UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

August 19, 2015

MEMORANDUM TO: Joel T. Munday, Director, Division of Reactor Projects (DRP)
Tony Gody, Director, Division of Reactor Safety (DRS)
Jimi Yerokun, Director, Division of Construction Inspection

FROM: Frank Ehrhardt, Chief, Reactor Projects Branch 1, DRP ***/RA/***
Jonathan Bartley, Chief, Engineering Branch 1, DRS ***/RA/***

SUBJECT: INSPECTION OF OCONEE NUCLEAR STATION
MAJOR PROJECTS

The purpose of this memorandum is to revise the subject memorandum dated June 9, 2009. The 2009 memorandum identified the estimated Region II inspection effort over six years with respect to major modifications at the Oconee Nuclear Station. These modifications involve tornado and high energy line break (HELB) mitigation, and protected service water (PSW) system project expansion due to a notice of violation and confirmatory order related to a fire protection program license condition (EA-13-010). This revision of the 2009 memorandum covers the modifications that have not been completed during the last six years.

Beginning in 2009, Region II conducted and documented inspections listed in the inspection plan enclosed in the June 9, 2009, memorandum. This inspection plan was implemented in parallel with NRR's review of the license amendment requests (LARs) discussed below in the background section. In 2011-2012 the tornado and HELB LAR reviews were suspended because the PSW LAR review was given a higher priority, due to the overall risk reduction provided by the system, and the fact that its completion was made a license condition in the NFPA-805 amendment issued in December 2010. The licensee previously indicated that they would resubmit the tornado and HELB LARs in March 2012, but their current schedule is for resubmittal in the first quarter of 2017. Based on the licensee's updated schedule, the 2009 inspection plan has been revised. Because the licensee has not established firm dates for some of the modification work, this revised memo does not contain a specific completion date.

Background:

HELB: Following a 1998 self-assessment of Oconee's licensing basis for HELB events outside containment, the licensee notified the NRC in January 1999 that it was initiating a project to reconstitute the design and licensing basis for HELB events outside the reactor building.

Tornado: As a result of a 95002 supplemental inspection of two White Mitigating System tornado-related findings in 2001, the NRC determined that Oconee Nuclear Station, Units 1, 2, and 3 had a number of tornado-related vulnerabilities that collectively represented a deficient tornado mitigation strategy. In 2008, the licensee submitted two LARs requesting revision to the HELB licensing basis of Unit 1 and to the tornado licensing basis of the site. Both LAR reviews were discontinued in 2011-2012 by the NRC due to the higher priority of the PSW LAR.

On November 30, 2006, the licensee submitted a letter describing strategies and listing commitments to address tornado/HELB. (ML 070290328 and ML12066A037)

PSW: On December 29, 2010, the NRC issued Amendments Nos. 371, 373, and 372 to renewed facility operating licenses DPR-38, DPR-47, and DPR-55 for the Oconee Nuclear Station, Units 1, 2, and 3 (ML 103630612). The amendments imposed new License Condition 3.D., which required among other items, implementation of the PSW modifications. On July 31, 2012, Duke Energy submitted a LAR to extend full PSW implementation by two years. On January 15, 2013, the NRC denied the July 31, 2012, LAR application (ML 12345A204). On July 1, 2013, the NRC issued an NOV and Confirmatory Order to Duke Energy specifying a schedule for implementing the PSW modifications (ML 13114A941).

Inspection Plan:

Region II conducted a review of the completed inspections and the open activities included in the original inspection plan. A revised inspection plan for the remaining activities related to the tornado and HELB commitments and the PSW work is enclosed. Several factors were used to select the activities listed in the revised inspection plan. A Region II senior reactor analyst provided risk assessments of the remaining activities. Additionally, the licensee provided information regarding the priority and risk impact of each activity. The enclosed inspection plan is subject to further revision based on NRR's review of future tornado and HELB LARs.

As described in the 2009 memo, inspections will be conducted by DRP and DRS (with assistance from DCI) under baseline inspection procedures (IP) 71111.01 (Adverse Weather Protection), 71111.04 (Equipment Alignment), 71111.06 (Flood Protection Measures), 71111.08 (In-Service Inspection), 71111.17T (Evaluation of Changes, Tests, or Experiments and Permanent Plant Modifications), and 71111.18 (Modifications). Consequently, normally allotted inspection times and/or sample sizes for some of the above baseline IPs will be exceeded. In order to minimize the impact of the "excess" samples on ROP assessments, the Task Code for the time charged against the IP in HRMS will be recorded as Other Routine (OA) versus Baseline Inspection (BI). In addition, inspection preparation and documentation for the "excess" samples will be charged to OAP and OAD.

