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May 13, 2009

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Subject: Oconee Nuclear Station  
Docket Nos. 50-269, -270, -287  
Licensee Event Report 269/2006-004, Revision 1  
Problem Investigation Process No.: O-05-3849,  
O-05-4578, O-06-1638, O-06-8064

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Revision 1 to Licensee Event Report 269/2006-004, regarding deficiencies identified as part of the Appendix R Reconstitution Program and NFPA 805 Pilot Program.

This report is being submitted in accordance with 10 CFR 50.73 (a)(3)(ii)(B) as unanalyzed conditions. The revision updates the LER to include PRA results which were not available at the time of the original LER submittal.

This event is of low to moderate significance with respect to the health and safety of the public.

There are no remaining regulatory commitments contained in this report.

Any questions regarding the content of this report should be directed to Russ Oakley at 864-873-3829.

Sincerely,

Dave Baxter, Vice President  
Oconee Nuclear Site

Attachment

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Date: May 13, 2009

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Mr. Andy Hutto  
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Oconee Nuclear Station

INPO (via E-mail)

Date: May 13, 2009

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(Revised 4-2-2009)

**LICENSEE EVENT REPORT (LER)**

(See reverse for required number of digits/characters for each block)

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**4. TITLE**  
Design Oversight Results in Appendix R Deficiencies

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	03	2005	06	004	1	5	13	2009	Unit 2	050-0270
									Unit 3	050-0287

<b>9. OPERATING MODE</b> NA	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply)										
	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)							
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)								
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)								
<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)								
<b>10. POWER LEVEL</b> NA	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)							
<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)								
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)								
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER								
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> Specify in Abstract below or in NRC Form 366A								

**12. LICENSEE CONTACT FOR THIS LER**

NAME R. L. Oakley, Senior Compliance Engineer	TELEPHONE NUMBER (Include Area Code) (864) 885-3829
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE		
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO		MONTH	DAY	YEAR

**16. ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

Licensee Event Reports 269/2002-02 (5-28-2002) and 269/2003-01 (8-4-2003) reported vulnerabilities to hot shorts and other Appendix R design deficiencies. As a result of the corrective actions from the first event, Oconee Nuclear Station initiated an Appendix R reconstitution program and subsequently elected to participate in the pilot NFPA 805 transition program. The original Appendix R evaluations considered spurious operation of many analyzed components to not be credible and assumed components would lose power, thus precluding spurious operation. However, the Current Licensing Basis requires that plant transients caused by one worst case hot short must be addressed. Between 6-3-2005 and 11-21-2006, the reconstitution program identified and documented in the Oconee corrective action program vulnerabilities to hot shorts which had not previously been considered. These issues involve potential spurious pump starts and spurious valve operations with associated procedure changes needed to address the possible hot shorts. The continuation of the Appendix R reconstitution program and the pilot NFPA 805 transition program will continue to identify and correct these items.

This event is of low to moderate significance with respect to the health and safety of the public.

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EVALUATION:

BACKGROUND

This event is reportable per 10CFR 50.73(a)(2)(B)

The issues identified below do not meet the Current Licensing Basis with respect to spurious actuations for Oconee Nuclear Station (ONS) in that plant transients caused by one worst case hot short are not addressed.

Historically, the issue of hot shorts and multiple hot shorts requirements has received extensive attention by the NRC and industry without resolution. For many years ONS considered that hot shorts were not credible and were therefore not addressed. In late 2002, ONS initiated an Appendix R Reconstitution Program in response to deficiencies that were identified as an acknowledgment that the ONS current licensing basis required a single case worst hot short with respect to Appendix R requirements. The purpose of the Reconstitution Program is to perform a thorough Safe Shutdown Analysis to identify potential fire damage and related impacts on the plant. Duke met with the NRC on December 6, 2004 to discuss the Appendix R Reconstitution Project and to also discuss transition to NFPA 805. Transitioning to NFPA 805 will address multiple hot shorts in addition to single case worst hot shorts and will provide resolution to a long standing industry/NRC issue. On February 28, 2005 Duke submitted a letter formally committing to NFPA 805 and volunteering Oconee to serve as a pilot plant for the proposed transition to NFPA 805. The NRC letter dated June 8, 2005 accepted Oconee as an NFPA 805 pilot plant and interpreted that Oconee would initiate transition June 1, 2005 and complete by May 31, 2007. As a pilot plant for a Fire Protection Program under 10CFR50.48(c) and NFPA-805, we are developing with industry experts, NRC NRR staff and NRC inspectors the tools and methodology needed to implement a risk-informed approach to post-fire safe shutdown and the means to effectively address multiple spurious actuations.

