



**Florida  
Power**  
CORPORATION

3F0790-04

July 9, 1990

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

Subject: Crystal River Unit 3  
Docket No. 50-302  
Operating License No. DPR-72  
Licensee Event Report No. 89-041-01

Dear Sir:

Enclosed is Licensee Event Report (LER) 89-041-01 which is submitted in accordance with 10 CFR 50.73.

This supplement represents the results of the evaluation described in LER 89-041 and the disposition of affected components.

Should there be any questions, please contact this office.

Sincerely,

G. L. Boldt  
Vice President  
Nuclear Production

WLR:mag

Enclosure

xc: Regional Administrator, Region II  
Senior Resident Inspector

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## LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20546, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) CRYSTAL RIVER UNIT 3 DOCKET NUMBER (2) 0500003021 OF 04

TITLE (4) Relay Failure in the Control Rod Transfer Logic and Order of Procedure Step Sequencing Allows Partial Simultaneous Withdrawal of the Safety Groups

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 NAMES	DOCKET NUMBER(S)
12	08	89	89	041	01	07	09	90	N/A	050000
									N/A	050000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)

OPERATING MODE (9)	20.402(b)	20.426(c)	50.73(a)(2)(iv)	73.71(b)
3	20.406(a)(1)(ii)	50.38(c)(1)	50.73(a)(2)(v)	73.71(c)
POWER LEVEL (10) 000	20.406(a)(1)(iii)	50.38(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 306A)
	20.406(a)(1)(iii)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(A)	
	20.406(a)(1)(iv)	X 50.73(a)(2)(iv)	50.73(a)(2)(viii)(B)	
	20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	

## LICENSEE CONTACT FOR THIS LER (12)

NAME W. A. STEPHENSON, NUCLEAR SAFETY SUPERVISOR TELEPHONE NUMBER 904 795-6486

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC
X	JC	RLY	E185	NO					

## SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) X NO EXPECTED SUBMISSION DATE (15)

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

On December 8, 1989, a partial, simultaneous withdrawal of two control rod safety groups occurred at Crystal River Unit 3. This event occurred in MODE 3 (HOT STANDBY) while performing a plant shutdown. Operators were in the process of selecting safety group 1 control when safety group 3 control also transferred to the auxiliary power supply. Initial attempts to remove control power from group 3 were unsuccessful. Operators inserted rods approximately 2% from full withdrawn and then withdrew rods back to fully withdrawn. Electricians installed a temporary jumper across portions of the transfer logic circuit allowing operators to remove group 3 control power. The shutdown then continued normally. Although the event could not be duplicated, it was most likely caused by a combination of a failed relay in the control rod transfer logic and the order of step sequencing in the control rod transfer procedure. The faulty relay has been replaced and the procedure has been revised. Additional procedure guidance has been provided to the operators concerning multiple group movement. All operating crews have been informed of this event.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F5301) U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON, DC 20555 AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104) OFFICE OF MANAGEMENT AND BUDGET WASHINGTON, DC 20503

FACILITY NAME (1)  CRYSTAL RIVER UNIT 3	DOCKET NUMBER (2)  0 5 0 0 0 3 0 2	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 9	- 0 4 1	- 0 1	0 2	OF	0 4

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

**EVENT DESCRIPTION:**

On December 8, 1989, a partial, simultaneous withdrawal of two control rod safety groups [AA,ROD] occurred at Crystal River Unit 3. Subsequent evaluation indicated this operation was outside the plant design basis.

Prior to the event, Crystal River Unit 3 (CR-3) was in the process of shutting down to allow the replacement and repair of a control rod drive stator [AA,MO]. The plant was in MODE 3 (HOT STANDBY) with Reactor Coolant System [AB] temperature and pressure approximately 495 degrees and 1925 psig respectively. The regulating control rod [AA,ROD] groups 5, 6, and 7 were fully inserted. Safety groups 1, 2, 3, and 4 were fully withdrawn. The Reactor Protection System [JC] was in service with the high flux trip setpoint set at 104% power. Safety group control rod exercises, per Technical Specification 4.1.3.2, were in progress.

At approximately 0540 on December 8, 1989, safety group 1 control was transferred to the auxiliary power supply [AA,JX] in preparation for exercising the group. At this point, control board licensed operators noticed safety group 3 individual rod control indication [AA,JI] was also energized. Operators attempted to transfer group 3 off the auxiliary power supply. This deenergized the individual rod control indication [AA,JI] and energized the group rod control indication [AA,JI] for group 3. In order to determine if both groups were actually on the auxiliary power supply, operators began inserting safety group 1. Control board operators noticed that both safety groups 1 and 3 were being inserted and immediately ceased rod movement. At this point, both groups had been inserted approximately 2% (minimum scale division of the rod position indication) from fully withdrawn. Operators attempted to reset the auxiliary power supply transfer logic and thus remove group 3 from the auxiliary power supply. When this was not possible, operators decided to return both groups to their original fully withdrawn configuration. In the process of returning to the original configuration, both groups were withdrawn simultaneously. Further rod movements were halted until the problem could be resolved.

