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February 19, 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 269/95-08, Revision 1

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a) (1) and (d), attached is Revision 1 to Licensee Event Report, 269/95-08, concerning the inoperability of a containment isolation valve. This supplement provides the completed abstract and report.

This report is being submitted in accordance with 10 CFR 50.73 (a) (2) (ii) (A). 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

/fts

Attachment

cc: Mr. S.D. Ebneter
Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta St., NW, Suite 2900
Atlanta, GA 30323

Mr. L. A. Wiens
U.S. Nuclear Regulatory Commission
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NRC Resident Inspector
Oconee Nuclear Station

IE22

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

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

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 Inoperable Due To Deficient Design Change

EVENT DATE (5) MONTH	DAY	YEAR	LER NUMBER (6) YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	REPORT DATE (7) MONTH	DAY	YEAR	OTHER FACILITIES INVOLVED (8) FACILITY NAME	DOCKET NUMBER
11	29	95	95	08	01	02	19	96		05000
										05000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

OPERATING MODE (9)	N				
POWER LEVEL (10)	000				
		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) (A)	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	(803) 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 November 29, 1995, Unit 1 was in a refueling shutdown. During testing, Reactor Coolant System valve 1RC-6 was found to have a different stroke time than was expected. Valve 1RC-6 is a 3/4 inch containment isolation valve for the Pressurizer (PZR) water space sample line. Subsequent analysis determined that the actual gear ratio for the valve 1RC-6 operator was different than what was indicated in the test setup calculation. On December 19, 1995, at 1530 hours, it was determined that valve 1RC-6 would not have closed against the design basis differential pressure. This was due to the installation of a new operator on May 31, 1990, which had a different gear ratio. The root cause of this event is determined to be deficient Design Change, design change not compatible with as-built (configuration at time of implementation). The gear ratio was corrected during the refueling outage and the valve stroke tested satisfactorily.

Background

Valve 1RC-6 is an Engineered Safeguards (ES) [EIIS:JE] electric motor operated valve that provides containment [EIIS:NH] isolation during an accident condition to prevent radioactive leakage to the environment. It is located inside the containment building. During normal operating conditions, this valve is used to obtain Pressurizer (PZR) [EIIS:PZR] water samples for routine surveillance of the chemical composition of Reactor Coolant [EIIS:AB] in the PZR.
This valve is an Anchor Darling 3/4 inch double disc gate valve.

Valve 1RC-7 (1/2 inch) is an ES air operated valve downstream of valve 1RC-6 that provides the redundant containment isolation during an accident condition. It is located outside the containment in the penetration room. During normal operation it is also opened to obtain PZR water samples.

Non-Safety Related piping, a sample cooler, and manual valves downstream of valve 1RC-7 complete the system for sampling the PZR.

Technical Specification 4.4.1.2.3 states that "the combined leakage rate from all penetrations and isolation valves shall not exceed 0.125 weight percent of the postulated post-accident containment air mass per 24 hours at 59 psig".

Description of Event

On November 27, 1995, Unit 1 was in a refueling shutdown. Valve Operation Test and Evaluation System (VOTES) testing was completed on valve 1RC-6. On November 29, 1995, while the data was being analyzed, it was noted that the stroke time was different than what was expected.

VOTES testing for this valve is performed after maintenance or on a scheduled frequency of each third refueling cycle. In 1992, during a refueling outage, valve 1RC-6 was VOTES tested using available data for stroke length and valve operator gear ratio. The expected stroke time was calculated to be 9.375 seconds and the observed stroke time was approximately 7.8 seconds, which was considered acceptable. Valve 1RC-6 was not VOTES tested in 1993 or 1994. Prior to 1994, the stroke length of 3/4 inch Anchor Darling double disc gate valves was incorrectly assumed to be 3/4 inch. In late 1994, information was received concerning the stroke length of Anchor Darling double disc gate valves. This information indicated that the stroke length of a 3/4 inch valve is approximately 1.5 inches.

