



**Florida  
Power**  
CORPORATION

Crystal River Unit 3  
Docket No. 50-302

May 17, 1991

3F0591-10

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

Subject: Licensee Event Report (LER) 90-02-02

Dear Sir:

Enclosed is Licensee Event Report (LER) 90-02-02 which is submitted in accordance with 10 CFR 50.73.

This supplement includes additional information and provides the status of the subject item.

Sincerely,

G. L. Boldt  
Vice President  
Nuclear Production

WLR:mag

Enclosure

xc: Regional Administrator, Region II  
NRR Project Manager  
Senior Resident Inspector

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PDR ADOCK 05000302  
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A Florida Progress Company

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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 (F533), 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										PAGE (3): 1 OF 0 5								
TITLE (4): FIRE DAMPERS MAY NOT CLOSE UNDER VENTILATION FLOW CONDITIONS DUE TO FAILURE TO CONSIDER FLOW CONDITIONS IN ORIGINAL DESIGN CRITERIA PER NRC IEN 89-52																												
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)													
									N/A						0 5 0 0 0													
0	2	1	6	9	0	0	0	2	0	2	0	5	1	7	9	1	N/A						0 5 0 0 0					
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11):																										
5		20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)														
POWER LEVEL (10)		0 0 0				20.406(a)(1)(i)				50.38(c)(1)				50.73(a)(2)(v)				73.71(c)										
		20.406(a)(1)(ii)				50.38(c)(2)				50.73(a)(2)(vi)				OTHER (Specify in Abstract below and in Text, NRC Form 386A)														
		20.406(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(vii)(A)																		
		20.406(a)(1)(iv)				X 50.73(a)(2)(ii)				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										TELEPHONE NUMBER																		
W. K. BANDHAUER, NUCLEAR OPERATIONS SUPERINTENDENT										AREA CODE 9 0 4 7 9 1 5 - 1 6 4 8 1 6																		
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																												
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPD		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPD																		
B	K	P	D	M	P	A	1	2	4	NO																		
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 February 16, 1990, at 1132, Crystal River Unit 3 determined that fire dampers may not be operable under expected ventilation flow conditions due to a design error. This conclusion was based on the results of testing and evaluation of plant fire dampers and ventilation flows performed as a result of Information Notice 89-52. Roving fire watch patrol routes were reviewed and revised to assure 100 percent coverage of the fire areas. Continuous fire watches were posted in areas where fire detectors were inoperable. The root cause of this event is the failure of the original design criteria to address the need to close the dampers under ventilation flow conditions. This condition had been identified in 1985 by an internal contractor evaluation but, due to personnel error, had not been pursued and resolved. Dampers which are installed in locations with excessive ventilation flows will either be modified to assure closure under design air flow conditions or fans will be turned off during a fire to allow closure of the dampers under reduced air flow conditions. Design basis documents have been updated to reflect the need for fire dampers to close under ventilation flow conditions.

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 (P-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)

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CRYSTAL RIVER UNIT 3

YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
910	002	02

02 OF 05

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

EVENT DESCRIPTION:

On February 16, 1990, at 1132, Crystal River Unit 3 (CR-3) determined that fire dampers [KP,DMP] may not be operable under expected ventilation flow conditions due to a design error. Several curtain-type fire dampers may not fully close with ventilation air flow.

On August 30, 1989, Florida Power Corporation (FPC) evaluated NRC Information Notice 89-52, "Potential Fire Damper Operational Problems", and determined the concerns identified by this notice may apply to CR-3. On November 10, 1989, FPC completed a review of damper flow rates and identified a representative sample of single section dampers corresponding to approximately 10% of the dampers to drop test under actual flow conditions. On January 26, 1990, CR-3 began drop testing the selected dampers.

On February 6, 1990, when three out of five dampers tested failed, an action plan was developed and a Nonconforming Operations Report was initiated. At this time, CR-3 was in MODE 1 (POWER OPERATION), 97% power. The action plan included:

- i. Perform a root cause evaluation of the fire damper failures.
- ii. Assure the hourly fire watch patrol route included all areas associated with the Technical Specification required fire dampers.
- iii. Assure a continuous fire watch is posted in areas with inoperable fire detectors [IC,28].
- iv. Begin repair of the failed fire dampers.
- v. Continue testing the selected dampers.