If you have any questions regarding the enclosed Inspection Plan, please contact the Inspection Plan Coordinator, Ms. Jannette Worosilo.

Enclosure:
Oconee Nuclear Station Major Projects Inspection Plan

cc w/encl: R. Pascarelli, NRR/ DORL
R. Hall, NRR/ DORL
J. Whited, NRR/ DORL
L. Lund, NRR/DORL
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CONTACT: Ms. Jannette Worosilo, RII/SPE
(404) 997-4485

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ADAMS: ☐ Yes ACCESSION NUMBER:_____ ☒ SUNSI REVIEW COMPLETE ☒ FORM 665 ATTACHED

OFFICE	RII:DRP	RII:DRS	RII:DRP				
SIGNATURE	JGW1	JHB1	FJE				
NAME	J. Worosilo	J. Bartley	F. Ehrhardt				
DATE	7/30/2015	7/30/2015	7/30/2015	8/ /2015	8/ /2015	8/ /2015	8/ /2015
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

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OCONEE NUCLEAR STATION MAJOR PROJECTS INSPECTION PLAN

SEQ #	DCP #	Brief Description	Inspection Scope	Responsibility, Status, IR
PSW Project and Other Items				
3	OD102148 OD202149 OD302150	Siding and Girts Installation New girts and siding will be added to CDTR & WPR exterior walls, designed to meet tornado loading criteria. In addition, steel plates will be added to the exterior walls to shield the existing SSF cabling located within the CDTR & WPR. **[Commitment 5T]**	**[See notes 1, 2, 3 & 5]**	Physical work completed at the plant. Waiting for Tornado LAR to be completed.
			Confirm SSF ASW guard pipe exists and affords piping missile protection consistent with LAR **IP – 71111.04 (Equip. Align.)** *Ref- 48051, 48053, 48055, 55100, 70370*	**DRP,** **OPEN,** **TBD**

Notes:

1. Verify that mod is performed during non-tornado period and/or appropriate compensatory measures in place.
2. During potential tornado periods, verify Tormis missile assumptions for SSF related equipment.
3. Verify new passive barrier is incorporated into passive barrier program and maintenance rule (risk rank, a(4), monitoring)
4. Verify that any breaches created in support of mods have been assessed with respect to flood, ventilation, and fire impacts
5. Verify risk impact of mod activities are accounted for, compensatory actions are implemented as needed, and contingency actions are pre-planned per NSD-213, Risk Management Process. This note applies to all sequences.
6. Verify adequacy of Administration Controls (e.g., TS, PMs, surveillances, APs, EOPs, etc…) on plant operations and SSCs are appropriately captured.
7. Verify captured in submerged cable program. (71111.06, Draft RG 1132)

PSW Project and Other Items				
5	OD102154 OD202155 OD302156	BWST and SSF Trench Superstructure A 12 foot high steel superstructure will be provided to tornado protect the BWST and Auxiliary Building West Wall. In addition, the superstructure will protect the above ground portion of the SSF Trench. Modify to protect against class 1 missiles; (including valves, piping, instrumentation) BWST itself protects west wall of the CDTR for SSF piping and cables running through CDTR. Eliminate SFP to HPI flow path for RCMU (Rx Coolant Make Up). **[Commitment 4T]**	**[See notes 3 and 5]**	Physical work completed at the plant. Waiting for tornado LAR
			Verify UFSAR is revised to clarify the tornado LB to reflect: (1) elimination of SFP to HPI for RCMU; (2) applicable TORMIS methodology results; and (3) accurate tornado design information for the AB cable and electrical equipment rooms **IP - 71111.18 (MODS)** **[Commitment 18T]**	**DRS,** **OPEN,** **TBD**
PSW Project and Other Items				
	OD100924	400 kW Pressurizer Heaters and CA &	**[See notes 4, 5, 6 & 7]**	