At approximately 1000, December 8, 1989, CR-3 electrical technicians briefly installed a jumper across the transfer logic unlatching circuit [AA] allowing group 3 to be removed from the auxiliary power supply. With group 3 control removed, operators then proceeded to insert the safety groups per normal shutdown procedures. No further problems were noted during the rod insertion. All safety rods were inserted by 1230, December 8, 1989.



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)  CRYSTAL RIVER UNIT 3	DOCKET NUMBER (2)  0 5 0 0 0 3 0 2	LER NUMBER (6) YEAR SEQUENTIAL NUMBER REVISION NUMBER 8 9 — 0 4 1 — 0 1	PAGE (3) 0 3 OF 0 4
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TEXT (IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC Form 306A's) (17)

On December 8, 1989, a Nonconforming Operations Report (NCOR) was initiated to determine if the above rod movement was considered to be operation outside the design basis. Although the CR-3 accident analyses are based on all control rod groups being pulled from the core simultaneously, this failure under other circumstances may not be bounded by the accident analysis. After review, Florida Power (FPC) determined that withdrawal of multiple rod groups was operation outside the design basis because this was contrary to a specific statement in the Final Safety Analysis Report (FSAR) Section 14.1.2.2.1.

FSAR section 14.1.2.2.1, Startup Accident states:

The control [rod] system is designed so that only one control rod group can be withdrawn at a time, except that there is a 25% overlap in travel when two regulating rod groups are successively withdrawn. This overlap occurs at the minimum worth positions for each group since one group is at the end of travel and the other is at the beginning of travel....

Thus on January 8, 1990, at 1641, FPC notified the NRC of this event per 10CFR50.72.b.1.ii.B.

**EVENT ANALYSIS:**

The control rod safety groups are each capable of being powered by two different power supplies, the holding power supply [AA,JX] and the auxiliary power supply. The holding power supply is used to maintain the safety rods fully withdrawn and is not capable of positioning the groups. The safety groups are positioned with the auxiliary power supply and then, when fully positioned, are transferred back to the holding bus. A single auxiliary power supply is provided for all safety and regulating rod groups. The auxiliary power supply control logic [AA] is designed to prevent selection and withdrawal of more than one safety group at a time. This design provision minimizes the potential power excursions during the Startup Accident, FSAR Section 14.1.2.2, and the Rod Withdrawal at Rated Power Operation Accident, FSAR Section 14.1.2.3.

Withdrawal of multiple control rod groups does not violate CR-3 accident analyses associated with startup, subcritical or power operation, because the analyses assume all rods are withdrawn simultaneously. Additionally, redundant protection is provided by operator action. Had this failure occurred under the circumstances assumed in the accident analysis, operators would have taken action to stop and minimize the power excursion. Therefore, this event did not impact plant or public health and safety.

Evaluation of this event indicates operator action was acceptable. The existing control rod operating procedures did not address this specific situation.

LICENSEE EVENT REPORT (LER) A  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555 AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

CRYSTAL RIVER UNIT 3

DOCKET NUMBER (2)

0 5 0 0 0 3 0 2 8 9

LER NUMBER (6)

YEAR SEQUENTIAL REVISION  
NUMBER NUMBER NUMBER

0 4 1 0 1

PAGE (3)

0 4 OF 0 4

TEXT (If more space is required, use additional NRC Form 305A's) (17)

**CAUSE:**

Although the event could not be duplicated, the most likely cause of this event is the combination of an equipment failure and the sequencing of steps in an operating procedure. A failed Group/Auxiliary Select relay [JC,RLY] in the Control Rod Drive Transfer logic in conjunction with the order of step sequencing in the procedure for transferring rod groups and quick movement of the Group Select Switch [JC,HS] caused both groups 1 and 3 control rods to be placed on the auxiliary power supply. The Group/Auxiliary Select relay is a 24 contact T-Bar switch relay manufactured by Electronics Controls, Inc. (C 8501-105-1).

**CORRECTIVE ACTION:**

Prior to startup, the group/auxiliary select relay was replaced (December 9, 1989). FPC has revised the procedure for transferring rod groups to reorder the sequence of steps.

FPC has revised the surveillance procedure for control rod testing to provide enhanced guidance to the control board operators concerning multiple control rod group movement. The operating crews have been advised of this event.

**PREVIOUS SIMILAR EVENTS:**

No previous failures of the suspect relays were found. Additionally, this appears to be the first event associated with multiple rod group movement.