



# Florida Power

CORPORATION

Crystal River Unit 3

Docket No. 50-302

April 26, 1996  
3F0496-28

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

Subject: Licensee Event Report (LER) 95-008-01

Dear Sir:

Please find the enclosed Licensee Event Report (LER) 95-008-01. This report is submitted in accordance with 10 CFR 50.73. This supplement provides the cause and corrective actions determined for this previously reported event.

Sincerely,

B. J. Hickle, Director  
Nuclear Plant Operations

BJH/JAF:ff

Attachment

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

9605020172 960426  
PDR ADDCK 05000302  
S PDR

JE22 1/1

EXPIRES 5/31/95

## LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HOURS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (MNB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON DC 20503.

FACILITY NAME (1)

CRYSTAL RIVER UNIT 3 (CR-3)

DOCKET NUMBER (2)

0 5 0 0 0 3 0 2 1 OF 0 6

PAGE (3)

TITLE (4)

Oil Leakage from Reactor Coolant Pump Motors Not Collected by Lube Oil Collection System Leads to Operation Outside Design Basis

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	5	1	9	9	5	9	5	0	0	8	0	1	0	4	2	6	9	6	N/A	0	5	0	0	0

OPERATING MODE (9)

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (CHECK ONE OR MORE OF THE FOLLOWING) (11)

POWER LEVEL (10)

20.402(b)

20.405(c)

50.73(a)(2)(iv)

73.71(b)

20.405(a)(1)(i)

50.36(c)(1)

50.73(a)(2)(v)

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)

X

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

J. A. Frijouf, Sr. Nuclear Regulatory Specialist

TELEPHONE NUMBER

AREA CODE

3 5 2 5 6 3 - 4 7 5 4

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE 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 May 19, 1995, Florida Power Corporation's (FPC) Crystal River Unit 3 (CR-3) was in MODE ONE (POWER OPERATION), operating at 100% reactor power and generating 867 megawatts. At that time, FPC personnel concluded that not all of the oil leakage from the reactor coolant pump (RCP) motors was being collected by the lube oil collection (LOC) system. The event was reported to the Nuclear Regulatory Commission at 1430 on May 19, 1995, via 10 CFR 50.72(b)(1)(ii)(B) and was assigned the event number 28835. Evaluations determined that no operability or safety concerns were present.

Subsequently, several reactor building entries were made to inspect the LOC system for leakage pathways and to effect repairs. During the Refuel 10 outage FPC personnel identified two primary leakage pathways. One pathway comprised oil leaking through thermocouple conduits and the second pathway was through a lower bolted, sealed seam in the LOC system. Corrective actions included thermocouple replacement, sealing LOC system seams, and replacement of an RCP motor with one having a new LOC system design incorporating a welded lower seam.

EXPIRES 5/31/95

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HOURS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON DC 20503.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

CRYSTAL RIVER UNIT 3 (CR-3)

YEAR

SEQUENTIAL  
NUMBERREVISION  
NUMBER

0 5 0 0 0 3 0 2 9 5 --- 0 0 8 --- 0 1 0 2 OF 0 6

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

**EVENT DESCRIPTION:**

On May 19, 1995, Florida Power Corporation's (FPC) Crystal River Unit 3 (CR-3) was in MODE ONE (POWER OPERATION), operating at 100% reactor power and generating 867 megawatts. At that time, FPC personnel concluded that not all of the oil leakage from the reactor coolant pump [AB,P](RCP) motors [AB,P,MO] was being collected by the lube oil collection [LM](LOC) system. Immediately following the discovery of this event, FPC issued a Problem Report.

The event was conservatively determined to be a potential design basis issue, and was reported to the Nuclear Regulatory Commission at 1430 on May 19, 1995, via the Emergency Notification System per the requirements of 10 CFR 50.72(b)(1)(ii)(B) and was assigned the event number 28835. An operability evaluation was conducted which concluded that the LOC system was degraded but operable based upon the most probable leakage pathway.

