Florida Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302

December 20, 1990
3F1290-12

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

Reference: FPC Letter * NRC dated 10/18/90
Licensee Eve.' Report 90-14

Dear Sir:

Enclosed is Licensee Event Report (LER) 90-014-01 which is submitted in accordance with 10CFR50.73.

This supplement includes additional information resulting from the investigations and evaluation performed relative to this issue.

Sincerely,

Gary Boldt

G. L. Boldt
Vice President, Nuclear Production

WLR:mag

Enclosure

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

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NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

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 0 6

TITLE (4): Lack of Knowledge Causes Auxiliary Nuclear Operator to De-energize Containment Isolation Valve Prior to Being Fully Seated Violating Containment Integrity

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

OPERATING MODE (9): 1

POWER LEVEL (10): 0 9 5

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

20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	X 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)	X 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: W. K. BANDHAUER, NUCLEAR OPERATIONS SUPERINTENDENT

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 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 9/18/90 at 1845, while Crystal River Unit 3 was operating in MODE I (POWER OPERATION) at 95% reactor power, valve DHV-43 was discovered partially open. This valve isolates the Reactor Building Sump from the suction header of the "B" Decay Heat Removal System. The partially open valve was a violation of Technical Specification 3.6.1.1 which specifies that Containment Integrity must be maintained in MODE I.

DHV-43 was not fully seated following its use as a drain path at 0430 on 09/18/90. When the valve "closed" indication was received, the Auxiliary Nuclear Operator opened the breaker, removing closing power from the motor-operator prior to the valve being fully seated. The "closed" light is operated by a geared limit switch but the motor-operator closing power is controlled by a torque switch. The valve motor-operator had not developed sufficient torque to be fully seated. Containment integrity was restored within 15 minutes of discovery of the non-conformance. Corrective action includes enhancing the training given to licensed and non-licensed operators.

EVENT DESCRIPTION

On 9/18/90 at 1845, while Crystal River Unit 3 was operating in Mode 1 (POWER OPERATION) at 95% reactor power, valve DHV-43 [BP,ISO] was discovered not fully seated. This valve isolates the Reactor Building (RB) Sump [WK] from the suction header of the "B" Decay Heat Removal System (DHRS) [BP] (see Attachment 1). The valve not being fully seated was a violation of Technical Specification 3.6.1.1 which specifies that Containment Integrity must be maintained in Mode 1. This is reportable under 10CFR 50.73a.2.i.B, 50.73a.2.ii.C, and 50.73a.2.v.D. By 1900 on 9/18/90, the valve was manually seated thus restoring containment integrity. A narrative of circumstances leading up this event follows.

A major portion of the "B" train of DHRS and Emergency Core Cooling System (ECCS), had been removed from service for maintenance at 2130 on 9/17/90. A 72 hour Action Statement for Technical Specification 3.5.2, ECCS Subsystems, had been entered to repair seat leakage on DHV-40 [BP,ISO], "B" train suction cross-connect isolation valve to the "B" DHRS pump. In order to meet the 72 hour Action Statement, isolation and draining of the "B" DHRS train needed to be completed within 10 hours as determined by pre-job planning. At 0400 on 09/18/90, it became apparent to the Nuclear Shift Supervisor (NSS) that the method of draining being used would not allow for completion within the required time. The NSS reviewed the system flow diagram for additional drain paths to expedite the process and determined DHV-43 could serve that purpose. After reviewing Technical Specifications and administrative procedures, the NSS determined DHV-43 could be used to drain a portion of the remaining water into the RB sump.

The RB Sump is divided into two compartments by a weir, both compartments normally containing water. The normal (non-ECCS) side of the sump receives the inflow of water from all RB drains and is pumped down automatically by the RB Sump Pumps [WK,P]. The ECCS side receives overflow from the normal side only when the inflow exceeds the capacity of the sump pumps, as in a Loss Of Coolant Accident (LOCA). The only piping penetration in the ECCS side of the sump is the DHRS suction piping for the post-LOCA RB emergency recirculation lineup.

DHV-43 was stroked several times over a 15 minute period and was effective in draining several hundred gallons of water from the DHRS piping to the ECCS side of the sump. As the water level in the ECCS sump overflowed the weir to the normal sump, the RB sump pumps removed the water to the waste treatment system.

