

FEB 13 2017

crpierce@southernco.com

Docket No.: 50-321
50-366

NL-17-0002

U. S. Nuclear Regulatory
Commission ATTN: Document
Control Desk Washington, D. C.
20555-0001Edwin I. Hatch Nuclear Plant – Units 1 and 2
Notification of Full Compliance of Required
Action for NRC Order EA-12-051
Reliable Spent Fuel Pool Level Instrumentation

Ladies and Gentlemen:

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Order EA-12-051, *Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation*, to Southern Nuclear Operating Company (SNC). This Order was effective immediately and directed Edwin I. Hatch Nuclear Plant (HNP) – Units 1 and 2 to install reliable spent fuel pool instrumentation as outlined in Attachment 2 of the Order.

This letter, along with its enclosure, provides the notification required by Item IV.C.3 of Order EA-12-051 that full compliance with the requirements described in Attachment 2 of the Order has been achieved for both HNP Units 1 and 2 on December 31, 2016. SNC previously notified the NRC of the Unit 1 compliance with the Order on May 3, 2016.

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
Regulatory Affairs Director
CRP/JMG/GLSSworn to and subscribed before me this 13th day of February, 2017.
Notary PublicMy commission expires: 1-2-2018

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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
Ms. C. Haney, Regional Administrator
Mr. M. D. Orenak, NRR Project Manager – Hatch
Mr. D. H. Hardage, Senior Resident Inspector – Hatch

State of Georgia
Mr. R.E. Dunn, Director – Environmental Protection Division

**Edwin I. Hatch Nuclear Plant – Units 1 and 2
Notification of Full Compliance of Required
Action for NRC Order EA-12-051
Reliable Spent Fuel Pool Level Instrumentation**

Enclosure

Compliance with Order EA-12-051

BACKGROUND

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Order EA-12-051, *Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation* (Reference 1), to Southern Nuclear Operating Company (SNC). This Order was effective immediately and directed the Edwin I. Hatch Nuclear Plant (HNP) - Units 1 and 2 to install reliable spent fuel pool instrumentation (SFPLIS) as outlined in Attachment 2 of the Order. The information provided herein documents full compliance for HNP Units 1 & 2 in response to the Order.

OPEN ITEM RESOLUTION

Issues from the NRC Interim Staff Evaluation (ISE) (Reference 9) have been addressed in the subsequent 6 month status updates and were reviewed at the October 2015 onsite audit as documented in the Audit Report (Reference 14). There were no SFPLIS Audit Questions/Audit Report Open Items.

COMPLIANCE

Edwin I. Hatch Nuclear Plant has installed two independent full scale level monitors in each of the Unit 1 & 2 Spent Fuel Pools (SFP) in response to Reference 1. The HNP site has two fuel pools (one for each unit) operated independently.

In accordance with SNC letter dated February 27, 2013 (Reference 5), HNP Unit 1 stated compliance with Reference 1 would coincide with implementation of Order EA-12-049, *Order to Modify Licenses with Regard to Mitigation Strategies for Beyond-Design-Bases External Events* (Reference 2).

Following SNC submittal of the HNP SFPLIS Overall Integrated Plan (Reference 5), the NRC requested additional information which was provided in reference 8. Subsequently, the NRC provided its interim staff evaluation and requested additional information necessary for completion of the review (Reference 9). The requested information previously provided to the NRC is included in Reference 12.

The previous responses from reference 8 and 9 were reviewed at the October 2015 onsite audit as documented in the Audit Report (Reference 14). The HNP Unit 1 Spent Fuel Pool Level Indication Audit Questions/Audit Report had no open items.

IDENTIFICATION OF LEVELS OF REQUIRED MONITORING - COMPLETE

HNP has identified the three required levels for monitoring SFP level in compliance with Order EA-12-051. Operations procedures have integrated the full capability of the Unit 1 & 2 SFP level indication systems.

INSTRUMENT DESIGNED FEATURES - COMPLETE

The design of the instruments installed at HNP Units 1 & 2 complies with the requirements specified in Reference 1 and described in NEI 12-02 "*Industry Guidance for Compliance with NRC Order EA-12-051.*" The instruments have been installed in accordance with the station design control process.

