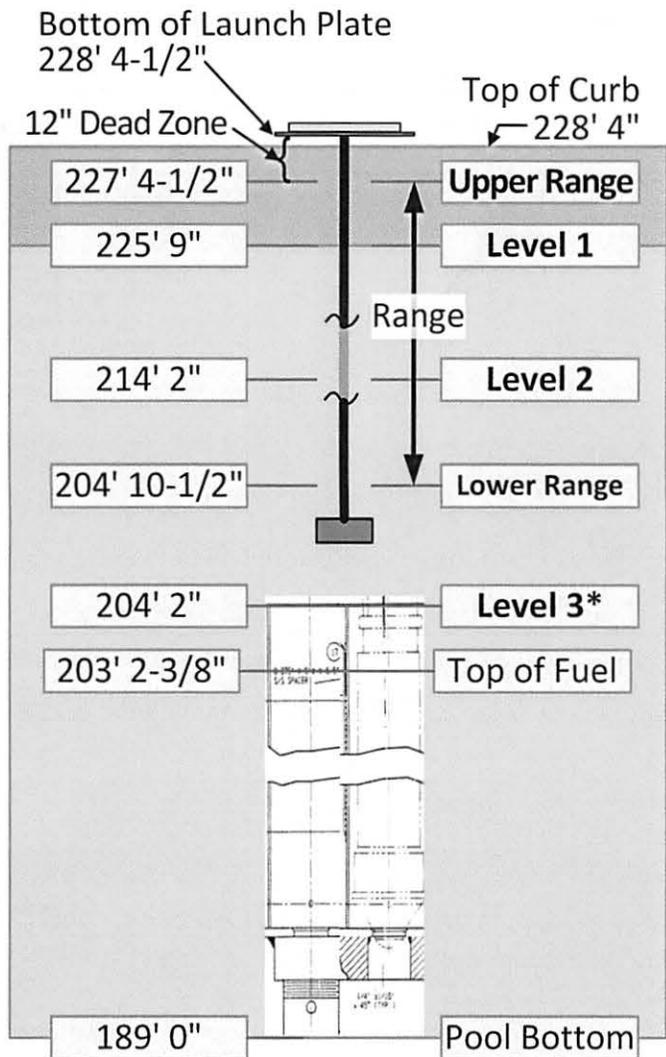
**Edwin I. Hatch Nuclear Plant – Units 1 and 2
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Enclosure 3

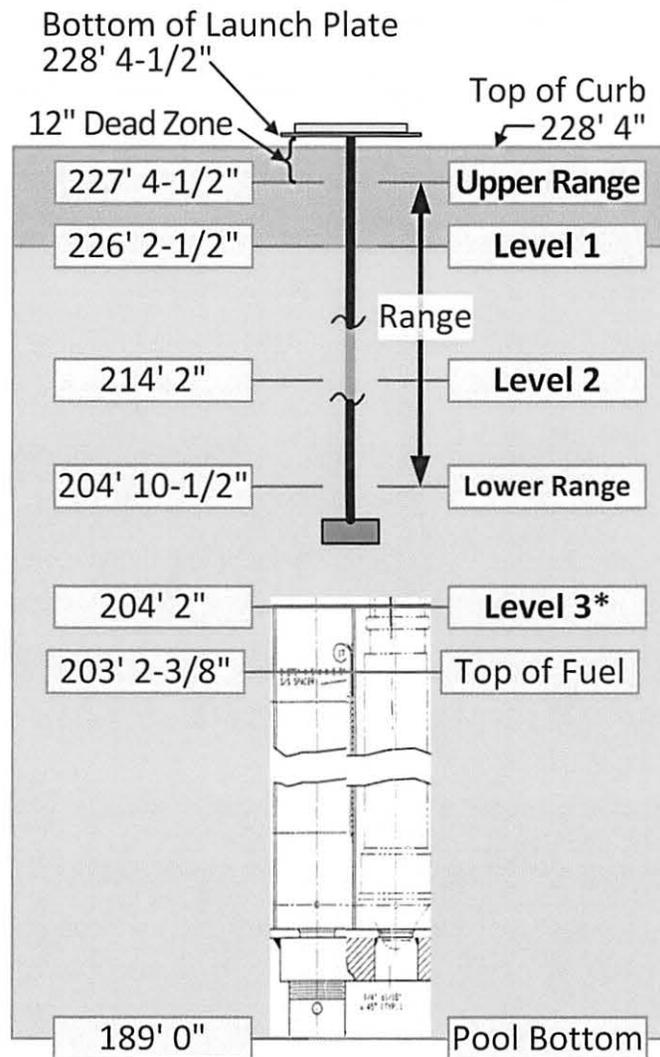
**Hatch Unit 1 and Hatch Unit 2
Elevation View of Level 1, 2, 3 and Instrument Range**