The LOC system was designed and installed in response to 10 CFR 50 Appendix R requirements for fire protection. This system is an arrangement of sheet metal encapsulating potential leakage sites on the RCP motor. Gaskets are installed between the sheet metal pieces and the RCP motor. This system collects and retains RCP motor lubricating oil in two four hundred gallon tanks [LM,TK](LOT-4A & LOT-4B). As a result of trending results for oil additions to RCPs and collections from LOT-4A & LOT-4B, as of April 1995, FPC personnel concluded that almost all of the approximately 115 gallons added since June, 1994, had not been recovered by the LOC system. Oil not recovered by the LOC system eventually migrates into the reactor building [NH](RB) sump. A small amount of this oil is entrained in the sump water which is pumped to the Miscellaneous Waste Storage Tank [WD,TK](MWST). The rest remains floating on the surface of the water in the sump.

A design basis review of this event was conducted on June 5, 1995. FPC engineering personnel determined that this event constituted a potential design basis issue.

An RB entry was made on June 8, 1995. One of the purposes for this entry was to verify, insofar as possible, the conclusions that had been reached relative to the LOC system leakage. Since CR-3 was operating at power, an inspection of the LOC system (inside the secondary shield wall) was precluded. However, access to the RB sump was possible. When subsequent confirmation of the RB sump contents was accomplished, FPC personnel verified that the majority of the uncontained RCP motor lube oil had migrated to the RB sump, as expected. The RB sump contained an estimated 45 to 95 gallons of oil, based on a measurement of the oil layer thickness. Additionally, 10 gallons of oil were pumped from LOT-4A & LOT-4B, indicating that the LOC system remained intact.

EXPIRES 5/31/95

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HOURS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON DC 20503.

FACILITY NAME (1)  CRYSTAL RIVER UNIT 3 (CR-3)	DOCKET NUMBER (2)  0 5 0 0 0 3 0 2	LER NUMBER (6)			PAGE (3)  9 5 --- 0 0 8 --- 0 1 0 3 OF 0 6
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	

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

On January 11, 1996, CR-3 was in MODE FIVE (COLD SHUTDOWN) as the result of a forced outage caused by a substantial condenser tube leak. At that time an RB entry was again made to more closely inspect the LOC system. Several LOC system leaks were identified and repaired.

On February 16, 1996, CR-3 entered its Refuel 10 outage and a complete inspection of the LOC system was undertaken. During this inspection two leakage pathways were identified. Oil was determined to be leaking out of the LOC system via thermocouple conduits and through the lower bolted seam around all four RCP motors. Due to the system design it is difficult to establish a totally pinhole leak free system. All of the leakage sites identified constituted pinhole leaks.

This report is submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B).

**EVENT EVALUATION**

Uncontained oil in the RB sump presents two issues that potentially affect the safe operation of CR-3. The first issue involves a Large Break Loss of Coolant Accident (LBLOCA) with RCP motor lube oil in the sump and the second issue is the potential fire hazard associated with uncontained RCP motor lube oil.

The LBLOCA issue is addressed in Babcock & Wilcox (B&W) document 77-1172291-00, "Evaluation of RCP Lube Oil in RB Sump". This report concludes that the impact of spilling the entire RCP lube oil inventory would be insignificant. The amount of oil (760 gallons) would amount to less than 0.2% of the total liquid inventory on the RB floor following a LBLOCA. The oil would also probably remain on the surface as a thin film and never reach the suction of the decay heat or RB spray pumps used to mitigate the event, and would therefore have only an insignificant effect on the postulated event.

The fire hazard issue has been considered in a recent FPC study conducted as part of an unrelated issue. The study concluded any RCP motor lube oil leakage will be contained within the secondary shield wall, or will migrate to the RB sump. These areas are both in compliance with Appendix R requirements for protection and separation of redundant safe shutdown circuits inside containment. Therefore, although unlikely, should a fire occur, the safe shutdown capability of the plant would not be compromised.