The instruments are arranged to provide reasonable protection against missiles and are mounted to retain design configuration during and following the maximum expected ground

motion. The instruments are designed to be reliable at expected environmental and radiological conditions including extended periods when the SFP is at saturation. The instruments are independent of each other and have separate and diverse power supplies. The instruments are designed to maintain their designed accuracy following a power interruption and to allow routine testing and calibration.

The SFP instrument display is readily accessible during postulated events and allows level information to be promptly available to decision makers.

PROGRAM FEATURES - COMPLETE

Training for HNP Units 1 & 2 SFPLIS is complete and was performed in accordance with an accepted training process (Systematic Approach to Training) as recommended in NEI 12-02, Section 4.1.

Operating and maintenance procedures for HNP Units 1 and 2 SFPLIS have been developed and integrated with existing procedures. Procedures have been verified and are available for use in accordance with the site procedure control program.

Site procedures and processes have been established to ensure the instruments are maintained at their design accuracy.

MILESTONE SCHEDULE – ITEMS COMPLETE

HNP Units 1 & 2 Milestone	Completion Date
Submit 20 Day Letter Acknowledging Receipt of Order	March 2012
Submit Overall Integrated Plan	February 2013
1 st 6 Month Update	August 2013
2 nd 6 Month Update	February 2014
Unit 1 - 1st Refueling Outage	March 2014
3 rd 6 Month Update	August 2014
4 th 6 Month Update	February 2015
Receipt of Unit 1 SFP Instrument Channel	June 2015
Develop Modifications Unit 1	August 2015
5 th 6 Month Update	August 2015
Develop Modifications Unit 2	November 2015
Receipt of Unit 2 SFP Instrument Channel	November 2015
Complete Functional Test of Unit 1 SFPI	February 2016
Procedures and Training Complete	February 2016
6 th 6 Month Update	February 2016
Unit 1 - 2nd Refueling Outage / Implementation Complete	March 2016
7 th 6 Month Update	August 2016
Complete Functional Test of Unit 2 SFPI	August 2016
Unit 2 – Implementation Complete	December 2016

Based on the above, the requirements of Order EA-12-051 have been achieved for HNP Units 1 & 2. A summary of HNP Units 1 & 2 compliance with the Order is provided as follows:

COMPLIANCE ELEMENTS SUMMARY

In accordance with NRC Order EA-12-051, HNP shall have a reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of the following pool water level conditions by trained personnel:

- (1) level that is adequate to support operation of the normal fuel pool cooling system,**
- (2) level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and**
- (3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred.**

The HNP Units 1 & 2 Spent Fuel Pool Level Indication System (SFPLIS) is capable of measuring SFP level from approximately nine inches above the top of the fuel racks to approximately eleven inches from the top of the SFP. A visual aid is included with the SFPLIS display units which indicates the three key SFP levels required by the Order.

1. In accordance with NRC Order EA-12-051, the spent fuel pool level instrumentation shall include the following design features:

- a. Instruments: The instrumentation shall consist of a permanent, fixed primary instrument channel and a backup instrument channel. The backup instrument channel may be fixed or portable.**

Two independent level detectors have been permanently installed in the Units 1 & 2 SFP. The level detectors are redundant and either may be used as the primary device with the other acting as the backup device.

- b. Arrangement: The spent fuel pool level instrument channels shall be arranged in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the spent fuel pool. This protection may be provided by locating the primary instrument channel and fixed portions of the backup instrument channel, if applicable, to maintain instrument channel separation within the spent fuel pool area, and to utilize inherent shielding from missiles provided by existing recesses and corners in the spent fuel pool structure.**

The detectors are located in opposing sides of the SFP, separated by a distance greater than the shortest length of a side of the pool. This provides reasonable protection of the level indicating function against missiles that may result from damage to the structure over the SFP.

- c. Mounting: Installed instrument channel equipment within the spent fuel pool shall be mounted to retain its design configuration during and following the maximum seismic ground motion considered in the design of the spent fuel pool structure.**

The sensing elements, detectors and display units are seismically qualified and mounted, consistent with the HNP Units 1 & 2 licensing bases.

- d. Qualification: The primary and backup instrument channels shall be reliable at temperature, humidity, and radiation levels consistent with the spent fuel pool water at saturation conditions for an extended period. This reliability shall be established through use of an augmented quality assurance process (e.g., a process similar to that applied to the site fire protection program).**

The sensing elements are constructed to be reliable at temperature, humidity, and radiation levels consistent with the SFP water at saturation conditions for an extended period. Westinghouse, supplier of the SFPLIS, has qualified the equipment through a quality assurance process.