Enclosure 3 to NL-15-0240
 Hatch Unit 1 and Hatch Unit 2 Elevation View of Level 1, 2, 3 and Instrument Range

Unit 1



Unit 2



*Corresponds with the Top of Spent Fuel Racks

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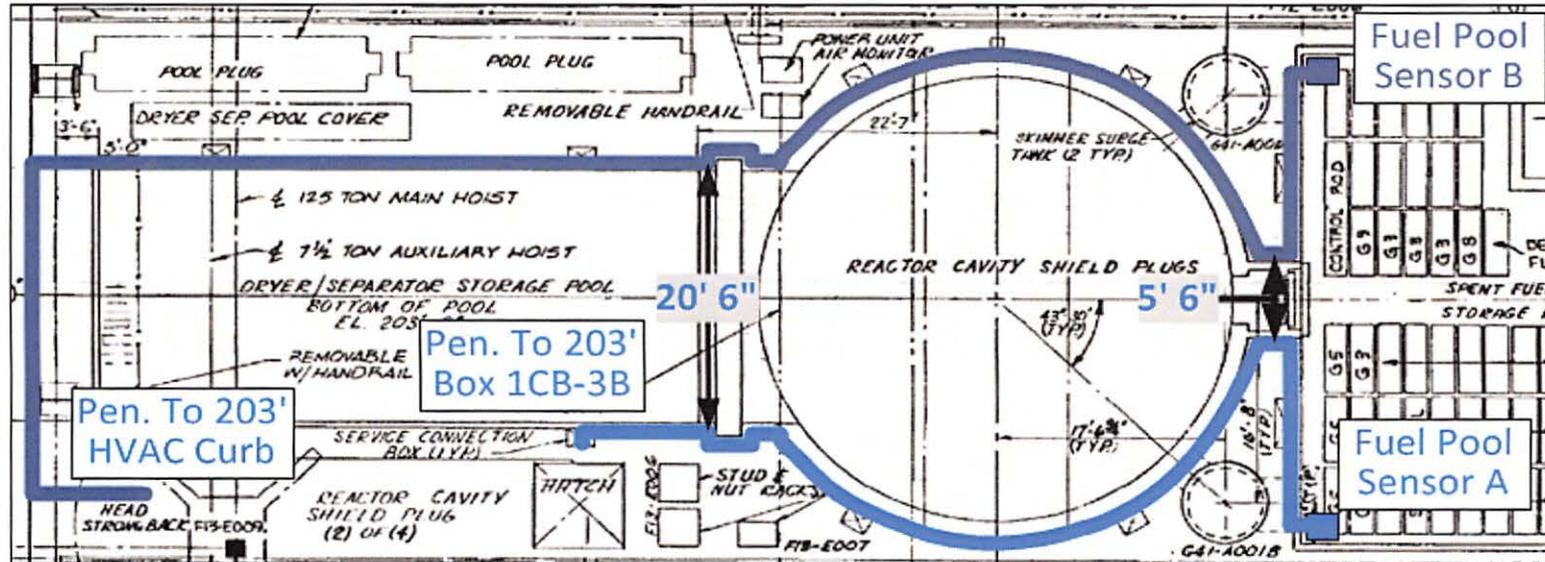
Enclosure 4

**Hatch Unit 1 and Hatch Unit 2
Proposed Sensor Location and Conduit Routing
on Elevation 228'**

Enclosure 4 to NL-15-0240

Hatch Unit 1 and Hatch Unit 2 Proposed Sensor Location and Conduit Routing on Elevation 228'

