CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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FACIL:50-270 Oconee Nuclear Station, Unit 2, Duke Power Co. 05000270

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SUBJECT: LER 96-007-01:on 961205,maint technicians found electric motor rotating in wrong direction.Caused by inadequate work practices,documents not followed correctly.Procedures revised.W/970227 ltr.

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February 27, 1997

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 270/96-07, Revision 1
Problem Investigation Process No.: 3-096-2566

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report 270/96-07, concerning the technical inoperability of the Low Pressure Injection System for an Appendix R Scenario.

This is a supplemental report that replaces the original which contained only the abstract. It is being submitted in accordance with 10 CFR 50.73 (a) (2) (v) (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

J. W. Hampton, Vice President
Oconee Nuclear Site

/fts

Attachment

IE22

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

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Oconee Nuclear Station, Unit Two	05000 270	1 Of 7

TITLE (4)
Low Pressure Injection System Technically Inoperable For Appendix R Scenario Due To Inadequate Work Practices

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(S)
									Oconee, Unit Three	05000 287
12	19	96	96	- 07	- 01	02	27	97		05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR *(Check one or more of the following)* (11)			
POWER LEVEL (10)	0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v) (B)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER *(Specify in Abstract below and in Text, NRC Form 366A)*
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER AREA CODE	
R. T. Bond, Safety Review Manager	(864)	885-3043

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 DATE (15)	MONTH	DAY	YEAR
YES *(If yes, complete EXPECTED SUBMISSION DATE)*	X NO				

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

On December 5, 1996, Unit 3 was in a refueling outage and Units 1 and 2 were at cold shutdown. Following a modification to replace the valve operator, functional verification of Unit 3 valve 3LP-1 (Low Pressure Injection/Reactor Coolant System Isolation Valve) found that the electric motor was rotating in the wrong direction. Maintenance Technicians changed the wiring at the Motor Control Center, instead of at the motor as specified in the procedure. During the review of the modification package, this error was identified. Wiring on other valves associated with an Appendix R event were inspected and it was found that Unit 3 valve 3LP-2 and Unit 2 valves 2LP-1 and 2LP-2 were also wired incorrectly. An engineering evaluation was performed to evaluate the past operability of these valves. On December 19, 1996, it was determined that, during an Appendix R fire event, these valves could not have been opened from the damage control panel. The root cause is Inadequate Work Practices; documents not followed correctly. Corrective actions include revising procedures and counseling personnel.

BACKGROUND:

Valve LP-1 (Low Pressure Injection/Reactor Coolant System Isolation Valve) and Valve LP-2 (Low Pressure Injection Hot Leg Suction Isolation Valve) are motor operated valves in series. They isolate the Reactor Coolant System [EIIS:AB] from the low pressure portion of the Low Pressure Injection System [EIIS:BP]. These valves are located inside the Reactor Building [EIIS:NH] and are normally in the closed position. They are required to open to establish normal decay heat removal when going to cold shutdown conditions.

10CFR50 Appendix R, Section III.G.1, states that fire protection features shall be required for structures, systems, and components important to safe shutdown. These features shall be capable of mitigating fire damage so that one train of systems, necessary to achieve and maintain a hot shutdown condition, remains operable from either the control room or alternate shutdown location(s).

Oconee Appendix R fire scenarios are mitigated either from the unit's main control room or from the Standby Shutdown Facility (SSF) [EIIS:NB]. The fire scenario in which the main control room becomes unavailable and the SSF is activated employs the use of an "Appendix R Damage Repair Valve Control Panel" to aid in achieving cold shutdown from hot shutdown on one or more of the three Oconee Units. Each unit's panel contains controls for valve positioning of several motor operated valves including LP-1 and LP-2.

Approximately 10 hours into an Appendix R event, the Appendix R Damage Repair Valve Control Panel would be connected at the Reactor Building electrical penetration. At approximately 36 hours into an Appendix R event, an operator would be dispatched to open LP-1 and LP-2.

These valves are powered by 600 Volt, 3 phase AC power. Connecting power leads to the motor terminals in the incorrect phase sequence can result in the motor rotating in the wrong direction. To detect this type of error, post maintenance functional testing usually includes a functional check for direction of motor rotation. If the motor is found to rotate in the wrong direction, two of the power leads are swapped and reconnected. In most applications, leads can be swapped at either the motor, the motor control center, or at any intermediate junction, such as the Reactor Building penetration.

DESCRIPTION OF EVENT:

On December 5, 1996, during a Unit 3 refueling outage, functional testing was performed on valves 3LP-1 and 3LP-2 following motor operator replacement as a result of a modification. Procedure IP/0/A/3001/10 (Maintenance Of Limitorque Valve Operators) was utilized in the performance of the functional testing. Motor rotation was observed to be backwards. Step 10.19.2 h provides for making necessary wiring corrections to change motor rotation. Prior to step 10.19.2 h, there is a note applicable to Appendix R valves stating that the motor leads at the motor control center (MCC) and penetration shall remain as designated by drawings. Wiring corrections for motor rotation shall be made at the operator. However, in this case, maintenance technicians overlooked the note and rolled the wiring leads at the MCC to correct the motor rotation. A component malfunction sheet was attached to the procedure to document this action.

