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August 6, 2009

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

Subject: Oconee Nuclear Station
Docket No. 50-269
Licensee Event Report 269/2009-01, Revision 0
Problem Investigation Process No.: O-09-04185

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report 269/2009-01, Revision 0, regarding the discovery of three (3) past instances where spent fuel assemblies were not stored in the Unit 1 and 2 spent fuel pool in accordance with Technical Specification 3.7.13 requirements. This report is being submitted in accordance with 10 CFR 50.73 (a) (2) (i) (B), as operating in a condition prohibited by the Technical Specifications.

This event is considered to be of no significance with respect to the health and safety of the public.

There are no regulatory commitments contained in this report.

Any questions regarding the content of this report should be directed to Stephen C. Newman, at 864-873-4388.

Sincerely,

Dave Baxter, Vice President
Oconee Nuclear Station

Attachment

Document Control Desk

Date: August 6, 2009

Page 2

cc: Mr. Luis Reyes
Administrator, Region II
U.S. Nuclear Regulatory Commission
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Mr. John Stang
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Mr. Eric Riggs
NRC Senior Resident Inspector (Acting)
Oconee Nuclear Station

INPO (Word File via E-mail)

Document Control Desk

Date: August 6, 2009

Page 3

bxc: ONS Station:

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EPIX Cord/R.E. Harris,

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(Revised 2-3-2009)

LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME Oconee Nuclear Station, Unit 1	2. DOCKET NUMBER 05000 269	3. PAGE 1 OF 6
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4. TITLE
Several Prior Spent Fuel Pool Configurations Did Not Comply with TS 3.7.13

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	10	2009	2009	- 01 -	0	08	06	2009	Unit 2	05000270
									FACILITY NAME	DOCKET NUMBER
									None	05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: <i>(Check all that apply)</i>
10. POWER LEVEL 100%	<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 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) <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 checked="" type="checkbox"/> 50.73(a)(2)(i)(B) <input type="checkbox"/> 50.73(a)(2)(v)(D) <input type="checkbox"/> OTHER <div style="text-align: right; font-size: small;">Specify in Abstract below or in NRC Form 366A</div>

12. LICENSEE CONTACT FOR THIS LER

NAME S. C. Newman, Regulatory Compliance Lead Engineer	TELEPHONE NUMBER (Include Area Code) (864) 873-4388
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE MONTH DAY YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On June 10, 2009, it was determined that there had been three (3) prior instances where spent fuel assemblies had not been stored in the Spent Fuel Pool (SFP) in compliance with Technical Specification (TS) 3.7.13. Each of the instances occurred in the shared Unit 1 and 2 SFP (Unit 3 has a separate SFP), during refueling outages, and in each case, the noncompliance existed from approximately one (1) week to one (1) month before the fuel was reloaded and TS compliance subsequently restored.

TS LCO 3.7.13, Condition A states, [upon discovery of the noncompliance] "Initiate action to move the noncomplying fuel assembly to the correct location." The required action completion time is given as "immediately." Duke has concluded that in each of these instances, a noncompliance with the TS existed that was not corrected in a timeframe commensurate with the required action completion time. Consequently, this event is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by the TSs.

As interim corrective actions, both Oconee current SFPs were confirmed to be in full compliance with TS 3.7.13, and applicable fuel handling procedures were revised to ensure that future storage configuration changes are validated by the subject matter expert(s) before being made. This event is considered to have no significance with respect to the health and safety of the public.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Oconee Nuclear Station, Unit 1	05000269	2009	- 01	- 0	2 OF 6

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

EVALUATION:

BACKGROUND

In 1980, the Spent Fuel [EIIS: DA] Pool (SFP) common to Oconee Nuclear Station (ONS) Units 1 and 2 was re-racked to increase the spent fuel storage capacity to 1312 fuel assemblies. The entire fuel assembly storage rack [EIIS: RK] was constructed of type 304 stainless steel, with Boraflex panels attached to each cell. The Boraflex was credited for reactivity control. However, it was later determined that the Boraflex panels were degrading and that credit for the boron contained in the panels could no longer be taken.

