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

Subject: Oconee Nuclear Station
Docket Nos. 50-270 and 50-287
Licensee Event Report 270/2011-01, Revision 0
Problem Investigation Program No.: O-11-0218

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 270/2011-01, Revision 0, regarding operation in a condition prohibited by Oconee Technical Specifications allowed by a Notice of Enforcement Discretion (NOED), for Oconee Units 2 and 3, on June 2, 2011. The prohibited condition was an inoperable containment isolation valve for a period of time which exceeded the completion time allowed by Technical Specification 3.6.3, "Containment Isolation Valves", Required Action A.1.

This report is being submitted in accordance with 10 CFR 50.73 (a)(2)(i)(B). There are no regulatory commitments contained in this report. This event is considered to be of no significance with respect to the health and safety of the public.

Any questions regarding the content of this report should be directed to Sandra N. Severance, Oconee Regulatory Compliance Group, at 864-873-3466.

Sincerely,

TP Gillespie

T. Preston Gillespie, Jr.
Vice President
Oconee Nuclear Station

Attachment

IE22
NRR

cc: Mr. Victor McCree
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INPO (Word File via E-mail)

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Oconee Nuclear Station, Unit 2	05000- 0270	1 OF 5

4. TITLE
Technical Specification Violation Involving a Notice of Enforcement Discretion for an Inoperable Containment Isolation Valve

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
									Oconee Unit 3	05000 0287
06	02	2011	2011	– 01	– 0	08	01	2011	FACILITY NAME: None	DOCKET NUMBER: 05000

9. OPERATING MODE
1

10. POWER LEVEL
100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Sandra N. Severance, Oconee Regulatory Compliance	(864) 873-3466

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
B	CB	ISV	Anchor / Darling	Y						

14. SUPPLEMENTAL REPORT EXPECTED
☐ YES (If yes, complete EXPECTED SUBMISSION DATE) ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

On June 2, 2011, Technical Specification (TS) 3.6.3, "Containment Isolation Valves", Condition A was entered upon confirmation that errors discovered in approved vendor calculations, when corrected, indicated insufficient closing margin for containment isolation valves HP-5 and HP-21 for Oconee Units 2 and 3. The completion time for Required Action A.1 was not met, and the station started preparations to shut down both units. On June 2, 2011, at approximately 1830 hours, the NRC verbally granted enforcement discretion for TS 3.6.3, Required Action A.1. The period of enforcement discretion began on June 2, 2011, at 1210 hours and was effective until June 16, 2011, at 1210 hours. Subsequent evaluation determined that valves 2HP-21 and 3HP-21, containment isolation valves in the respective unit's flow path that returns Reactor Coolant Pump Seal Water to the Seal Return Coolers, had sufficient margin to remain operable. Valve 2HP-5 was returned to operable status via an engineering design change at 0705 on June 11, 2011. Valve 3HP-5 was returned to operable status via an engineering design change on at 2345 on June 10, 2011. A root cause evaluation was performed, and the root cause and the resultant corrective actions are described in the body of this LER.

This event is similar to the failure of 1HP-5 reported under LER 269/2011-02. This event is considered to have no significance with respect to the health and safety of the public.

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Oconee Nuclear Station, Unit 2	05000270	2011	- 01 -	00	2 of 5

NARRATIVE

BACKGROUND

This event is reportable per 10 CFR 50.73(a)(2)(i)(B) as operation prohibited by Technical Specifications.

For Oconee Units 2 and 3, the respective unit's High Pressure Injection [EIIS:BG] valve HP-5 is a containment isolation valve [EIIS:ISV] in the Letdown System [EIIS:CB]. This air operated valve (AOV) has an instrument air operated piston actuator. It shall go to the closed position on loss of air. The valve is normally open when High Pressure Injection (HPI) is in service to allow letdown flow from the Reactor Coolant System (RCS)[EIIS:AB]. The valve serves as the outside containment isolation valve on penetration number 6 and is automatically closed by an Engineered Safeguards (ES)[EIIS:JM] signal. ES channel 2 automatically de-energizes a solenoid valve to bleed off air, allowing HP-5 to close by spring force. An ES Channel 2 signal is generated on low RCS pressure or high containment building pressure. The valve also receives a close signal on high letdown temperature to terminate letdown flow; however, this function is provided to prevent damage to the Purification Demineralizers [EIIS:FDM] (equipment protection) rather than for nuclear safety.