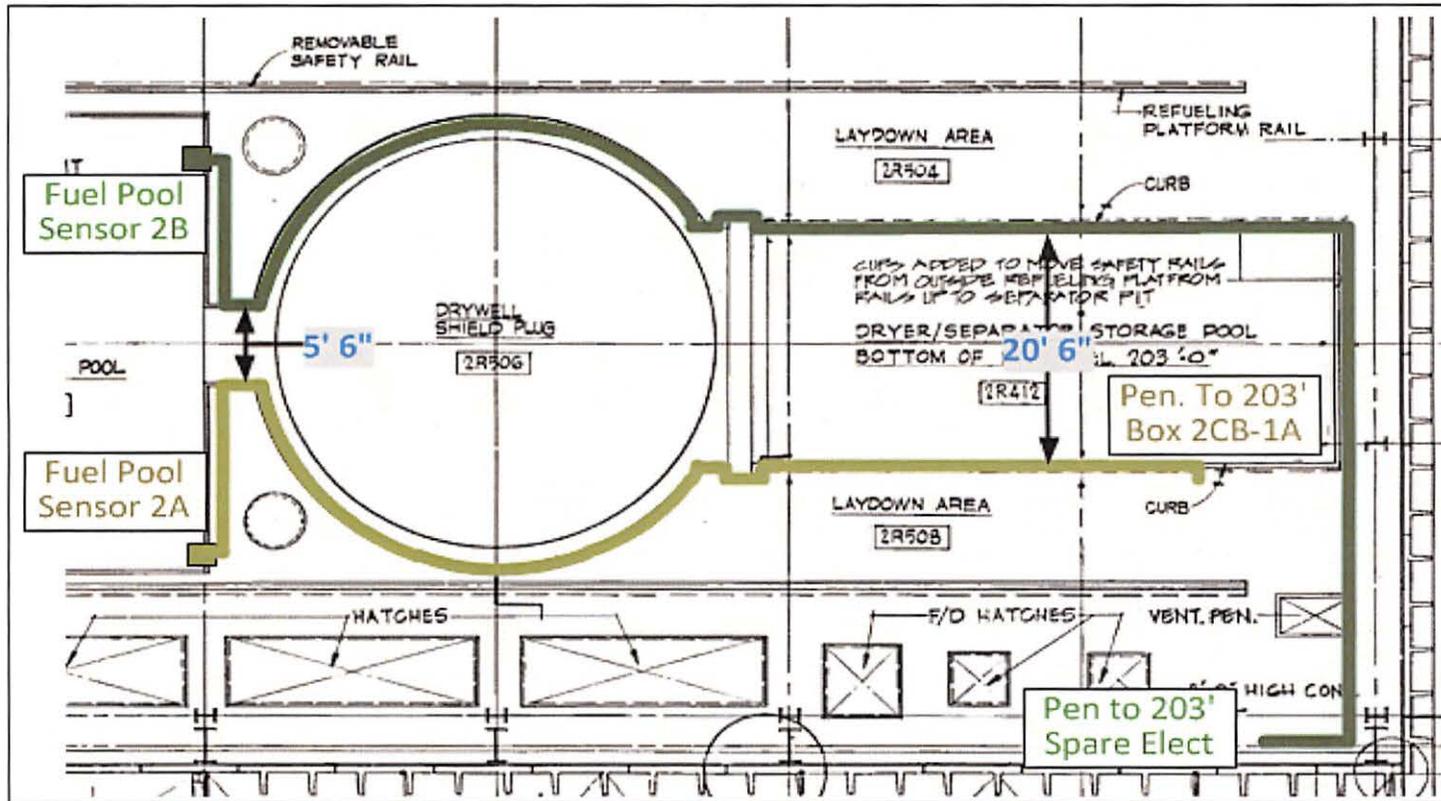
Proposed Unit 1 Sensor Location and Conduit Routing on EL. 228'



Enclosure 4 to NL-15-0240

Hatch Unit 1 and Hatch Unit 2 Proposed Sensor Location and Conduit Routing on Elevation 228'