On December 6, 1996, the maintenance craft supervisor performed a review of the completed work package and questioned the deviation from the procedure. A work order was generated on both components to check the installed wiring against drawings. It was found that valve 3LP-1 drawing and wiring matched. Therefore, the leads were incorrect (per the drawing) prior to the modification but connected such that the rotation was correct for normal operation. For valve 3LP-2 the inspection found that the wiring did not match the drawing. As a result, the wiring at the MCC was re-connected to match the drawings and the wiring at the valve operator was re-connected to provide proper rotation.

A Problem Investigation Process report was originated to document the discrepancy. Work orders were generated to verify similar Appendix R valve operator wiring for each unit. The valves to be verified were 1,2LP-1, LP-2 and Core Flood System [EIIS:BP] valves 1,2,3CF-1 and CF-2.

On December 9, 1996, an engineering evaluation was requested to determine past operability.

On December 10, 1996, valves 2LP-1, 2LP-2, and 2CF-2 were found to have motor leads that did not match the connection drawings. Valves 1LP-1, 1LP-2, 1CF-1, 1CF-2, 2CF-1, 3CF-1, and 3CF-2 were wired correctly.

An evaluation determined that these valves were wired such that they would operate properly using their normal control and power connections. However, connection of the Appendix R Damage Repair Valve Control Panels requires that the connector at the Reactor Building penetration be disconnected and the Appendix R cable connected in its place. Therefore, any wires rolled at the normal MCC would be removed from the circuit. If the wiring at the MCC had been intentionally rolled to obtain proper motor rotation, then the Appendix R cable might not have the proper phase relationship. This might cause the motor to rotate in the wrong direction.

On December 19, 1996, the engineering evaluation concluded that valves LP-1 and LP-2 for Units 2 and 3 would not have opened to perform the safety function of achieving and maintaining safe shutdown during an Appendix R event.

Valve 2CF-2 was evaluated by engineering. The wiring, although not in accordance with the drawing, would not have affected the motor rotation because of the phase sequence in which the wiring was connected.

An investigation to determine the cause of the incorrect wiring was performed. The Appendix R Damage Repair Valve Control Panel was built in 1987 and included in the Appendix R procedures. At that time the wiring was inspected and confirmed to match the drawings. Post maintenance or periodic testing utilizing the damage control panel has not been required because it is considered a repair and not permanently installed plant equipment. It could not be determined when, after 1987, the wiring was incorrectly installed on valves 2LP-1, 2LP-2 and 2CF-2.

CONCLUSION:

The root cause of this event is Inadequate Work Practices; document use practices, documents not followed correctly. The procedure contained a note stating the requirements for successful completion of the task. The procedure utilized is for all Limitorque valve operators. The note only applied to Appendix R valves and was overlooked by the technicians. The procedure step was located after the note and did not reference any Appendix R criteria. If the procedure contained a sign-off step instead of the note referring to Appendix R valves, the technicians may not have overlooked the requirement.

A search of the Operating Experience Data Base and Problem Investigation Process reports over the past two years indicates that this event is not recurring. There have been events at Oconee involving failure to follow procedure. However, no significant events were noted involving electrical Maintenance Technicians.

There were no personnel injuries, releases of radioactive materials, or NPRDS reportable equipment failures associated with this event.

CORRECTIVE ACTION:

Immediate:

1. The wiring on valves 3LP-1 and 3LP-2 was corrected and tested satisfactory.

Subsequent:

1. The other valves with this type configuration were inspected and three valves with wiring deficiencies were identified.

2. Personnel involved in rolling the wiring leads on valves 3LP-1 and 3LP-2 modification were counseled concerning their actions.

3. The wiring on valves 2LP-1, 2LP-2 and 2CF-2 was changed to agree with the drawings.

Planned:

1. Install tags in Motor Control Centers (MCC) containing Appendix R components to caution against changing motor wiring at the MCC.

2. Revise procedure IP/0/A/3001/010 to add a sign off step for determining Appendix R valves and the required action to achieve correct motor rotation.

3. Perform a one time test per unit to verify proper operation of components using the Appendix R Damage Repair Valve Control Panel.

Because correction of the wiring and counseling of employees are complete and the planned corrective actions are considered enhancements only, none of the corrective actions contained in this report are considered an NRC commitment.

SAFETY ANALYSIS:

The Low Pressure Injection valves LP-1 and LP-2 are required to be opened to achieve Cold Shutdown conditions. During normal operation, this is accomplished from the Control Room. Following certain Appendix R events, operators are dispatched to the Standby Shutdown Facility (SSF) to achieve Cold Shutdown conditions. If required, an Appendix R Damage Repair Valve Control Panel is connected approximately 10 hours into an Appendix R event. It is connected to the existing wiring at the penetration. Approximately 36 hours into an Appendix R fire event an operator would be dispatched to open LP-1 and LP-2.

Due to wiring errors at the motor control center, the motor operator rotation would have been in the opposite direction from what was expected. Therefore, the motors on the operators would be damaged such that the valves could not be opened electrically.

With LP-1 and LP-2 motor operated valves inoperable and inaccessible, operations could continue using the SSF Auxiliary Feedwater pump and the

Steam Generators to remove decay heat. This would continue until a Reactor Building entry could be made to manually operate the valves. However, this added time could have prevented the unit's being at cold shutdown within 72 hours per the Appendix R requirements.

There are contingency procedures for using the SSF to maintain Auxiliary Feedwater [EIIS:BA], Reactor Coolant Makeup, and diesel generator power [EIIS:EK] for periods longer than 72 hours.

The health and safety of the public were not compromised by this event. Also, this event did not result in the release of any radioactive materials. There were no radiation overexposures or personnel injuries associated with this event.