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14	OD200925 OD300926 **PSW Milestone 5**	<u>CB Battery Charger Power Feed from the PSW Building</u> The objective of this modification is to install PSW power as an alternate (back-up) source of electrical power for operation of the Unit #1, 2 & 3 Pressurizer Heater equipment and CA & CB Battery Charger Power Feeds. Install power feeds from the new 600 VAC, load center located in the new PSW building to selected pressurizer heater loads. Install power feeds to the 1CA & 1CB. Battery Chargers from the new 600 VAC, motor control center (MCC) located in the Auxiliary building. The load swap from the primary to the back-up (PSW) power feeds from the PSW MCC will be accomplished	Verify power cables to all three Unit's PZR heaters and the 1CA and 1CB battery chargers are protected from fire/tornado/HELB effects, consistent with the assumptions of the respective LAR and NFPA-805. **IP – 71111.18 (MODS)** *Ref- 50100, 51061, 51063, 51065,*	**DRS,** **OPEN,** **NLT FEB. 2016**
			Verify sufficient heater KW available for each Unit to ensure PZR steam bubble. **IP – 71111.17 (50.59)** *Ref – 71111.21, 51061, 51063, 51065*	**DRS,** **OPEN,** **NLT FEB. 2016**

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		by installing automatic transfer switches. **[Commitment 7T and 8T] [Commitment 22H, 23H and 24H]**	Verify the battery chargers automatically swap to the PSW alternate source with the normal power supply removed. **IP –71111.18 (MODS)** *Ref- 64051*	**DRS,** **OPEN,** **NLT FEB. 2016**

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7. Verify captured in submerged cable program. (71111.06, Draft RG 1132)

PSW Project and Other Items				
16	OD100937 OD200938	<u>125VDC Vital I&C Primary and Backup Cable Re-Routes</u> A number of vital safety related cables that are part of the 125VDC Vital I&C Battery System are routed through Turbine Building. This package will replace and reroute all the 125VDC Vital I&C cables outside of the Turbine Building. All of the Unit 1 125VDC Vital I&C Battery System primary cables and Unit 1 125VDC Vital I&C Battery System backup cables to Unit 3 will be replaced with new cables routed outside of Turbine Building through areas protected from HELB and Tornado design basis events. The new cable routing will not affect the system functional characteristics and the termination points. **[Commitment 7T and 8T]** **[Commitment 22H, 23H and 24H]**	**[See notes 4, 5, 6 & 7]** Observe PMT (continuity) to ensure proper termination **IP – 71111.18** *Ref – 51051, 51053, 51055, 51061, 51063, 51065, 71111.19, 71111.21, 71111.22, 72701*	Physical work completed at the plant. **DRP,** **OPEN,** **NLT FEB. 2016**

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PSW Project and Other Items				
21	OD500920	<u>Design and Erection of Protected Service Water Building</u> This package has been developed to design and erect a new Protected Service Water Building. This building will house the new major electrical equipment needed for this system. This DCP will design and install a new reinforced concrete building south of Oconee Unit 3 in the yard area between the Radwaste Facility and the Reactor Coolant Pump (RCP) Motor Refurbishment Building adjacent to the existing CCW pipes. **[Commitment 7T and 8T]** **[Commitment 22H, 23H and 24H]**	**[See notes 3 & 5]**	
			Verify adequate facility ventilation to support housed electrical equipment heat loading and freeze protection. **IP – 71111.17 (50.59)** *Ref –50100, 71111.21*	**DRS,** **OPEN,** **READY**

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6. Verify adequacy of Administration Controls (e.g., TS, PMs, surveillances, APs, EOPs, etc…) on plant operations and SSCs are appropriately captured.
7. Verify captured in submerged cable program. (71111.06, Draft RG 1132)

PSW Project and Other Items				
22	OD500921	PSW Building Equipment Installation The objective of this package to support the installation and testing of the equipment in the new PSW building. The equipment includes switchgear, MCCs, breakers and transfer switches. Provide the engineering and design documentation to support the installation and testing of the equipment in the new PSW building. The equipment will not be energized by this modification. This package only installs the equipment necessary to provide power under other modification packages. This equipment will be located inside the New PSW Building to protect against design basis tornado and provide a source of safety related electrical power for operation of the safety related loads associated with the new PSW equipment. **[Commitment 7T and 8T] [Commitment 22H, 23H and 24H]**	**[See notes 5, 6 & 7]**	
			Verify installed equipment is seismically qualified and afforded appropriate fire protections (hose reels and detection) **IP – 71111.17 (50.59)** *Ref –50071, 50073, 50075, 64051, 93811, 71111.21*	**DRS,** **OPEN,** **READY**