- e. Independence: The primary instrument channel shall be independent of the backup instrument channel.**

The two instrumentation channels are independent. No equipment is shared between the two channels. Each channel has independent conduit runs and the conduit runs inside the Reactor Building have been routed to maximize channel separation.

- f. Power supplies: Permanently installed instrumentation channels shall each be powered by a separate power supply. Permanently installed and portable instrumentation channels shall provide for power connections from sources independent of the plant ac and dc power distribution systems, such as portable generators or replaceable batteries. Onsite generators used as an alternate power source and replaceable batteries used for instrument channel power shall have sufficient capacity to maintain the level indication function until offsite resource availability is reasonably assured.**

The instrumentation channels are each powered from separate uninterruptable power supplies (UPS). The UPS for each channel is capable of powering the instrument for greater than 24 hours. An onsite portable generator will be used to supply power to the instruments should an extended loss of AC power occur. A 24 hour battery life is sufficient time to obtain a portable generator and connect to the SFPLIS. A factory acceptance test confirmed the ability of the batteries to power the channels for a minimum of 24 hours.

- g. Accuracy: The instrument channels shall maintain their designed accuracy following a power interruption or change in power source without recalibration.**

The channels are designed to maintain accuracy following a power interruption. This feature was confirmed during the site acceptance test.

- h. Testing: The instrument channel design shall provide for routine testing and calibration.**

The channels are designed for routine testing and calibration. These features were confirmed during the site acceptance test.

- i. Display: Trained personnel shall be able to monitor the spent fuel pool water level from the control room, alternate shutdown panel, or other appropriate and accessible location. The display shall provide on-demand or continuous indication of spent fuel pool water level.**

The displays provide continuous level indication and are easily accessible by operators. The display units are located near the Main Control Room on the Reactor Building 164' Elevation for each unit, just inside the Turbine Building to Reactor Building airlock.

2. In accordance with NRC Order EA-12-051, the spent fuel pool instrumentation shall be maintained available and reliable through appropriate development and implementation of the following programs:

a. Training: Personnel shall be trained in the use and the provision of alternate power to the primary and backup instrument channels.

The Systematic Approach to Training process has been used to evaluate and develop personnel training for the SFPLIS.

I&C Technicians: The CRC re-evaluated the current tasks and determined that periodic maintenance and calibration of the new level detection system was considered skill of the craft and no training is required.

Operations: CRC determined that formal training is not required. Skill of the craft and instructions within approved procedures are adequate to monitor displays and to supply backup power, if needed. Training of Operations personnel was conducted to familiarize them with the location of the displays and the procedures associated with this new system.

b. Procedures: Procedures shall be established and maintained for the testing, calibration, and use of the primary and backup spent fuel pool instrument channels.

The following procedures have been either updated or created for testing, calibration and use of the SFPLIS:

34SO-G41-003, Spent Fuel Pool Level Indication System

New system operating procedure

34AB-G41-001-2, Loss of Spent Fuel Cooling

Added new SFPLIS channels for monitoring SFP level in a Beyond Design Basis Event.

31EO-FSG-003-2 Extended Loss of All AC Power

Added directions to initiate SFP level monitoring.

NMP-OS-019-262/282, U1 and U2 SIG-2, 600V Alternate Power

New procedure which provides instructions for connecting remote power to the SFPLIs from the 600V FLEX Diesel Generator.

34GO-OPS-030-1/-2, Reactor Building Rounds

Added weekly check/comparison of SFPLIs level displays with the SFP ruler level and check of battery alarms.

57IT-G41-001-0, Spent Fuel Pool Level Indication System - Channel Calibration

New procedure which provides instructions for calibration of new SFPLIs and UPS alarm response.

- c. Testing and Calibration: Processes shall be established and maintained for scheduling and implementing necessary testing and calibration of the primary and backup spent fuel pool level instrument channels to maintain the instrument channels at the design accuracy.**

SFPLI accuracy is evaluated by a two point response check per procedure 57IT-G41-001-0 listed above. If required, calibration of the instrument requires vendor involvement. Vendor calibration involves data changes to an EPROM chip in the instrument.