Proposed Unit 2 Sensor Location and Conduit Routing on EL. 228'



**Edwin I. Hatch Nuclear Plant – Units 1 and 2
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Enclosure 5

**Westinghouse Status of Spent Fuel Pool Level Instrumentation
for the Edwin I. Hatch Nuclear Plant**

Westinghouse Status of Spent Fuel Pool Level Instrumentation for the Edwin I. Hatch Nuclear Plant

#	Topic	Parameter Summary	Westinghouse Reference Document #	Additional Comment	Test or Analysis Results
1	Design Specification	SFPIS Requirements derived from References 1, 2, & 3	WNA-DS-02957-GEN	Contains technical SFPIS requirements based on NRC order, NEI guidance, and the ISG listed above.	N/A
2	Test Strategy	Per Requirements.	WNA-PT-00188-GEN	Strategy for performing the testing and verification of the SFPIS and pool-side bracket.	N/A
3	Environmental qualification for electronics enclosure with Display	50° F to 140° F, 0 to 95% RH TID ≤ 1E03 R γ normal (outside SFP area) TID ≤ 1E03 R γ abnormal (outside SFP area)	EQ-QR-269, Rev. 2 and WNA-TR-03149-GEN for all conditions.	Results are summarized in EQ-QR-269, Rev. 2 and WNA-TR-03149-GEN. Radiation Aging verification summarized in Section 5 of WNA-TR-03149-GEN.	Test passed conditions described.
4	Environmental Testing for Level Sensor components in SFP area – Saturated Steam & Radiation	50 ° F to 212° F and 100% humidity	EQ-QR-269, Rev. 2	Testing summarized in Section 5.7.	Passed
		1E03 R γ normal (SFP area)	WNA-TR-03149-GEN	Thermal Aging & radiation aging verification summarized in Sections 4.1 and 5 (entire system) of WNA-TR-03149-GEN.	Passed
		1E07 R γ BDB (SFP area)	EQ-QR-269, Rev. 2	Additional radiation aging testing documented in Section 5.3.	Passed

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5	Environmental Testing for Level Sensor Electronics Housing – outside SFP	50° F to 140° F, 0 to 95% RH	EQ-QR-269, Rev. 2	Testing summarized in Section 5.5.	Passed
		100% RH	WNA-TR-03149-GEN	100% humidity addressed in Section 7.5.	Passed
		TID ≤ 1E03 R γ normal (outside SFP area) TID ≤ 1E03 R γ abnormal (outside SFP area)	WNA-TR-03149-GEN	Radiation Aging verification summarized in Section 5.	Passed
6	Thermal & Radiation Aging – organic components in SFP area	1E03 R γ normal (SFP area)	EQ-QR-269, Rev. 2 and WNA-TR-03149-GEN	Thermal Aging & radiation aging verification summarized in Sections 4.1 and 5 (entire system) of WNA-TR-03149-GEN.	Passed
		1E07 R γ BDB (SFP area)	EQ-QR-269, Rev. 2	Additional radiation aging testing documented in Section 5.3.	Passed

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#	Topic	Parameter Summary	Westinghouse Reference Document #	Additional Comment	Test or Analysis Results
7	Basis for Dose Requirement	<p><u>SFP Normal Conditions:</u></p> <p>1E03 R γ TID (above pool)</p> <p>1E09 R γ TID (1' above fuel rack)</p> <p><u>SFP BDBE Conditions:</u></p> <p>1E07 R γ TID (above pool)</p> <p>< 1E07 R γ TID (1' above fuel rack)</p>	LTR-SFPIS-13-35 and WNA-DS-02957-GEN	<p>Explanation of Basis for Radiation Dose Requirement</p> <p>(includes the clarification of production equivalency of electronics enclosure used for Seismic and EMC Testing)</p>	Passed for all conditions
8	Seismic Qualification	Per Spectra in WNA-DS-02957-GEN	EQ-QR-269, Rev. 2	Documented in Section 5.4.	Passed
			WNA-TR-03149-GEN	WNA-TR-03149-GEN provides high level summary of the pool-side bracket analysis and optional RTD.	Passed
			EQ-QR-269, Rev. 2	Seismic Pull test for new connectors documented in Section 4.4.	Passed