In December 2000 a License Amendment Request (LAR) was submitted to remove the boron credit taken in the criticality analyses for the Boraflex panels installed in the SFP racks. As a result, the present Technical Specification (TS) Limiting Condition for Operation (LCO) 3.7.13, approved in April 2002, defined three storage configurations that were to be used to achieve acceptable spent fuel storage: Unrestricted, Restricted, and Checkerboard. Unrestricted storage allows storage in all cells without restriction on the storage configuration; Restricted storage allows storage of higher reactivity fuel when restricted to a certain storage configuration with lower reactivity fuel; Checkerboard storage allows storage of the highest reactivity fuel in each region when checkerboarded with empty storage cells.

For the Unit 1 and 2 SFP, the fuel classification criteria are given in TS Tables 3.7.13-1, 3.7.13-2, and 3.7.13-3 and the fuel storage patterns are given by Figures 3.7.13-1 and 3.7.13-2. Similar TS guidance is provided for the Unit 3 SFP.

TS 3.7.13 is applicable whenever any fuel assembly is stored in the SFP. If the LCO is not met, Condition A states, [upon discovery of the noncompliance] "Initiate action to move the noncomplying fuel assembly to the correct location." The required action completion time is given as "immediately."

Between 2006 and 2008, three separate SFP storage instances occurred that were later revealed to be noncompliant with the TS. Consequently, these events are being reported pursuant to 10 CFR

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Oconee Nuclear Station, Unit 1	05000269	2009	- 01	- 0	3 OF 6

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

50.73(a)(2)(i)(B) as operating in a condition prohibited by the TSs.

At the time of the discovery of these past events, Units 1 and 2 were operating at 100% power. At the actual time of the individual instances, one unit was in refueling while the other unit was operating at 100% power. No plant evolutions or other inoperable equipment contributed to these events.

EVENT DESCRIPTION

On June 10, 2009, it was determined that there had been three (3) prior instances where spent fuel assemblies had not been properly stored in the SFP in compliance with TS 3.7.13. Each of the instances occurred in the shared Unit 1 and 2 SFP (Unit 3 has a separate SFP), during refueling outages. In each case, the noncompliance existed for a short duration ranging from approximately one (1) week to one (1) month before the condition was corrected. TS 3.7.13 compliance was restored as a result of the noncompliant fuel being reloaded back into the core.

Specifically, the following core offloads to the Unit 1 and 2 SFP were affected:

1. Unit 1, End-of-cycle(EOC) 23; Fall 2006
2. Unit 2, EOC 22; Spring 2007
3. Unit 1, EOC 24; Spring 2008

The required loading pattern for Restricted [R] and Filler [F] fuel assembly storage (as shown by TS Figure 3.7.13-1), was not met in certain areas of the SFP. A review of past SFP configuration maps from the above three core offload periods reveal several Restricted/Filler fuel configurations that did not comply with the storage patterns given in the TS.

Specifically, the current TS is restrictive in that it requires, at minimum, a 2-by-2 array to create a "2 out of 4" storage pattern. This pattern may be repeated within a region composed of the same pattern. The boundary condition restrictions are then applied to the resultant array. This rationale is contained in both the 2000 Duke LAR and 2002 NRC SER associated with the change to TS 3.7.13.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Oconee Nuclear Station, Unit 1	05000269	2009	- 01	- 0	4 OF 6

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

The reason for this event is that the TS did not permit boundary condition application to a single assembly, which was inappropriately assumed to be acceptable in the three cases being reported. Although this assumption resulted in several SFP loading configurations that were spaced "more conservatively" from a criticality perspective, the resulting configurations did not meet the boundary condition requirements when evaluated as an array.

