

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)
CRYSTAL RIVER UNIT 3

DOCKET NUMBER (2)
0 5 0 0 0 3 0 2

PAGE (3)
1 OF 13

TITLE (4)
EMERGENCY FEEDWATER ACTUATION

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)												
0	6	20	8	6	8	6	0	0	8	0	2	0	9	1	6	8	7	N/A	0	5	0	0	0
												N/A	0	5	0	0	0						

OPERATING MODE (9) 1

POWER LEVEL (10) 0 2 0

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

20.402(b)	<input type="checkbox"/>	20.403(a)	<input checked="" type="checkbox"/>	90.73(a)(2)(iv)	<input type="checkbox"/>	73.71(b)	<input type="checkbox"/>
20.405(a)(1)(i)	<input type="checkbox"/>	90.30(a)(1)	<input type="checkbox"/>	90.73(a)(2)(v)	<input type="checkbox"/>	73.71(a)	<input type="checkbox"/>
20.405(a)(1)(ii)	<input type="checkbox"/>	90.30(a)(2)	<input type="checkbox"/>	90.73(a)(2)(vi)	<input type="checkbox"/>	OTHER (Specify in Abstract below and in Text, NRC Form 380A)	<input type="checkbox"/>
20.405(a)(1)(iii)	<input type="checkbox"/>	90.73(a)(2)(i)	<input type="checkbox"/>	90.73(a)(2)(vii)(A)	<input type="checkbox"/>		<input type="checkbox"/>
20.405(a)(1)(iv)	<input type="checkbox"/>	90.73(a)(2)(ii)	<input type="checkbox"/>	90.73(a)(2)(viii)(B)	<input type="checkbox"/>		<input type="checkbox"/>
20.405(a)(1)(v)	<input type="checkbox"/>	90.73(a)(2)(iii)	<input checked="" type="checkbox"/>	90.73(a)(2)(viii)(B)	<input type="checkbox"/>		<input type="checkbox"/>
20.405(a)(1)(vi)	<input type="checkbox"/>	90.73(a)(2)(iv)	<input type="checkbox"/>	90.73(a)(2)(ix)	<input type="checkbox"/>		<input type="checkbox"/>

LICENSEE CONTACT FOR THIS LER (12)

NAME: L. W. MOFFATT, NUCLEAR SAFETY SUPERVISOR

TELEPHONE NUMBER: AREA CODE 9 0 4, NUMBER 7 9 5 - 6 4 8 6

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (if you complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

On June 20, 1986, Crystal River Unit 3 was returning to power operation following an extended outage. The "A" main feedwater pump was supplying both once through steam generators (OTSGs). At 0205 the main generator was connected to the transmission system and reactor power was being increased. At 0210 a low level alarm was received on the "B" OTSG and was followed by automatic actuation of the Emergency Feedwater System. Reactor power was reduced and the main generator was disconnected from the transmission system at 0221. The main turbine automatically tripped one minute later. Emergency feedwater addition continued until the "B" OTSG level recovered and main feedwater flow was restored. Reactor power was reduced and stabilized at 8% rated thermal power. During this event the emergency feedwater design basis flowrate was exceeded.

Extensive troubleshooting was performed on the main feedwater controls following the event. No problems which could have caused the event were identified. The system was returned to service and performed satisfactorily.

Florida Power Corporation has developed a modification which will preclude emergency feedwater flow from exceeding the design limits.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		86	008	02	

TEXT (If more space is required, use additional NRC Form 366A (1/17))

EVENT DESCRIPTION

On June 20, 1986, Crystal River Unit 3 was returning to power operation following an extended outage. The reactor was stable at approximately 15% rated thermal power with the reactor and turbine under manual control. The "A" main feedwater pump [SJ, P] was under automatic control and supplying both once through steam generators [AB, HX] (OTSGs) via the startup control valves [SJ, FCV] (FWV-39 and 40; see Figure 1). At 0205 the plant output breakers were closed connecting the main generator to the transmission system and reactor power was being increased. At 0210 a low level alarm was received on the "B" OTSG. The alarm was followed by automatic actuation of the Emergency Feedwater System [BA]. Reactor power was reduced to approximately 18% rated thermal power and the main generator was disconnected from the transmission system at 0221. The main turbine automatically tripped one minute later. Emergency feedwater addition continued until approximately 0228 when the "B" OTSG level recovered and main feedwater flow was restored using the low load control valve [SJ, FCV] (FWV-38) under manual control. The Emergency Feedwater System was secured at 0233. Reactor power was reduced and stabilized at 8% rated thermal power.

