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SUBJECT: LER 96-005-00:on 960320,containment isolation valve technically inoperable due to unknown cause.Evaluated & tested Yarway valves.W/960418 ltr.

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April 18, 1996

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 269/96-05

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report, 269/96-05, concerning the technical inoperability of a containment isolation valve due to an unknown cause.

This report is being submitted in accordance with 10 CFR 50.73 (a)(2)(ii)(B). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

J. W. Hampton, Vice President
Oconee Nuclear Site

/fts

260016

Attachment

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1/1

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NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Oconee Nuclear Station, Unit One	05000 269	1 OF 7

TITLE (4)

Containment Isolation Valve Technically Inoperable Due To Unknown Cause

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									Oconee, Unit Two	05000 270
03	20	96	96	-- 05	-- 00	04	18	96	Oconee, Unit Three	05000 287

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	100	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	X 50.73(a)(2)(ii) (B)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
L. V. Wilkie, Safety Review Manager	(864) 885-3518

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

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

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

On March 18, 1996, Oconee Engineering learned the results of special flow testing on Yarway valves. The testing was performed to validate the valve characteristics assumed in the Generic Letter 89-10 calculation. Testing indicated that the valve factor, coefficients of friction, and rate of loading were higher than assumed in the calculations. On March 20, 1996, Unit 1 and 2 were at 100 % full power and Unit 3 was shutdown. An engineering evaluation indicated that two Engineered Safeguard/Containment Isolation valves (HP-3 and HP-4) on all three units may not be able to close against the maximum differential pressure under certain accident scenarios. The root cause of this problem is determined to be Unknown. Corrective actions include further evaluation and testing of Yarway valves to determine why the valve factor, coefficient of friction and rate of loading increased above the industry standards for globe valves.

BACKGROUND

Engineered Safeguards (ES) [EIIS:JE] are those systems and components designed to function under accident conditions to prevent or minimize the severity of an accident or to mitigate the consequences of an accident. During accident conditions when reactor coolant [EIIS:AB] is lost, the ES system acts to provide emergency cooling to assure structural integrity of the core, to maintain the integrity of the Reactor Building (RB) [EIIS:NH] and to collect and filter potential RB leakage. Separate and independent ES systems are provided for each of the three units at Oconee.

The Standby Shutdown Facility (SSF) is a separate structure which houses the systems and components necessary to provide an alternate and independent means to achieve and maintain hot shutdown conditions for one or more of the three Oconee units. The SSF is designed to fulfill the safe shutdown requirement for fire protection, turbine building flooding, and physical security. The SSF has the capability of maintaining hot shutdown conditions on all three units for approximately three days (72 hours) following a loss of normal AC power.

HP-3 (Letdown Cooler A Outlet, and inside Containment Isolation Valve) and HP-4 (Letdown Cooler B Outlet, and inside Containment Isolation Valve) are used during normal operation to align letdown flow through the Letdown Coolers. If open during normal operation, the valves shall be capable of being automatically closed by an ES signal as one method of isolating RB penetration number 6. Also, the valves shall be capable of being remotely closed from the SSF and shall not reopen due to equipment damage that results from an event that required use of the SSF. The existing Yarway valves were installed in Units 1, 2 and 3 in July 1994, March 1995, and March 1994, respectively.

HP-5 (Letdown Line Outside Containment Isolation Valve) is open during normal operation to allow letdown flow from the Reactor

Coolant System. This valve is an air operated valve and will go to the closed position on a loss of instrument air.

EVENT DESCRIPTION

The General Office Engineering group has been programatically performing flow loop testing (at an offsite testing facility) to assure that certain motor operated valves can perform their intended design function as required by Generic Letter 89-10.

On March 18, 1996, Oconee Engineering was informed of the flow loop testing results for Yarway globe valves. Testing indicated that valve factors, coefficients of friction, and rate of loading were higher than that assumed in the calculations for Generic Letter 89-10 Yarway globe valves. Engineering began evaluating the consequence of the higher values.

On March 19, 1996, at 1930 hours, Unit 1 and 2 were at 100 % full power and Unit 3 shutdown. The preliminary engineering evaluation indicated that Unit 2's HP-3 and Unit 3's HP-3 valves may not be able to close against the maximum differential pressure (Dp) under certain accident scenarios. A single failure of the other containment isolation valve (HP-5) could potentially result in a failure to isolate a containment penetration following a Loss of Coolant Accident requiring an Engineered Safeguard actuation. Therefore, both valves were determined to be technically past and presently inoperable (since the installation of Yarway valves). This was reported via the Emergency Notification System (ENS). The suspect valves were closed and their breakers were opened to assure containment integrity. A decision was made to modify valve 3HP-3 since the unit was shutdown. The evaluation of Yarway valves continued.

On March 20, 1996, at 1200 hours, the continuing evaluation indicated that valves HP-3 and HP-4 on all three units may not be able to close against the maximum differential pressure under certain accident scenarios requiring the Standby Shutdown Facility (SSF). Therefore, both valves on all three units were

determined to be technically past and presently inoperable (since the installation of Yarway valves). A second ENS notification was made. Management recommended that the SSF Abnormal Procedure be changed to require Operations to close all three units HP-5 prior to evacuating the Control Room. This action will lower the Dp across all three units' HP-? and HP-4 to allow the valves to close. At 1940 hours, the revision to the SSF Abnormal Procedure was completed.