At 1132, on February 16, 1990, the root cause evaluation concluded the damper failures were caused by design deficiency. At the time, CR-3 was in MODE 5 (COLD SHUTDOWN) with Reactor Coolant System temperature 95 degrees and at atmospheric pressure. CR-3 had been shutdown since February 12 to repair RCV-8, Pressurizer Code Safety/Relief valve [AB,RV]. At 1235, the NRC Operations Center was notified of this event per 10CFR50.72(a)(2)(i). This written report is being made per the requirements of 10CFR50.73(a)(2)(ii)(B) for operation outside the plant design basis.

The fire dampers are designed with several interlocking slats which are retracted in a configuration similar to a raised venetian blind. The fire dampers are actuated by fusible links. When the damper is released, the damper is pulled into position by retracting springs and may be assisted by gravity. As the damper attempts to close, the increasing air velocity induced pressure can lock up the dampers and prevent them from fully closing. For some dampers, this may cause the closing spring to break. The fire dampers affected are various sizes and manufactured by Air Balance, Inc., Model Nos. N319ALV (vertical) and N319ALH (horizontal), three hour UL-rated.

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 TO REPORTS MANAGEMENT BRANCH (F-500), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO "PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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CRYSTAL RIVER UNIT 3	050003J290-002-02	03 OF 05	

TEXT (If more space is required, use additional NRC Form 305A's) (7)

In June 1985, during an evaluation of CR-3 fire protection features by an FPC contractor, the need to verify the ability of dampers, especially multi-section dampers, to close under ventilation flow conditions was identified. A summary of maximum acceptable velocities through Air Balance type 319 fire dampers was provided by the contractor. As a result of the contractor's finding, a study was performed to determine the ability of multi-section dampers to close. This study concluded several dampers should have larger nine pound springs, rather than the currently installed four pound springs. No action was taken to follow up on these recommendations at that time.

CAUSE:

The root cause of this event is the failure of the original plant design to consider the need to close the dampers under ventilation flow conditions. At the time the plant was designed, this was the standard practice since closure under air flow is not required by the NFPA code. When Appendix R was implemented at CR-3 a contractor performed a study to identify deficiencies in the air damper capabilities. The study resulted in several recommendations for improvement of the fire dampers. Due to FPC engineering personnel error, the recommendations in the study were not pursued. This was a violation of engineering procedures which were in effect at the time of the study.

EVENT EVALUATION:

The purpose of these fire dampers is to help assure a fire is limited to a single area. By limiting the spread of the fire and by protecting certain trains of equipment, availability of alternate equipment located in adjacent areas, which may be needed for safe shutdown, is assured.

The design error affects ten of approximately 120 total fire dampers. Several damper designs include an automatic trip of the associated operating fans. Most of the dampers tested to date satisfactorily completed the closure test under ventilation flow conditions. The dampers which have failed are those installed in areas where the ventilation flow is very large. Attached is a list of the dampers affected, their location and a general description of the areas protected by the damper.

Since 1985, CR-3 has maintained an hourly roving fire watch. The roving fire watch is required to walk an established route each hour and observe for fires. If a fire is observed, the watch reports the fire immediately and extinguishes the fire if possible. The route(s) established since 1985 cover approximately 90 percent of the plant fire areas. In addition, the operability of fire detectors on at least one side of each fire barrier has been maintained and monitored.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 600 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

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CRYSTAL RIVER UNIT 3

YEAR

SEQUENTIAL  
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0 5 0 0 0 3 0 2 9 0 — 0 0 2 — 0 2 0 4 OF 0 5

TEXT (IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC FORM 388A'S) (17)

Considering the safety aspects derived from the roving fire watch and existing fire detection and suppression systems in the areas of concern, the failure of some dampers to close under flow conditions does not create undue risk to the safety of the public.