Florida Power Corporation (FPC) established a team in May 1986 to reexamine the Emergency Feedwater System design basis and its implementation to assure system operational readiness. As the result of activities performed by this team, it was discovered the emergency feedwater design flow rate of 1175 GPM to a single OTSG was exceeded in this event.

CAUSE

Actuation of the Emergency Feedwater System was caused by low water level in the "B" OTSG. The low water level occurred because the startup control valve (FWV-39) spuriously closed and blocked feedwater addition to the "B" OTSG. The cause of the spurious closure of FWV-39 could not be positively determined. However, it is suspected that a small amount of dirt or moisture could have affected its operation. The valve functioned normally during extensive troubleshooting activities performed following the event.

The main turbine tripped because of generator field overexcitation after the main generator was disconnected from the transmission system.

Emergency feedwater flow rates to a single generator with two emergency feedwater pumps with the reactor at power was not considered during the system design.

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		86	008	02	03	OF

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

ANALYSIS OF EVENT

The Emergency Feedwater System performed as designed to supply secondary side cooling water when main feedwater was blocked and the "B" OTSG reached the low level actuation limit. No other Engineered Safety Feature or Reactor Protective System actuations occurred and no releases of radioactive material were made as a result of this event. Therefore, the event had no effect upon the health and safety of the public.

Additional analysis has shown that the emergency feedwater flow rates observed during this event did not result in excessive OTSG tube vibration.

CORRECTIVE ACTIONS

Following the event, the startup control valve (FWV-39) was successfully stroked using a temporary voltage source and the control station. The Integrated Control System [JA] signals during the event were recovered from the plant Recall System and were found to be normal for the plant conditions experienced before and during the event. Air regulators for FWV-39 were blown down to remove any traces of dirt or water which may have collected in the regulators. None was found. FWV-39 was returned to service and operated satisfactorily. Chart recorders were installed to monitor FWV-39 during the subsequent startup. No problems which could have caused this event were recorded or evident.

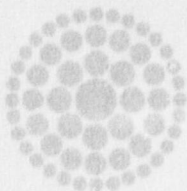
FPC has developed a modification which will preclude emergency feedwater flow from exceeding the design limits. This modification is presently scheduled to be performed during the upcoming refueling outage, dependent upon the availability of the required hardware.

SIMILAR PREVIOUS EVENTS

The Emergency Feedwater Initiation and Control (EFIC) System [BA] was installed during the 1985 refueling outage. The low OTSG level initiation feature of EFIC has actuated the Emergency Feedwater System on 17 previous occasions. Spurious actuations account for 15 of these events. (12 of these spurious actuations occurred during initial startup following the 1985 refueling outage.) The spurious actuations were due to instrument transients caused by EFIC maintenance activities, actuation setpoint problems, or pressure transients experienced when the turbine stop valves were closed.

The other two low OTSG level EFIC actuations were valid and occurred when low level setpoints were reached because of main feedwater control problems, (reference: LERs 85-014 and 85-026).

This is the first reported event in which the emergency feedwater design basis flow rate was exceeded.



**Florida
Power**
CORPORATION

September 16, 1987
3F0987-13

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

Subject: Crystal River Unit 3
Docket No. 50-302
Operating License No. DPR-72
Licensee Event Report 86-008-02

Dear Sir:

Enclosed is Licensee Event Report (LER) No. 86-008-02 which is submitted in accordance with 10 CFR 50.73.

Should there be any questions, please contact this office.

Sincerely,

E. C. Simpson
Director
Nuclear Operations Site Support

WLR/sjm

Attachment

cc: Dr. J. Nelson Grace
Regional Administrator, Region II

Mr. T. F. Stetka
Senior Resident Inspector

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