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PSW Project and Other Items				
28	OD500933	<u>Replace the ASW System with the New PSW System</u> The existing ASW pump/motor will be replaced by separate PSW Booster and Primary Pumps/motors to provide the injection pressure range required of the new PSW System. New manual transfer switches for I&C power, the new exhaust fan and the new pump minimum flow valve, as well as a new PSW Instrument and Control Panel will be installed. Associated power and control cables, instruments and controls will be provided and connected as part of this package. The DCP will provide all the activities required to install and put into service the new PSW Pump. The following tasks will be performed:	**[See notes 5 & 6]**	**Seismic review done. Waiting for tornado and HELB LARs.**
			Verify piping/components/control and power cables are seismic and protected from HELB/tornado/fire effects per applicable LAR. **IP – 71111.17 (50.59)** *Ref – 71111.05, 50075, 55100, 64051, 71111.21*	**DRS,** **OPEN,** **TBD**

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		Install a 2000 hp primary pump and a booster pump. Install the PSW pipe, valves and instruments. Terminate power cables (installed by other DCPs) at PSW booster and primary pumps and Electro- Mechanical Operated (EMO) valves Install and terminate control cable from breakers (PSW Bldg) to EMO valves Install and terminate instrumentation cable from Main Control Room (MCR) ATC cabinet to instruments and EMO valves. Perform integrated system testing of the PSW system, including primary and backup power and response to system inputs When installed and tested, the PSW system will be operable. This is the last modification to be completed for the PSW Project. **[Commitment 7T and 8T] [Commitment 22H, 23H and 24H]**		

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PSW Project and Other Items				
36	Modifications numbers have not been assigned for these mods. However, the engineering change request has been originated. This request is tracked in PIP O-98- 5293, CA 53.	<u>Modify Valves HP-103 and 107 (Suction lines to HPI Pumps)</u> Will allow remote operation with reach rod. Mod to include two new valves in series with HP 103 and 107. Following HELB on discharge of HPI, remotely isolate damaged HPI such that other HPI remains available. Maintain availability of LDST. Single Failure vulnerability being addressed. **[Commitment 28H, 36H and 42H]**	**[See notes 5 & 6]**	
			Verify valves are safety-related, with operation protected from HELB effects. **IP – 71111.18 (MODS)**	**DRS,** **OPEN,** **READY**
			Assess effect of mod on HPI during/after installation. **IP – 71111.18 (MODS)**	**DRP,** **OPEN,** **READY**
			Observe PMT and assess adequacy of Administrative controls (e.g., PMs, surveillances, EOPs, APs, etc.) **IP – 71111.18 (MODS)** *Ref –71111.19, 71111.21, 71111.22, 72701*	**DRP,** **OPEN,** **READY**

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7. Verify captured in submerged cable program. (71111.06, Draft RG 1132)

PSW Project and Other Items				
37		Replace CCW Discharge Stop Gates Enable termination of reverse flow through HELB damaged CCW and LPSW piping. Required to recover from TB flood caused by HELB. **[Commitment 31H]** –	**[See note 6]**	
			Observe PMT and assess use TB flood control. **IP – 71111.18 (MODS)** Ref – 71111.06, 50090, 55100 551501, 73753, 73755, 73756	**DRP,** **OPEN,** **TBD**
			Verify during modification review that this modification use in TB flood control is adequate.	**DRS,** **OPEN,** **TBD**

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PSW Project and Other Items				
43	Modification is still in design phase.	Control Room Complex HVAC Mods Serve to isolate control room from steam/air environments. MS or MFDW break in EPR causes steam/air intrusion into Aux Bldg. Duct Registers located in rooms adjacent to EPR that could carry steam/air into control room. These will be covered to prevent possible migration into control room A block wall adjacent to EPR that is not reinforced may collapse following HELB and affect HVAC ductwork and allow steam/air to enter the control room. A new structural barrier will be built to protect the ductwork or HELB actuated dampers will be installed. **[Commitment 27H, 35H and 41H]**	**[See notes 3, 5 & 6]**	
			Verify duct registers covered and new structural barrier or HELB actuated dampers installed. **IP – 71111.18 (MODS)** *Ref –48051, 48053, 48055*	**DRP,** **OPEN,** **TBD**
			Observe PMT and assess adequacy of Administrative controls (e.g., PMs, surveillances, EOPs, APs, etc.) if dampers installed. **IP – 71111.18 (MODS)** *Ref –71111.19, 71111.22, 72701*	**DRP,** **OPEN,** **TBD**