For Oconee Units 2 and 3, the respective unit's HP-21 is a containment isolation valve in the flowpath that returns Reactor Coolant Pump Seal Water to the Seal Return Coolers. This valve is normally open during unit power operation and serves as the outside containment isolation valve on penetration number 7. HP-21 is automatically closed by an ES signal. ES channel 2 automatically energizes a solenoid valve to close HP-21.

For Technical Specification (TS) Operability, HP-5 and HP-21 are credited to close during Large Break LOCA, Small Break LOCA, and Rod Ejection Accident events. On June 2, 2011, at approximately 1210 hours, it was determined that 2HP-5, 2HP-21, 3HP-5, and 3HP-21 may not close on an ES Signal on low RCS pressure or high Reactor Building (RB) pressure due to low actuator margin.

TS LCO 3.6.3, Containment Isolation Valves, requires that each containment isolation valve shall be OPERABLE in MODES 1, 2, 3 and 4. Condition A states that, for penetration flow paths that have two isolation valves, with one or more penetration flow paths with one containment isolation valve inoperable, at least one isolation valve in the affected flow path must be isolated by use of at least one closed and de-activated automatic valve, one closed and de-activated non-automatic power operated valve, closed manual valve, blind flange, or check valve with flow through the valve secured within 4 hours. If the penetration is not isolated within 4 hours, then the Unit must be placed in MODE 3 within 12 hours and MODE 5 within 36 hours per Condition D.

At the time this condition was identified, Oconee Units 2 and 3 were operating at 100 percent power with no safety systems or components out of service that would have contributed to this event.

EVENT DESCRIPTION

On May 31, 2011, discussion with Kalsi Engineering identified that the KVAP Program (Kalsi Engineering Valve and Actuator Program) may calculate non-conservative torque values for ball

valves. On June 2, 2011, Kalsi Engineering confirmed the non-conservative torque values were calculated for the ball valves in question. The KVAP software predicted non-conservative torque values when the inlet diameter of the ball valve was significantly larger than the bore through the seat and ball. Oconee confirmed negative actuator margins for 2HP-5, 2HP-21, 3HP-5, and 3HP-21 at normal RCS pressures. Thus, the operability of the subject valves was not assured, and TS 3.6.3, Condition A was entered for Units 2 and 3. Four hours later, the station started preparations to shut down both units. At approximately 1830 hours on June 2, 2011, the NRC granted enforcement discretion concerning TS 3.6.3, Action A.1.

TS 3.6.3, Condition A was not entered for Unit 1 since Unit 1 was in MODE 6 for a refueling outage. During the refueling outage, the actuator spring for 1HP-5 was replaced with a stronger spring to provide additional margin. Adequate valve actuator margin was validated and documented in the site's corrective action program prior to the Unit 1 restart. Temporary design changes were implemented on 2HP-5 and 3HP-5 to install an air-assist system to increase the closing capability of the actuator to provide the additional force required to close these valves. Valve 2HP-5 was returned to operable status at 0705 on June 11, 2011. Valve 3HP-5 was returned to operable status at 2345 on June 10, 2011.

Subsequent evaluation determined that valves 2HP-21 and 3HP-21, containment isolation valves in the respective unit's flow path that returns Reactor Coolant Pump Seal Water to the Seal Return Coolers, had sufficient margin to remain operable.

CAUSAL FACTORS

Although the Root Cause report has not been finalized, the root cause and corrective actions are well understood and included below. Following acceptance of the Root Cause report and associated corrective actions, if it is concluded that the final report information would significantly change that which was previously reported, a supplement will be submitted.

Root Cause:

Insufficient actuator margin existed following a valve seat material change due to an inadequate modification design change performed in the 2003 and 2004 timeframe.

Basis:

The modification process and post-modification testing failed to identify the reduction in closing torque margin when the valve seat material was changed. As part of the root cause analysis for the failure of 1HP-5 to fully close, a calculation was developed using KVAP (Kalsi Valve and Actuator Program, software used by Duke Energy to create air operated valve (AOV) capability calculations). This evaluation initially revealed positive margin. Subsequent to this, however, it was discovered that this software yielded non-conservative values and that the sister valves, 2HP-5 and 3HP-5, could no longer be reasonably assured of closing under all Engineered Safeguards (ES) actuation conditions. Analysis with corrected software confirmed that the 2HP-5 and 3HP-5 actuators have had a negative closing margin since replacement of the valve seat material in 2003 and 2004.