Following the comprehensive LOC system inspection during Refuel 10, FPC engineering personnel determined that in the event of a catastrophic failure of a RCP motor oil



EXPIRES 5/31/95

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HOURS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
CRYSTAL RIVER UNIT 3 (CR-3)		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		0 5 0 0 0 3 0 2	9 5	0 0 8	

TEXT (If more space is required, Use additional NRC Form 365A's (17))

reservoir, substantially all of the oil would have been contained by the LOC system and routed to lube oil collection tanks LOT-4A & LOT-4B.

Since no substantive operability or safety issues relative to operation have been identified, continued operation of the plant does not present any threat to or compromise of the health and safety of the general public.

**CAUSE**

The source of leakage in the LOC system has been determined to be associated with two primary leakage pathways. The first pathway is from thermocouples in the RCP motors which were not designed for oil submergence. This leakage pathway allows oil to run down the inside of their associated conduits and out through an auxiliary connection box. The second leakage pathway was determined to be via pinhole leaks in the lower seam of the LOC system.

**IMMEDIATE CORRECTIVE ACTION**

Since access to the LOC system is prohibited during power operation, no immediate corrective actions were possible.

**ADDITIONAL CORRECTIVE ACTION**

1. A series of RB entries were made to identify the LOC system leakage pathways and to perform repair activities.
2. Maintenance personnel sealed the LOC system especially focussing on the pinhole leak prone lower seam.

**ACTION TO PREVENT RECURRENCE**

1. The motor for RCP-1A was replaced with a new style motor during the Refuel 10 outage. The greatest amount of LOC system leakage for any one RCP motor had been attributed to this motor. The new motor's design is expected to greatly reduce the probability of LOC system leakage, since the lower seam is welded, rather than bolted and sealed as in the previous design.

EXPIRES 5/31/96

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HOURS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON DC 20503.

FACILITY NAME (1)  CRYSTAL RIVER UNIT 3 (CR-3)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
	0   5   0   0   0   3   0   2	9   5	---   0   0   8	---   0   1	0   5   OF   0   6

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

2. Thermocouples not specifically designed for oil submergence were replaced with thermocouples designed for oil submergence service.
3. FPC considers that the corrective actions taken thus far are sufficient to correct the LOC system deficiency. However, FPC will continue to monitor LOC system performance and will evaluate further corrective actions which may be deemed desirable.

PREVIOUS SIMILAR EVENTS

There have been two previous reportable events involving the RCP motor LOC system. LER 88-009-00 and LER 92-022-00 both address the issue of insufficient reserve volume in the RCP motor LOC system tanks.

ATTACHMENT

Attachment 1 - Abbreviations and Acronyms

EXPIRES 5/31/95

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATIONESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS  
INFORMATION COLLECTION REQUEST: 50.0 HOURS. FORWARD  
COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS  
AND REPORTS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR  
REGULATORY COMMISSION, WASHINGTON, DC 20555-0001,  
AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104),  
OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON DC 20503.

FACILITY NAME (1)  CRYSTAL RIVER UNIT 3 (CR-3)	DOCKET NUMBER (2)  0   5   0   0   0   3   0   2	LER NUMBER (6)			PAGE (3)  0   6   OF   0   6
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		9   5   ---	0   0   8   ---	0   1	

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

## ATTACHMENT 1

## Abbreviations and Acronyms

APPENDIX R      Appendix R to 10 CFR part 50. Fire Protection Program for  
Nuclear Power Facilities Operating Prior to January 1, 1979

B&W77-1172291-00      Evaluation of RCP Lube Oil in RB Sump Report

CR-3      Crystal River Unit 3

FPC      Florida Power Corporation

LBLOCA      Large Break Loss of Coolant Accident

LOC      Lube Oil Collection

LOT-4A & LOT-4B      Lube Oil Tanks 4-A and 4-B

MODE ONE      Power Operation

MODE FIVE      Cold Shutdown

MWST      Miscellaneous Waste Storage Tank

RB      Reactor Building

RCP      Reactor Coolant Pump

REFUEL 10      Refueling outage with expected ending date of April 30, 1996