The Current Licensing Basis with respect to spurious actuations for ONS is now interpreted that plant transients caused by one worst case hot short must be addressed as part of the licensing basis. Spurious operation of many analyzed components was considered to

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not be credible in the original Appendix R evaluations and components were assumed to fail as a result of loss of power precluding spurious operation.

As recommended in the NRC Inspection Manual, ONS enters identified conditions into the corrective action program via the Problem Investigation Process (PIP). PIP O-02-1357 and LER 269/2002-02 identified possible failure of the Reactor Coolant Makeup (RCMU) pump as the result of spurious operation of two motor operated valves. PIP O-02-5549 documented Appendix R deficiencies identified during an Appendix R compliance self assessment in October 2002. PIP O-03-3708 and LER 269/2003-01 identified cable routing in areas not protected by fire suppression or detection systems which could potentially lead Reactor Coolant System (RCS) (EIIS:AB) leakage to exceed the capability of the RCMU pump during an event requiring Standby Shutdown Facility (SSF) (EIIS:NB) activation.

Prior to this event Units 1, 2, and 3 were operating at ~100% power with no safety systems or components out of service that would have contributed to this event.

EVENT DESCRIPTION

As a result of the ongoing Appendix R reconstitution program and the pilot NFPA 805 transition program, additional items have been identified which are vulnerable to hot shorts which had not previously been considered. The items identified as vulnerable to hot shorts needing to be addressed are; (1) spurious pump starts and (2) spurious valve operations. We have also identified needed procedure revisions to assure appropriate manual operator actions and cold shutdown repairs are implemented if a hot short occurs. These items were not evaluated as part of the original Appendix R analysis. These items are considered reportable per 10CFR50.73 (a)(2)(B) as unanalyzed conditions.

These items are identified and tracked in four PIPS (O-05-3849, O-05-4578, O-06-1638 and O-06-8064) dated June 3, 2005, July 13, 2005, March 22, 2006, and November 21, 2006. At the time of the first PIP all three plants were operating at 100% power. LER 269/2002-02 had identified vulnerability to hot shorts previously and these items were considered to be additional examples of the extent of condition of the same issue (vulnerability to hot shorts)

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and an LER supplement was considered appropriate when the identification of items was complete and the risk evaluation completed. As the program has extended for a longer period than originally anticipated, it is appropriate to issue an LER at this time prior to completion of the risk evaluation.

Compensatory measures are in place in accordance with Nuclear System Directive 316 Fire Protection Impairment and Surveillance and Site Directive 3.2.14 Fire Protection Program Compensatory Measure Process. Fire prevention surveillances are presently in place for Appendix R deficiencies as follows:

1. 1, 2, 3 Cable Rooms,
2. 1, 2, 3 Turbine Building 3rd floor Various Areas
3. 1, 2, 3 Auxiliary Shutdown Panels
4. 1, 2, 3 Equipment Rooms
5. 1, 2, 3 East Penetration Rooms
6. 1, 2, 3 West Penetration Rooms
7. 1, 2, 3 Cask Decon rooms
8. 1, 2, 3 Spent Fuel Cooler Rooms
9. Standby Shutdown Facility

Further discussion of the identified Appendix R deficiencies are provided in the Safety Analysis section of this report.

**CAUSAL FACTORS**

LER 269/2002-02 previously addressed vulnerability to hot shorts and identified the cause as a historic design deficiency existing since the Standby Shutdown Facility was declared operational in 1986. It had been assumed that these components would fail as a result of loss of power thereby precluding spurious operation. The items identified in this LER are the results of the same historic Appendix R design deficiency.

The original ONS Appendix R Safe Shutdown Analysis considered the consequences of a spurious HPI pump start to be a low risk problem. The following statement was made in an internal correspondence from Safety Analysis to Design Engineering dated 10/10/85: "Spurious operation of HPI would increase RCS inventory and cause RCS pressure and pressurizer level to rise. The maximum fill rate from the worst case would be approximately 26 inches per minute in the pressurizer. Subcooled natural circulation would maintain core

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cooling, and the pressurizer safety relief valves would prevent overpressurization of the primary system. Therefore, no mandatory action is required to mitigate the spurious actuation of HPI. However, it is recommended that the following caution be included in the SSF procedure: 'if increasing pressurizer level and RCS pressure are observed along with stable or decreasing RCS temperatures, and the RCS is adequately subcooled, then spurious high pressure injection is occurring and action should be taken to control it when possible.'

CORRECTIVE ACTIONS

Immediate:

Fire prevention surveillances have been set per NSD 316 and SD 3.2.14. These procedures have been developed using industry best practices. Valves 1MS-33, 2MS-24, and 3MS-33 were verified closed and associated breakers White Tagged Open.