On March 21, 1996, a modification to 3HP-3 was completed. The modification assured the capability of the valve to close during Engineered Safeguards scenarios.

On March 27, 1996, after further evaluation by Engineering on Unit 2's HP-3, it was determined that this valve would have closed following an ES actuation.

On April 8, 1996, after further evaluation by Engineering on Unit 3's HP-3, it was determined that this valve also would have closed following an ES actuation.

On April 10, 1996, an ENS notification was made. The notification reported that, after further review, Unit 2's and Unit 3's HP-3 valves would have been operable in the past, in the event of an ES actuation.

The initial calculation (prior to installation) for these valves utilized industry standard values for the valve factor, coefficient of friction, and rate of loading due to the fact that it is known throughout the industry that globe valves are predictable. Following the testing, the valve was disassembled for inspection of internal parts and the valve body was cut open on the stem centerline. The body bore adjacent to the outlet port had score marks and a bur raised at the extreme end of travel near seating (corresponding to the disk lower guide ring). Engineering has not concluded the reason for the physical damage to the valve; however, the increased values for the valve factor,

coefficient of friction and rate of loading were attributed to the damage.

CONCLUSIONS

The increased values for the valve factor, coefficient of friction, and rate of loading of Yarway globe valves can be attributed to the valve damage. However, the exact cause of the damage has not been determined. Therefore, the root cause of this event has been classified as Unknown.

Further evaluation and testing is being performed by Engineering to determine why the valve demonstrated these characteristics.

There have not been any events involving Generic Letter 89-10 valves associated with the Standby Shutdown Facility during the past two years. Therefore, this event is considered to be non-recurring.

This event did not involve an equipment failure and is not NPRDS reportable. There were no radiological overexposures, radioactive releases, or personnel injuries associated with this event.

CORRECTIVE ACTIONS

Immediate

1. The suspect valves were closed and their breakers were opened to assure containment integrity.

Subsequent

1. The Standby Shutdown Facility Abnormal Procedure was revised to require Operations to close all three units' HP-5 valve prior to actuating the Standby Shutdown Facility.

2. A modification was performed on Unit 2's and 3's HP-3 valves.

Planned

1. Continue evaluating and testing similar Yarway valves to determine why the valve factor, coefficient of friction and rate of loading increased above the typical values for globe valves.

2. Based on the results of the testing in planned corrective action number 1, implement a modification on all three units HP-3 and 4 that will allow these valves to close against the maximum differential pressure for all scenarios.

SAFETY ANALYSIS

Valves HP-3 and HP-4 (on all three Oconee units) are required to close under two design basis scenarios. In one scenario, an Engineered Safeguards (ES) actuation occurs, and the valve must close against approximately 1710 psid. In the other scenario, the Standby Shutdown Facility (SSF) is involved in mitigating the Design Basis Accident (DBA), and the valve must close against a maximum differential pressure (dp) of approximately 2790 psid. An engineering evaluation concluded that HP-3 and HP-4 may not be able to close against this higher dp of SSF scenarios.

The design basis for containment isolation valves requires that they close to provide a double barrier to minimize leakage. The double barrier minimizes the possibility that a single failure or malfunction of a containment isolation valve would result in loss of isolation or unacceptable containment leakage. However, for failure of HP-3 and HP-4 to close, the leakage is contained within the letdown system, preventing a direct release of radioactive material to the atmosphere. Thus, in addition to the failure of HP-3 or HP-4 to close, the redundant isolation valve,

HP-5, would also have to fail to close to lose containment isolation. HP-5 is a fail-closed air-operated valve and is not affected by the problems identified in this report. Also, other non-safety related valves are available which could be used to isolate the letdown path.

For the Final Safety Analysis Report Chapter 15 events where containment isolation is required (ES actuation events), the expected dp is within the capability of the Yarway valves.

For the SSF events, the Reactor Coolant System (RCS) pressure initially decreases with coolant volume shrinkage following the reactor trip. It is at this time that the RCS letdown is normally isolated. Thus, it is expected that HP-3 and HP-4 could be closed. However, for some scenarios, such as loss of power, they may not be operable until the SSF is actuated. The RCS pressure may subsequently increase, and if letdown was not isolated immediately after the reactor trip, HP-3 and HP-4 may not close under the higher dp condition. In this case, redundant valve HP-5 must also fail to close in order to fail letdown isolation. Continued RCS letdown would degrade SSF capability, since the SSF is not designed for excessive RCS leakage.

For SSF events, estimated to have a frequency of 3.3E-4 per reactor-year, a high dp could develop across HP-3 and HP-4. However, since failure to isolate letdown also requires a failure of redundant valve HP-5 to close (a failure probability of about 2.2E-3), the overall probability is 7.3E-7. Therefore, the impact on core damage frequency is not risk significant.

A failure of valves HP-3 and HP-4 to close at high RCS pressure to isolate letdown does not significantly contribute to Oconee's core damage frequency or 10CFR100 releases. During the period of time that these valves were technically inoperable, no events requiring SSF operation have occurred. Therefore, the health and safety of the public were not affected by this event.