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9	Sloshing	N/A	LTR-SEE-II-13-47	Calculation to demonstrate that probe will not be sloshed out of the SFP.	Passed
			WNA-TR-03149-GEN	Sloshing is also addressed in Section 7.2.	Passed
10	Spent Fuel Pool Instrumentation System Functionality Test Procedure	Acceptance Criteria for Performance during EQ testing	WNA-TP-04613-GEN	Test procedure used to demonstrate that SFPIS meet its operational and accuracy requirements during Equipment Qualification Testing programs.	See applicable EQ test.
11	Boron Build-Up	Per requirement in WNA-DS-02957-GEN	WNA-TR-03149-GEN	Boron build up demonstrated through Integrated Functional Test (IFT).	Passed
12	Pool-side Bracket Seismic Analysis	N/A	CN-PEUS-14-26, Rev. 0	Also includes hydrodynamic forces, as appropriate.	Passed
13	Additional Brackets (Sensor Electronics and Electronics Enclosure)	N/A	WNA-DS-02957-GEN	Weights provided to licensees for their own evaluation.	N/A
14	Shock & Vibration	WNA-DS-02957-GEN	WNA-TR-03149-GEN	Section 7 provides rationale and summary of RTD.	N/A

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#	Topic	Parameter Summary	Westinghouse Reference Document #	Additional Comment	Test or Analysis Results
15	Requirements Traceability Matrix	Maps Requirements to documentation / evidence that Requirement is met	WNA-VR-00408-GEN, Rev. 1	The RTM maps the requirements of the NRC order, NEI guidance, ISG to the applicable technical requirements in the SFPIS design specification and maps the design specification requirements to the documentation demonstrating the requirement is met.	Complete
16	Westinghouse Factory Acceptance Test, including testing of dead-zones	IFT Functional Requirements from WNA-DS-02957-GEN	WNA-TP-04752-GEN	The Integrated Functional Test (IFT) demonstrates functionality of the full system for each customer's FAT, which includes calibration of each channel. Farley functional checks executed/passed Vogtle functional checks executed/passed	Pilot IFT executed/passed Hatch functional checks executed/passed
		12" dead-zone at top of probe 4" dead-zone at bottom of probe	WNA-TP-04752-GEN	Dead-zone tests are in Section 9.6.2.	N/A
17	Channel Accuracy	+/- 3 inches per WNA-DS-02957-GEN	WNA-CN-00301-GEN	Channel accuracy from measurement to display.	Passed

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#	Topic	Parameter Summary	Westinghouse Reference Document #	Additional Comment	Test or Analysis Results
18	Power Consumption	3 day battery life (minimum) 0.257 Amps power consumption	WNA-CN-00300-GEN	N/A	Passed
19	Technical Manual	N/A	WNA-GO-00127-GEN	Information and instructions for Operation, Installation, use, etc. are included here.	N/A
20	Calibration	Routine Testing/calibration verification and Calibration method	WNA-TP-04709-GEN	Also, includes preventative maintenance actions such as those for Boron buildup and cable probe inspection.	N/A
21	Failure Modes and Effects Analysis (FMEA)	N/A	WNA-AR-00377-GEN	Addresses mitigations for the potential failure modes of the system.	N/A
22	Emissions Testing	RG 1.180 R1 test conditions	EQ-QR-269, Rev. 2	Documented in Section 5.6.	Passed

References:

- 1) ML12056A044, NRC Order EA-12-051, "ORDER MODIFYING LICENSES WITH REGARD TO RELIABLE SPENT FUEL POOL INSTRUMENTATION," Nuclear Regulatory Commission, March 12, 2012.
- 2) ML12240A307, NEI 12-02 (Revision 1), "Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" August, 2012.
- 3) ML12221A339, Revision 0, JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation", August 29, 2012, Nuclear Regulatory Commission Japan Lessons-Learned Project Directorate.
- 4) Westinghouse Proprietary Document, WNA-DS-02957-GEN, "Spent Fuel Pool Instrumentation System (SFPIS) Standard Product System Design Specification," Revision 4 reviewed by NRC in April 2014; current revision is Revision 4.