CORRECTIVE ACTION:

Each fire damper flow rate has been compared to test data which reflects the maximum flow rate under which the damper is expected to successfully close. Based on this review, dampers which were close to or exceeded the maximum allowable flow rate were drop tested. Additionally, certain dampers identified in the 1985 study were inspected to determine if larger nine pound spring were installed. The dampers that failed the testing and inspection are identified in the Attachment.

To ensure the identified dampers close during a fire, FPC is pursuing the necessary improvements including:

- multiple closure springs and larger nine pound springs,
- a redesigned spring bracket,
- flow interrupters in the ducts, and
- a temperature switch to turn off the associated fans and a higher temperature fusible link to allow the damper to close under no flow conditions.

Design basis documents have been updated to reflect the need for fire dampers to close under ventilation flow conditions.

Since 1985, several procedural and organizational changes have occurred which should prevent recurrence of the personnel error associated with the 1985 Damper Study. These changes include strengthening engineering procedures by adding requirements for management review and approval of studies, improving and proceduralizing engineering problem reporting, establishing a Design Basis Engineering Group, and the addition of a Fire Protection Engineer to the Fire Protection Staff.

PREVIOUS SIMILAR EVENTS:

There have been three prior events related to fire dampers. Two of these events were related to design errors. This is the first event involving a design failure concerning damper closure under ventilation flow conditions.



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST, 80.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, D.C. 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

FACILITY NAME (1)

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CRYSTAL RIVER UNIT 3

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TEXT (If more space is required, use additional NRC Form 306A (4-89))

## ATTACHMENT

FIRE DAMPER  
TAG NUMBER

## DESCRIPTION\*

FD-223, 224,  
225, 226,  
238, 239,

These multi-section dampers separate fire areas in the 164', 145' and 124' elevations of the Control Complex (NA). These fire areas include the Main Control Room (CC-134-118B) and Cable Spreading Room (CC-134-118A), Operations Office (CC-145-119), Control Complex Ventilation Equipment room (CC-164-121A) and the 124' elevation hallway (CC-124-111). In the event of a fire that spreads between these areas, control of safe shutdown equipment will be transferred to the Remote Shutdown Panel and the dedicated Control Complex HVAC will be used. The dedicated HVAC should not be affected by a fire in this area.

FD-266

This damper is located in the floor of the 119' elevation of the Auxiliary Building [NE]. It separates the Reactor Coolant Pump Seal Injection Filter Room (AB-95-3Y) from the 119' elevation Hallway (AB-119-6Q). A fire could affect the safe shutdown equipment on the 95' elevation and then move upward through this damper to the 119' elevation. Should a design basis fire spread to both of these areas, then Decay Heat [BP] and Nuclear Service Closed Cycle Cooling Water [CC] systems may not be available for shutdown.

FD-271

This damper is located in the floor of the 119' elevation of the Auxiliary Building [NE]. It separates the Miscellaneous Radioactive Waste Rooms (AB-95-3K) from the 119' elevation Central Hallway (AB-119-6J). Should a design basis fire spread to both of these areas, then the Makeup Injection [BG] and Decay Heat [BP] systems may not be available for shutdown.

FD-273

This damper is located in the floor of the 119' elevation of the Auxiliary Building [NE]. It separates the 119' elevation Central Hallway (AB-119-6J) from the 95' elevation Central Hallway (AB-95-3G). Should a design basis fire spread to both of these areas, then Makeup Injection and Decay Heat systems may not be available for shutdown.

FD-278

This damper is located in the wall between the Intermediate and Auxiliary [NE] Buildings on the 95' elevation. This damper separates the 95' elevation North Hallway Nuclear Sample Room (AB-95-3B) from the Intermediate Building Penetration and Fan area (IB-95-200C). Should a design basis fire spread to both of these areas, at least one train of safe shutdown equipment will still be available.

\*Evaluation is based on the Crystal River Unit 3 Updated Fire Hazards Analysis, Revision 2, November 1989. Mitigating factors for a fire in the affected areas is discussed in "Event Evaluation".