The software error was reported under 10CFR21.21 to the NRC Operations Center at 1604 EST on June 13, 2011. The NRC assigned event number 46955 to this notification.

CORRECTIVE ACTIONS

Immediate:

TS 3.6.3, Condition A was entered. Enforcement discretion was requested since the valves could not be restored to Operability within the time allowed.

Subsequent:

1. 2HP-5: Engineering Change (EC) 106233 (Unit 2) installed an air-assist system to increase the closing capability of the actuator for valve 2HP-5. As part of post-modification testing, this valve was stroke tested at nominal RCS pressure to demonstrate the effectiveness of the modification, and 2HP-5 was returned to service.

2. 3HP-5: Engineering Change (EC) 106237 (Unit 3) installed an air-assist system to increase the closing capability of the actuator for valve 3HP-5. As part of post-modification testing, this valve was stroke tested at nominal RCS pressure to demonstrate the effectiveness of the modification, and 3HP-5 was returned to service.

3. Notified Kalsi Engineering of the software error. Reported the defect to the NRC under 10CFR21.

Corrective Actions to Prevent Recurrence:

1. 2HP-5: Implement Engineering Change (EC) 106083 to replace the existing Bettis SR60 actuator spring with an SR100 actuator spring on 2HP-5 to restore margin.

2. 3HP-5: Implement Engineering Change (EC) 106084 to replace the existing Bettis SR60 actuator spring with an SR100 actuator spring on 3HP-5 to restore margin.

There are no NRC Commitment items contained in this LER.

SAFETY ANALYSIS

Valve HP-5 is normally open during unit power operation to allow letdown flow from the Reactor Coolant System. The valve serves as the outside containment isolation valve for penetration number 6 and is automatically closed by an engineered safeguards (ES) signal. ES channel 2 automatically deenergizes a solenoid valve to close HP-5. The valve has an instrument air operated piston actuator that goes to the closed position on loss of air or if the solenoid valve loses power. HP-5 also receives a close signal on high letdown temperature to terminate letdown flow; however,

this function is provided to prevent damage to the Purification Demineralizers (equipment protection) rather than for nuclear safety.

A failure of HP-5 to close on demand is associated with the following two types of accident scenarios.

1. Letdown Line Pipe Break (LOCA outside containment) with a failure to isolate redundant isolation valves inside containment.

2. Containment Isolation Failure for Core Damage Accidents (excluding Letdown Breaks)

A failure to isolate this line represents a potential containment bypass sequence. A Level 2/3 PRA evaluation of these accident sequences was conducted to evaluate the potential public health consequences to determine whether each type should be classified as a large early release frequency (LERF) sequence.

The consequence analysis showed that an unisolated letdown line break can produce significant dose consequences that are indicative of large early release frequency (LERF) sequences. The frequency of an unisolated letdown line break accident is estimated to be 5E-08 /Rx-Yr.

For other core damage accidents, the consequence analysis showed that these accidents (i.e., those without letdown line breaks) do not produce significant dose consequences that are indicative of LERF sequences. This result stems from lower flow rates that allow time for the evacuation of the public from areas close to the plant prior to significant radiological exposures. The core damage frequency impact of these other accidents is estimated to be approximately 2.6E-07 /Rx-Yr. The change in CDF is dominated by Station Blackout scenarios.

The overall impact on core damage frequency (CDF) is the combination of the above 2 types of sequences resulting in an increase of approximately 3.1E-07 /Rx-Yr. This value is well below the annual risk significance threshold of 1E-06 /Rx-Yr. The increase in LERF is attributed to letdown line break events and estimated to be 5E-08 /Rx-Yr which is well below the LERF risk significance threshold of 1E-07 /Rx-Yr. Consequently, the inoperability of HP-5 on Oconee Units 2 and 3 did not have a significant risk impact.

ADDITIONAL INFORMATION

This event is similar to the failure of 1HP-5 reported under LER 269/2011-02. It was determined through the root cause extent of condition review that the condition described in this LER did not adversely affect any other similar valve and actuator combinations. Also, a search of Oconee's Corrective Action Program data base found no events similar to the modification quality issue during the previous five years of operation.

Energy Industry Identification System (EIIS) codes are identified in the test as [EIIS:XX]. This event is considered reportable under the Equipment Performance and Information Exchange (EPIX) program. There were no releases of radioactive materials, radiation exposures or personnel injuries associated with this event.