Preventative Maintenance Change Request (PMCR) 83682 was generated to establish multiple Preventative Maintenance (PM) work orders for the SFPLI System:

- 1) PM to perform test of level indication every 24 months within 60 days of planned refueling outage (U1 and U2) which begins prior to U2 refueling outage in 2017.
- 2) PM to perform 24 volt battery functional test every 24 months.
- 3) PM to replace 24 volt battery every 3 years.

Battery testing will be performed during calibration procedures using 57IT-G41-001.

REFERENCES:

The following references support the HNP Units 1 and 2 compliance with the requirements of Order EA-12-051:

1. NRC Order EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, dated March 12, 2012.
2. NRC Order EA-12-049, Order to Modify Licenses with Regard to Mitigation Strategies for Beyond-Design-Bases External Events, dated March 12, 2012.
3. Edwin I. Hatch Nuclear Plant Answer to the March 12, 2012 Commission Order Modifying License with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-51), dated March 27, 2012. (SNC letter NL-12-0619)
4. Edwin I, Hatch Nuclear Plant – Units 1 and 2 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 23, 2012. (SNC letter NL-12-2151)
5. 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. (SNC letter NL-13-0172)

Enclosure to NL-17-0002
Edwin I. Hatch Nuclear Plant – Units 1 & 2
Compliance with Order EA-12-051

6. NRC letter, Edwin I. Hatch Nuclear Plant, Units 1 and 2 - Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (Order EA-12-051), dated August 1, 2013.
7. Edwin I. Hatch Nuclear Plant – Units 1 and 2, First Six-Month Status Report of Implementation of the Requirements of the Commission Order with Regard to Reliable Spent Fuel Pool Instrumentation (Order EA-12-051), dated August 27, 2013. (SNC letter NL-13-1766)
8. Edwin I. Hatch Nuclear Plant – Units 1 and 2 Response to Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (Order EA-12-051) dated August 29, 2013. (SNC letter NL-13-1865)
9. NRC letter, Interim Staff Evaluation and Request for Additional Information Hatch Nuclear Plant Units 1 and 2 Regarding Overall Integrated Plan (OIP) for Reliable Spent Fuel Pool Instrumentation (Order EA-12-051), dated October 28, 2013.
10. Edwin I. Hatch Nuclear Plant – Units 1 and 2, Second Six-Month Status Report of Implementation of the Requirements of the Commission Order with Regard to Reliable Spent Fuel Pool Instrumentation (Order EA-12-051), dated February 26, 2014. (SNC letter NL-14-0184)
11. Edwin I. Hatch Nuclear Plant – Units 1 and 2, Third Six-Month Status Report of the Implementation of the Requirements for Commission Order with Regard to Reliable Spent Fuel Pool Instrumentation (Order EA-12-051), dated August 26, 2014. (SNC letter NL-14-1110)
12. Edwin I. Hatch Nuclear Plant – Units 1 and 2, Fourth Six-Month Status Report of the Implementation of the Requirements for Commission Order with Regard to Reliable Spent Fuel Pool Instrumentation (Order EA-12-051), dated February 26, 2015. (SNC letter NL-15-0240)
13. Edwin I. Hatch Nuclear Plant – Units 1 and 2, Fifth Six-Month Status Report of the Implementation of the Requirements for Commission Order with regard to Reliable Spent Fuel Pool Instrumentation (Order EA-12-051), dated August 27, 2015. (SNC letter NL-15-1154)
14. NRC letter, Edwin I. Hatch Nuclear Plant, Units 1 and 2 – Report for the Audit Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Pool Instrumentation Related to Orders EA-12-049 and EA-12-051 (TAC NOS. MF0712, MF0713, MF0721, and MF0722), dated January 13, 2016.
15. Edwin I. Hatch Nuclear Plant- Units 1 and 2, Sixth Six-Month Status Report Regarding Reliable Spent Fuel Pool Instrumentation (EA-12-051), dated February 25, 2016.
16. Edwin I. Hatch Nuclear Plant- Units 1, Completion of Required Action for NRC Orders EA-12-049 & EA-12-05 Mitigation Strategies for Beyond-Design Basis External Events and Reliable Spent Fuel Pool Level Instrumentation dated May 3, 2016.
17. Edwin I. Hatch Nuclear Plant- Units 1 and 2, Seventh Six-Month Status Report Regarding Reliable Spent Fuel Pool Instrumentation (EA-12-051), dated August 8, 2016.