The November 27, 1995, VOTES test was the next scheduled testing of valve 1RC-6 and at that time, the actual stroke time observed was approximately 7.7 seconds. The calculation, using the 1.5 inch stroke length, indicated the stroke time should have been approximately 18.75 seconds.

Subsequent analysis indicated that the 7.7 seconds would be expected if the actual gear ratio of this valve was 33.5:1 as opposed to the gear ratio of 75:1 that was noted in the test setup calculation. It was verified that the actual gear ratio was 33.5:1.

A modification to correct the gear ratio was completed and the required testing was performed. The actual stroke time recorded during this testing was approximately 17 seconds, which is an acceptable value.

Engineering personnel reviewed the test data on the Unit 2 and 3 RC-6 valves and found no problems noted with these valves.

On December 19, 1995, at 1530 hours, a past operability evaluation was completed by engineering and indicated that the maximum differential pressure (Dp) at which this valve would have closed was approximately 900 psig. The Reactor Coolant System (RCS) Design Basis Document states that this valve has two safety functions:

> The first is to automatically close on a channel 1 Emergency System actuation signal. Since this signal is generated at an RCS pressure of approximately 1600 psig, the Dp seen by the valve during closing could be well above that seen during normal operation (sampling flow is routinely isolated downstream of valve 1RC-6 prior to closing).
>
> The second function is to be capable of being closed from the Standby Shutdown Facility (SSF) to establish an intact RCS pressure boundary. When valve closure is required for SSF events, the RCS pressure could be high enough to lift the Pressurizer code safety valves (2500 psig).

Therefore, the valve was determined to be technically inoperable in the past, as it would not have been able to close against the differential pressure. A four hour non-emergency report was made to the NRC at 1648 hours on December 19, 1995.

An investigation into the cause of the gear ratio discrepancy was initiated. Drawings, specifications, and work histories were reviewed. Engineering personnel indicated that the 75:1 ratio, on the test setup calculation, has been on the Valve and Valve Operator Data Base, since it was developed. A diagnostics contractor developed the data base about 1991, but it is currently maintained by the Mechanical/Civil Engineering (MCE) group.

In reviewing work requests, it was noted that valve 1RC-6 had a seat leak on May 10, 1990. A work request was written to repair as necessary. The valve operator was refurbished as a part of this work. The maintenance technicians completed the work and contacted site engineering. They were advised that the valve and operator would be replaced. The work request noted that the valve and operator would be replaced by a modification.

The modification, completed on May 31, 1990, changed valve 1RC-6 from a 1/2 inch globe valve to a 3/4 inch gate valve. The new operator was addressed in the modification documentation as the same model number as the existing operator. It was not recognized that the new operator had a different gear ratio than the old operator. The Preventive Maintenance (PM) procedure data sheet, which was included in the modification documentation, indicated the new operator to have a gear ratio of 33.5:1. The PM procedure data sheet, attached to the May 10, 1990 work request, for the old operator indicated the gear ratio to be 75:1. These PM data sheets were sent to the valve operator engineer, but were not information that the design or analysis engineers (not located at Oconee at that time) commonly received. Since the operators were the same model number, it was not recognized by the accountable engineer that the new operator had a different gear ratio than the old operator. Therefore, valve 1RC-6 has been technically inoperable since the replacement.

MCE personnel were questioned concerning other problems of this type. They indicated that other deficiencies could exist; however, MCE is currently reviewing the VOTES data, as it is obtained, in the same manner that revealed the discrepancy in valve 1RC-6. Also, organization and process changes have been made such that MCE currently performs and/or checks the calculations and analyzes the test data. In 1990, this was accomplished by two different organizations.

On January 24, 1996, MCE performed further reviews of the other similar valves for all three units for possible generic applicability. VOTES data indicated the potential for a similar problem with valve 3RC-5. An analysis of the data was initiated and on January 25, 1996 a Problem Investigation Process Report was written to document the problem. Valve 3RC-5 is currently not used for sampling. Operations verified valve 3RC-5 was in the safety position (closed) and locked the electrical breaker open. The investigation is continuing to determine if 3RC-5 was inoperable in the past.

