

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) CRYSTAL RIVER UNIT 3										DOCKET NUMBER (2)	PAGE (3)
										0 5 0 0 0 3 0 2	1 OF 03

TITLE (4) Change in Vendor Guidance Results in Determination that Decay Heat Removal Pumps Were Unable to Perform Their Safety Function

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	3	15	89	89	-	00	9	-	N/A	0 5 0 0 0	
0	3	15	89	89	-	00	04	14	N/A	0 5 0 0 0	

OPERATING MODE (9)		5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)								
POWER LEVEL (10)	0 0 0	20.402(b)	20.406(c)	80.73(a)(2)(iv)	73.71(b)						
		20.406(a)(1)(i)	80.73(e)(2)(v)	72.71(e)							
		20.406(a)(1)(ii)	80.73(a)(2)(vii)								
		20.406(a)(1)(iii)	80.73(a)(2)(viii)(A)								
		20.406(a)(1)(iv)	80.73(a)(2)(viii)(B)								
		20.406(a)(1)(v)	80.73(a)(2)(ix)								

LICENEE CONTACT FOR THIS LER (12)											
NAME L. W. MOFFATT, NUCLEAR SAFETY SUPERVISOR										TELEPHONE NUMBER	
										AREA CODE	9 0 4 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 NPPDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPPDS	

SUPPLEMENTAL REPORT EXPECTED (14)					EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	NO							

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

On March 15, 1989 Crystal River Unit 3 was in OPERATIONAL MODE 5 (COLD SHUTDOWN) for Reactor Coolant Pump repair. At 1548 it was determined that the Decay Heat Removal Pumps might not be able to perform their safety function for some accidents. This determination was based on new vendor guidance concerning minimum continuous flow. If the new guidance were assumed to be correct then the DHP's would be required to operate at less than the minimum allowable flow for an extended period of time following some sizes of LOCA. Florida Power's position is that the new guidance does not have a complete technical basis and therefore may be unnecessarily conservative.

This event resulted from changes in engineering practice by the vendor between the time the pump was purchased and the present. Therefore a root cause determination is not applicable.

The Pumps will be tested at flows representative of accident conditions. A supplement to this report will be submitted to describe the results of this test and actions required.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OEM NO. 0150-0004
EXPIRES 3-31-86

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (7)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
CRYSTAL RIVER UNIT 3	0 5 0 0 0 3 0 2	89	-009	-00	02	0 3

TEXT (If more space is required, use additional NRC Form 366A 3's (17))

EVENT DESCRIPTION

On March 15, 1989 Crystal River Unit 3 was in OPERATIONAL MODE 5 (COLD SHUTDOWN) for repair of Reactor Coolant Pumps [AB,P]. An engineering review of minimum flow requirements for Decay Heat Removal Pumps (DHP's) was in progress. At 1548 it was determined that for certain small break LOCA's, Decay Heat Removal Pumps DHP-1A [BP,P] and DHP-1B [BP,P] would be required to operate at flows less than the manufacturers recent new minimum allowable flow requirement for an indefinite period of time in order to perform their safety function. This was determined to be operation outside the design basis and is thus being reported pursuant to 10CFR50.73.a.2.ii.B.

The engineering review had been initiated in May 1988 as a result of NRC Bulletin 88-04. On June 14, 1988, in response to inquiries by Florida Power, the manufacturer of the Decay Heat Removal Pumps, Dresser Pump Division, stated that their recommendation for the minimum flow for continuous operation of these pumps was being changed from 800 gpm to 2350 gpm. Florida Power Corporation (FPC) considered this number to be unreasonably conservative because it corresponded to a flow of 78% of the best efficiency point on the pump curve. Other pump manufacturers were responding to similar inquiries with values in the range of 25% to 50% of best efficiency flow.

In subsequent communications the manufacturer was unwilling to work with Florida Power to establish a minimum flow value with a more complete technical basis in a timely manner.

On March 15, 1989 at 1300 a meeting was held to determine the significance of changes in the manufacturer's minimum flow requirement for DHP-1A and DHP-1B. At this meeting it was determined that for certain sizes of small break LOCA's DHP-1A and DHP-1B would be required to operate at flows significantly less than 2350 GPM for an indefinite period of time. At 1548 FPC decided that the manufacturers new recommendation should be considered as being the valid design basis until a value with a better technical basis could be determined. This resulted in the determination that the plant had operated outside its design basis.

CAUSE

The design of the pump and the original determination of operating limitations were performed by the manufacturer. The operating limitations originally specified were consistent with good engineering practices at the time. In the time since this pump was designed much experience has been gained by the industry in the area of operation of centrifugal pumps at low flow. This experience has led to more conservative limitations for low flow operation of centrifugal pumps. This event resulted from the increase in operating experience. Therefore, determination of a root cause is not applicable for this event.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)		
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CRYSTAL RIVER UNIT 3	0 5 0 0 0 3 0 2	89	009	00	03	OF	0	3

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

EVENT ANALYSIS

At Crystal River Unit 3 the DHP's perform two safety functions. For some sizes of LOCA's these pumps start automatically and supply water from the Borated Water Storage Tank (BWST) [BP,T] into the Reactor Coolant System (RCS) [AB] to provide the Low Pressure Injection (LPI) function. When the water in the BWST is exhausted, these pumps are aligned to take suction from the reactor building sump [NH,T]. For some break sizes the break flow could stabilize at significantly less than 2350 GPM.

The second safety function of these pumps is required during a small break LOCA. For certain sizes of small break LOCA's the RCS pressure initially decreases, until the Makeup Pumps (MUP's) [BQ,P] are started to provide the High Pressure Injection (HPI) function. After HPI is operating RCS pressure may stop decreasing, and remain above the pressure at which LPI can provide flow, until after the BWST inventory is exhausted. In this case, the Decay Heat Removal pumps are aligned to take suction from the reactor building sump and discharge into the suction of the MUP's. This provides adequate suction pressure to allow the MUP's to continue to provide the HPI function. In this case the DHP's would be operating at significantly less than 2350 GPM for several hours.

No accident which required the DHP's to operate in either of the above modes has ever occurred at Crystal River Unit 3. The probability of such accidents occurring is very low. If one of these accidents had occurred, the DHPs would have begun their safety function. However, the capability of the DHPs to function properly with less flow than the newly recommended minimum flow for a length of time sufficient to provide adequate core protection has not been determined.

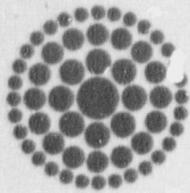
CORRECTIVE ACTION

Tests will be performed to confirm the capability of these pumps to operate reliably at lower flows following stabilization of the plant after sustaining certain size breaks in the RCS. These tests will be complete prior to the plant entering an operational mode in which the pumps are required to be operable. A supplement to this report will be submitted to describe the results of this testing. This supplement will include a justification for startup and a description of any short term actions taken.

An engineering evaluation is in progress to determine if plant modifications or other long term actions are necessary to improve the ability of these pumps to perform their safety functions.

PREVIOUS SIMILAR EVENTS

No previous events could be found in which a change in vendor guidance resulted in the determination that the plant had operated outside its design basis.



**Florida
Power**
CORPORATION

April 14, 1989
3F0489-10

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. 89-009

Dear Sir:

Enclosed is Licensee Event Report (LER) 89-009 which is submitted
in accordance with 10 CFR 50.73.

Should there be any questions, please contact this office.

Yours very truly,

Kenneth R. Wilson
Manager, Nuclear Licensing

WLR:mag

Enclosure

xc: Regional Administrator, Region I
Senior Resident Inspector

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