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PSW Project and Other Items				
45		Upgrade TB Structural Support Columns D-29 and 31 (Unit 2) to prevent potential failure Prevents loss of routing to get temporary cabling to LPI and LPSW motors. **[Commitment 38H]**	**[See note 5]**	
			Inspection sample accomplished via Activity 44, unless inspection results revealed the need for additional oversight. **IP – 71111.17 (50.59)** *Ref- 48051, 48053, 18055, 71111.21*	**DRS,** **OPEN,** **TBD**
48	Unit 1 - 2020 Unit 2 - 2021 Unit 3 – 2022	Physically protect the ADVs per UFSAR Class 1 tornado criteria. **[Commitment 16T]**	**[See notes 3, 5 & 6]**	
			Verify doing IP 71111.17 review that modification tornado missile protection afforded.	**DRS,** **OPEN,** **TBD**

Notes:

1. Verify that mod is performed during non-tornado period and/or appropriate compensatory measures in place.
2. During potential tornado periods, verify Tormis missile assumptions for SSF related equipment.
3. Verify new passive barrier is incorporated into passive barrier program and maintenance rule (risk rank, a(4), monitoring)
4. Verify that any breaches created in support of mods have been assessed with respect to flood, ventilation, and fire impacts
5. Verify risk impact of mod activities are accounted for, compensatory actions are implemented as needed, and contingency actions are pre-planned per NSD-213, Risk Management Process. This note applies to all sequences.
6. Verify adequacy of Administration Controls (e.g., TS, PMs, surveillances, APs, EOPs, etc…) on plant operations and SSCs are appropriately captured.
7. Verify captured in submerged cable program. (71111.06, Draft RG 1132)

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PSW Project and Other Items				
49	Modification numbers have not been assigned for these mods. However, the engineering change request has been originated.	<u>MSIVs and Power Atmospheric Dump Valve (PADV)</u> Currently the Main Turbine Stop Valves are the first pressure boundary. MSIVs and branch line containing the MSRVs and PADVs are to be installed just outside TB (on top of Aux Bldg). MSIVs will provide assured means of MS pressure boundary control (this will include new branch with PADV and MSRVs) Serves to prevent the use of TB equipment while providing stable platform for SSF and PSW.	**[See notes 3, 4, 5 & 6]**	
			Assess seismic effects and adequacy of AB roof/support structure to support MSIVs **IP – 71111.17 (50.59)** *Ref –48051, 48053, 48055, 55100, 55150, 71111.21*	**DRS/DCI,** **OPEN,** **TBD**
			Assess adequacy of MSIVs, PADVs, and MSRVs to support SSF and PSW operations. **IP – 71111.17 (50.59)** *Ref - 71111.21*	**DRS,** **OPEN,** **TBD**

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	This request is tracked in PIP O-04-4733 CA 11. Unit 1-2021 Unit 2-2022 Unit 3-2023	The MSRVs will be flanged. MSIVs and PADVs to be operated from CR and SSF CR. change, and could change a lot if the licensee moves to 24 month fuel cycles. **[Commitment 11T, 12T and 13T]** **[Commitment 22H, 23H and 24H]**	Verify operation (via PMT) of MSIVs from CR and SSF and administrative controls (e.g. TS, SLC, PMs, surveillances, EOPs, APs, etc?). **IP – 71111.17 (50.59)**	**DRP,** **OPEN,** **TBD**
			Verify MSIVs, PADVs, MSRVs and associated piping/controls are adequately protected from tornado, HELB, seismic, and fire effects. **IP – 71111.17 (50.59)** *Ref –49061, 49063, 49065, 50090, 70370, 71111.21, 73053, 73055, 73753, 73756*	**DRS,** **OPEN,** **TBD**
			Verify the effects on time critical operator actions are achievable	**DRS,** **OPEN,** **TBD**

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PSW Project and Other Items				
56	**PSW Milestone 6**	Verify NFPA 805 requirements have been met based on approved LAR		
			Verify that the cables rerouted to areas with protection consistent with the assumptions of NFPA-805.	**DRS,** **OPEN,** **NLT NOV 2016**

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