As a result of finding a similar problem on 3RC-5, all Anchor Darling gate valves (within the scope of Generic Letter 89-10, Safety Related Motor Operated Valve Testing and Surveillance) were reviewed to assure that they have the correct stroke time (as calculated in the setup calculation). Since stroke time is a function of the gear ratio, any significant anomalies could indicate a gear ratio that is different than expected. No problems were found.

The stroke length assumption (being the same as the valve size) is only used for gate valves. It is valid for the normal gate valve design, but is not valid for double disc gate valves (since the disc is generally larger than the valve size). Stroke length for globe valves must come from another source. The only double disc gate valves used at Oconee are manufactured by Anchor Darling. The double disc gate valves are a subset of the Anchor Darling gate valve population. Motor operated valves that are set up with a detailed calculation (and valve diagnostics) are included in the GL 89-10 program.

Conclusion

The root cause of this event is determined to be deficient Design Change, design change not compatible with as-built (configuration at time of implementation). The documentation for the modification implemented in May, 1990 did not address the change in the gear ratio of the valve operator. It appears that the valve setup calculation data was based on the previous operator gear ratio and an assumed stroke length. In 1994, new information on the stroke length was received and it indicated the stroke length for Anchor Darling double disc gate valves was not the same as the valve size.

This problem could have been detected in 1992, when the Valve Operation Test and Evaluation System (VOTES) testing was performed, had the actual stroke length been known.

This type of problem should not occur in the future due to the current calculation/analysis and modification processes.

The modification process has undergone significant changes. With the current process for valve minor modifications, engineers that perform the setup calculations also perform the Qualified Review of the modification package. Any physical changes to the valve or valve operator should be adequately addressed in the setup calculation.

Although design deficiencies have occurred in the past, a review of LERs written within the last two years revealed that no similar reportable events had occurred with the same root cause. An event did occur in October 1994 (LER 269/94-05) involving the redundant containment isolation valve used for sampling (1RC-7). This valve was not post maintenance tested as required. When this was identified, it tested satisfactorily.

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

CORRECTIVE ACTION:

Immediate:

1. A modification was completed on valve 1RC-6 to change the gear ratio from 33.5:1 to 75:1.

Subsequent:

1. Disabled valve 3RC-5 in its safety position (closed) until the gear ratio can be changed.

2. Engineering reviewed the latest test data on the Generic Letter 89-10 (Safety Related Motor Operated Valve Testing and Surveillance) Anchor Darling gate valves for all three Oconee Units and no problems were found.

Planned:

1. Correct the gear ratio in 3RC-5 during the next refueling outage.

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	05000	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	7 OF 7
Oconee Nuclear Station, Unit One	269	95	08	01	

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

SAFETY ANALYSIS:

The safety concern of the identified problem with valve 1RC-6 is described as the potential release of post-accident containment atmosphere into the environment. The potential escape route would be from the Reactor Coolant System (RCS) and/or Reactor Building atmosphere into the Pressurizer (PZR), out through valves 1RC-6 and 1RC-7 and into the penetration room.

Had an accident occurred during the PZR sampling, valve 1RC-7 would have closed as designed upon receipt of an Engineered Safeguards (ES) signal, providing adequate containment isolation. Valve 1RC-7's operator is a spring close pneumatic, and fails closed. Valve 1RC-7 is quarterly stroke tested and leak rate tested each refueling. A review of the maintenance performed on 1RC-7 since 1990 indicates that no work has been required to correct the valve's closing stroke. The leakage through this penetration with only valve 1RC-7 closed would have been low enough to meet Technical Specification 4.4.1.2.3 Acceptance Criteria for the combined leakage through all penetrations and isolation valves. Also, the stroke time of valve 1RC-7 is less than one second which is much less than the stroke time of valve 1RC-6. Once valve 1RC-7 closes, the differential pressure across valve 1RC-6 would decrease sufficiently to permit it to close. As a result, the offsite dose consequences for all design basis accidents would have remained within the 10 CFR 100 limits, as described in Chapter 15 of the Final Safety Analysis Report.

There were no releases of radioactive material involved with this incident. The health and safety of the public were not affected.