The duration of each noncompliance was:

1. Unit 1 EOC 23 - 10/14/06 through 11/17/06 = 35 days
2. Unit 2 EOC 22 - 5/6/07 through 5/13/07 = 8 days
3. Unit 1 EOC 24 - 4/21/08 through 5/3/08 = 13 days

Since the TS 3.7.13, Condition A required action is to take action to restore compliance, and the required completion time is "Immediately," it was concluded that these event durations did not meet that criterion, and are therefore reportable under 10 CFR 50.73(a)(2)(i)(B) as "Operation in a condition prohibited by Technical Specifications."

CAUSAL FACTORS

The root cause is that design deliverable documents were not generated following approval of the license application request in 2002. Design deliverable documents are the mechanism to ensure that important design-related information is contained within station procedures. In this instance, certain information on the use of a minimum loading array that was proposed and subsequently approved by the NRC, was neither properly transmitted to, nor recognized by, station personnel.

As contributing causal factors (1) the minimum loading array was assumed to be implicitly understood and so, was not explicitly stated in TS and TSB 3.7.13, and (2) design basis requirements were neither understood nor translated into appropriate station engineering support documentation.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Oconee Nuclear Station, Unit 1	05000269	2009	- 01	- 0	5 OF 6

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

CORRECTIVE ACTIONS

Immediate:

Following the discovery of the condition, the current loading configurations of both Spent Fuel Pools [Units 1 and 2, and Unit 3] were confirmed to be in full compliance with Technical Specification 3.7.13.

Subsequent:

As an interim corrective action, the applicable fuel handling procedures associated with the movement of fuel assemblies in the spent fuel pools were revised to ensure that future storage configuration changes are validated by the subject matter expert(s) before being implemented.

Planned:

1. Develop appropriate design deliverable documents that support TS 3.7.13 to formally transmit design requirements for implementation in station procedures.
2. Revise the TS 3.7.13 Bases to include additional clarifying information on evaluation of compliance based on rectangular regions of fuel assemblies with a minimum 2-by-2 array size (except along the SFP wall).
3. Update the applicable station engineering support documentation to include relevant information related to TS 3.7.13 (e.g., calculations, NRC SER, etc.)

SAFETY ANALYSIS

Accidents can be postulated which would increase reactivity. Misloading of an assembly would increase reactivity; in particular, misloading the highest reactive assembly in place of the lowest reactive assembly. This is either the misplacement of a fresh assembly in an empty cell in the Checkerboard configuration or in a filler cell in the Restricted configuration.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Oconee Nuclear Station, Unit 1	05000269	2009	- 01	- 0	6 OF 6

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

Although not required for safe storage of fuel assemblies, the SFP water is normally borated to a concentration of at least 2220 parts per million, or higher as specified by the Core Operating Limits Report (COLR). The rack design also assures a k-eff of less than 1.0 even when the entire array of fuel assemblies, assumed to be in their most reactive condition and within the limits specified in the Technical Specifications, are immersed in unborated water at room temperature. Furthermore, if the pools were filled with the most reactive fuel allowed, which is clearly in violation of the Technical Specifications, k-eff would be approximately 0.85 with full credit for soluble boron. Under these conditions a criticality accident during refueling or storage is not considered credible.

The immediate significance and consequences of the event are that the actual configurations did not exceed SFP criticality requirements, even though they were not in compliance with TS 3.7.13. Although the instances represented undesired reactivity management events, nuclear safety was not jeopardized. There were no fission product barriers compromised and no actual impact on the health and safety of the public due to this event.

ADDITIONAL INFORMATION

A review of relevant external Operating Experience (OE) was conducted and there was no particular external OE where proper use of OE would have prevented this event or represent a particular "missed opportunity." A search of Oconee's corrective action database identified a 2005 condition report (and subsequent LER 287/05-01) as potentially recurring and based upon review of the cause of that case, it was determined that this instance is a recurring event. One stated root cause in the 2005 condition report was that Engineering personnel failed to capture critical design inputs in design deliverable documents. The failure to include this critical design input was due to the engineers incorrectly assuming that the physical configuration of the room (related to air flow path) would not change. The 2005 report's "corrective actions to prevent recurrence" were reviewed and would not have prevented nor would be reasonably expected to have prevented the events listed in this report.