Subsequent and Planned:

The Appendix R Reconstitution and NFPA 805 Transition Program is continuing. The following tasks remain to be completed:

1. Identification of actions necessary to mitigate spurious pump starts and valve operation,
2. Feasibility evaluation of manual operator actions to mitigate spurious pump starts and valve operation,
3. Development/identification of procedural guidance necessary to mitigate spurious pump starts, valve operation and cold shutdown repairs,
4. Identification and implementation of appropriate modifications,
5. Evaluate the identified issues with respect to risk in order to compare them to NFPA-805 Enforcement Discretion requirements.
6. Conduct risk analysis of multiple spurious operations and compare them to NFPA-805 Enforcement Discretion requirements

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7. Update this LER. (expected ~ December 31, 2007)

Corrective action 7 is considered an NRC Commitment item. There are no other NRC Commitment items contained in this LER.

SAFETY ANALYSIS

To date approximately 30 spurious HPI Pump Starts and approximately 90 spurious valve operations have been identified as hot short vulnerabilities. Evaluations have also identified 21 procedure enhancements. All deficiencies are captured and tracked within the corrective action program.

SPURIOUS HPI PUMP STARTS

Post Fire Safe Shutdown procedural guidance does not adequately address potential spurious operation of the High Pressure Injection (HPI) (EIIS:BG) Pumps. Based upon a review of the pump circuits, the HPI pumps could be affected by fires in numerous fire areas/zones as documented in the referenced PIPs.

Since a spurious start of an HPI Pump could result in plant conditions that could defeat safe shutdown, the plant design does not meet the requirements of the current licensing basis. This situation was not addressed in the original plant design which assumed that HPI would fail as a result of loss of power, precluding spurious HPI operation.

OTHER SPURIOUS INITIATIONS

In addition to spurious HPI pump starts, other issues not evaluated as part of the original Appendix R analysis also have the potential to affect post-fire safe shutdown. The identified issues are not typically with the "required" or "credited" component or systems to achieve and maintain safe shutdown but with "associated" components whose mal-operation could adversely affect safe shutdown and which were not addressed in the supporting analyses.

The areas identified were: Spurious Pump Starts, Spurious Engineered Safeguards (ES) (EIIS:JE) Actuations, Spurious Pressurizer (EIIS:PZR) Heater Operation, Spurious Valve (EIIS:20) Operations, and procedure enhancement for required manual actions

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and implementation of cold shutdown repairs. The other spurious starts identified are: Low Pressure Injection (LPI) (EIIS:BP) pump, Condensate Booster (EIIS:SD) pump, Main Feedwater (MFW) (EIIS:SJ) pump, Emergency Feedwater (EFW) (EIIS:BA) pump, Building Spray (BS) (EIIS:BE) pump, and Reactor Coolant pump. These situations were not addressed in the original plant design which assumed that these components would fail as a result of loss of power, precluding spurious operation.

The Reconstitution Project performed a unit similarity comparison with Unit 2 as the base which found a 2% deviation for Unit 1 and 11% deviation for Unit 3. Circuit and cabling analysis were completed for Unit 2 and Unit 3. Although the re-analysis performed to date has not included Unit 1, the results are considered representative of all three units and compensatory measures were enacted for the affected fire areas in all three units. Circuit and cabling analysis for Unit 1 will be conducted for all risk significant scenarios identified for Units 2 and 3. Procedure Enhancements for required manual operator actions and implementation of cold shutdown repairs are taken from the Unit 2 review and are tracked in the corrective action program and are representative of Units 1, 2, and 3. Typically steps have been identified to guide the operator through appropriate actions.

These items did not significantly degrade plant safety.

This event did not include a Safety System Functional Failure.

Therefore, this event is deemed to be of low to moderate impact on the health and safety of the public.

**ADDITIONAL INFORMATION**

The Appendix R Reconstitution and NFPA 805 Transition Project is divided into three phases as described in the December 14, 2004 meeting. Phase I, which developed the Safe Shutdown Equipment List and logic diagrams, was completed prior to the December 2004 Meeting. The issues described in this LER were identified during the ongoing Phase II Cable and Fire Area Analysis phase. Phase III, Performance Based/Risk Informed analysis of multiple spurious actuations, is expected to complete on a schedule to be determined with NRC Region II. This LER will then be updated with the Phase III results.

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The status of the NFPA 805 Transition Project was discussed with the NRC during the October 2006 NFPA 805 Pilot Plant Transition Observation Visit at the Oconee site. Additional status meetings are expected to be conducted monthly.

The items identified in this LER occurred at the same time as the Appendix R deficiencies identified in LER 269/2002-02 and LER 269/2003-01 as a result of design oversights. The corrective actions identified in those LERs could not prevent the occurrence of these items. The corrective actions from those LERs have led to the identification of the items reported in this LER. Therefore, this event is not considered recurring.

There were no releases of radioactive materials, radiation exposures or personnel injuries associated with this event.

This event is not considered reportable under the Equipment Performance and Information Exchange (EPIX) program.