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- 5) Westinghouse Proprietary Document, WNA-PT-00188-GEN, "Spent Fuel Pool Instrumentation System (SFPIS) Standard Product Test Strategy," Revision 1 reviewed by NRC in February 2014; NRC did not review in April; current revision is Revision 3.
- 6) Westinghouse Proprietary Document, EQ-QR-269, "Design Verification Testing Summary Report for the Spent Fuel Pool Instrumentation," Revision 1 reviewed by NRC in April 2014; current revision is Revision 2.
- 7) Westinghouse Proprietary Document, WNA-TR-03149-GEN, "SFPIS Standard Product Final Summary Design Verification Report," Revision 1 reviewed by NRC in April 2014; current revision is Revision 1.
- 8) Westinghouse Proprietary Document, LTR-SFPIS-13-35, "SFPIS: Basis for Dose Requirement and Clarification of Production Equivalency of Electronics Enclosure Used for Seismic Testing," Revision 0 reviewed by the NRC in February 2014; NRC did not review in April; current revision is Revision 1.
- 9) Westinghouse Proprietary Document, LTR-SEE-II-13-47, "Determination if the Proposed Spent Fuel Pool Level Instrumentation can be Sloshed out of the Spent Fuel Pool during a Seismic Event," Revision 0 reviewed by the NRC in February 2014; NRC did not review in April; current revision is Revision 0.
- 10) Westinghouse Proprietary Document, WNA-TP-04613-GEN, "Spent Fuel Pool Instrumentation System Functionality Test Procedure," Revision 5 reviewed by the NRC in February 2014; NRC did not review in April; current revision is Revision 5.
- 11) Westinghouse Proprietary Document, CN-PEUS-14-26, "Seismic Analysis of the SFP Mounting Bracket at Hatch Nuclear Plant Units 1 and 2," Revision 0; never reviewed by the NRC.
- 12) Westinghouse Proprietary Document, WNA-VR-00408-GEN, "Spent Fuel Pool Instrumentation System Requirement Traceability Matrix," Revision 0 reviewed by the NRC in April 2014; current revision is Revision 1.
- 13) Westinghouse Proprietary Document, WNA-TP-04752-GEN, "Spent Fuel Pool Instrumentation System Standard Product Integrated Functional Test Procedure," Revision 1 reviewed by the NRC in February 2014; NRC did not review in April; current revision is Revision 2.
- 14) Westinghouse Proprietary Document, WNA-CN-00301-GEN, "Spent Fuel Pool Instrumentation System Channel Accuracy Analysis," Revision 0 reviewed by the NRC in February 2014; NRC did not review in April; current revision is Revision 2.
- 15) Westinghouse Proprietary Document, WNA-CN-00300-GEN, "Spent Fuel Pool Instrumentation System Power Consumption Calculation," Revision 0 reviewed by the NRC in February 2014; NRC did not review in April; current revision is Revision 0.
- 16) Westinghouse Proprietary Document, WNA-GO-00127-GEN, "Spent Fuel Pool Instrumentation System Standard Product Technical Manual," Revision 1 reviewed by the NRC in April 2014; current revision is Revision 3.
- 17) Westinghouse Proprietary Document, WNA-TP-04709-GEN, "Spent Fuel Pool Instrumentation System Calibration Procedure," Revision 3 was reviewed by the NRC in February 2014; NRC did not review in April; current revision is Revision 4.
- 18) Westinghouse Proprietary Document, WNA-AR-00377-GEN, "Spent Fuel Pool Instrumentation System Failure Modes and Effect Analysis," Revision 2 was reviewed by the NRC in February 2014; NRC did not review in April; current revision is Revision 4.

**Edwin I. Hatch Nuclear Plant – Units 1 and 2
Fourth Six-Month Status Report of the Implementation of the
Requirements of the Commission Order with Regard to
Reliable Spent Fuel Pool Instrumentation (EA-12-051)**

Enclosure 6

**Hatch Unit 1 and Hatch Unit 2 Proposed
System Design Configuration**

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 Hatch Unit 1 and Hatch Unit 2 Proposed System Design Configuration

U1 and U2 Proposed System Design Configuration