When it was determined stroking was no longer beneficial, DHV-43 was closed using its motor-operator. A non-licensed Auxiliary Nuclear Operator (ANO) had been stationed at the switchgear for DHV-43 during the stroking of the valve. He had been instructed as part of the equipment maintenance clearance order to open the breaker for DHV-43 power when the valve was closed . When the green indicating light illuminated at the switchgear, the ANO verified the closed indication with the control room operator and opened the breaker for DHV-43. A later re-enactment showed this action took 4-5 seconds after the green light illuminated. This occurred at approximately 0430, 09/18/90.

At 0800, shift turnover was accomplished and main control room log readings were taken by the licensed Nuclear Operator. He noted the level of the ECCS side of the RB sump had decreased from 2.6 feet to 1.1 feet since closing DHV-43. He informed the NSS of the sump level change since the midnight readings. The NSS did not recognize the implication of the change and assumed it was associated with the use of DHV-43 as a drain path. No further investigation was conducted into the cause of the level change. Turnover to the next shift took place at 1600 and work actively progressed on the DHR system. At 1845, approximately 14 hours after the initial opening of DHV-43, it was noted that air was exiting DHV-83 and BSV-58, the high point vents of the DHRS and the interconnected Building Spray System. Subsequent investigation revealed DHV-43 was not fully seated and the ECCS sump had emptied, allowing the higher pressure RB atmosphere to escape into the Auxiliary Building. At 1900, DHV-43 was manually sealed using the handwheel, stopping the air flow from DHV-83 and BSV-58.

CAUSE

DHV-43 was not fully seated following its use as a drain path at 0430 on 09/18/90 due to a cognitive personnel error resulting from the lack of knowledge of Limitorque motor-operators. When the valve "closed" indication was received, the ANO opened the breaker removing closing power from the valve prior to the torque switch actuating. This stopped disc travel before the valve disc was fully seated. The valve "closed" indication had been received; however, the "closed" light is operated by a geared limit switch, whereas the motor-operator power, while closing, is controlled by a torque switch. This design allows the valve to "torque-out" while closing and ensures the valve is fully seated and leak-tight. Longer delay times are unique to the 120 second stroke valves such as DHV-43. Valve movement after the closed light illuminates is proportional to the valve stroke time. Subsequent testing has shown DHV-43 continues to build-up torque, seating the valve, for approximately seven seconds after the "closed" light illuminates. The operator was unaware of this delay time in de-energizing the motor operated valve by the torque switch.

SAFETY CONSEQUENCES

DHV-43 is a motor operated containment isolation valve. It provides single barrier containment sump isolation to the "B" DHRS train. Under normal circumstances, the DHRS is a closed system capable of withstanding the projected peak RB pressure following a containment Design Basis Accident (DBA). It is this system integrity which prevents the release of contamination from the RB when DHV-43 is opened following a LOCA. At the time of this event, the DHRS was not intact (DHV-83 and BSV-58 were open), therefore, the significance of DHV-43 not being fully seated must be addressed.

The area of the opening through DHV-43 has been determined based on observed flow rates through the valve with a known differential pressure. The calculation uses actual data retrieved from level charts of the ECCS sump as the water drained through DHV-43 to the Auxiliary Building sump. The composite area of the opening was calculated to be 0.11 square inches or approximately 0.3% open.

Under LOCA conditions, the composite area of the opening would be decreased by the higher differential pressure across the valve acting on the disc and pressing against the side of the valve seat. The magnitude of the effects of the increased differential pressure is difficult to quantify due to the wide range of variables to consider. However, conservatively assuming no additional sealing and the opening remains 0.11 square inches, a maximum of 119 standard cubic feet per minute (scfm) of air or 19.9 gallons per minute (gpm) of water would pass from the RB to the Auxiliary Building at the containment DBA peak pressure of 53.9 psig.

The consequences of the DHRS being in a degraded condition would slightly increase the post-LOCA offsite doses. The safety significance is low when compared to the current FSAR LOCA analysis. A study was performed using the current FSAR LOCA assumptions and adding a 20 gpm leak in the DHRS piping. Thirty minutes into the event, the thyroid dose at the Exclusionary Boundary increased from the current 0.04 Rem to 0.65 Rem. After two hours, the dose at the Low Population Zone increased from 0.2 Rem to 1.6 Rem. These values remain well below the 10CFR 100 limits of 300 Rem.

CORRECTIVE ACTION

As corrective action to prevent recurrence, Florida Power Corporation will:

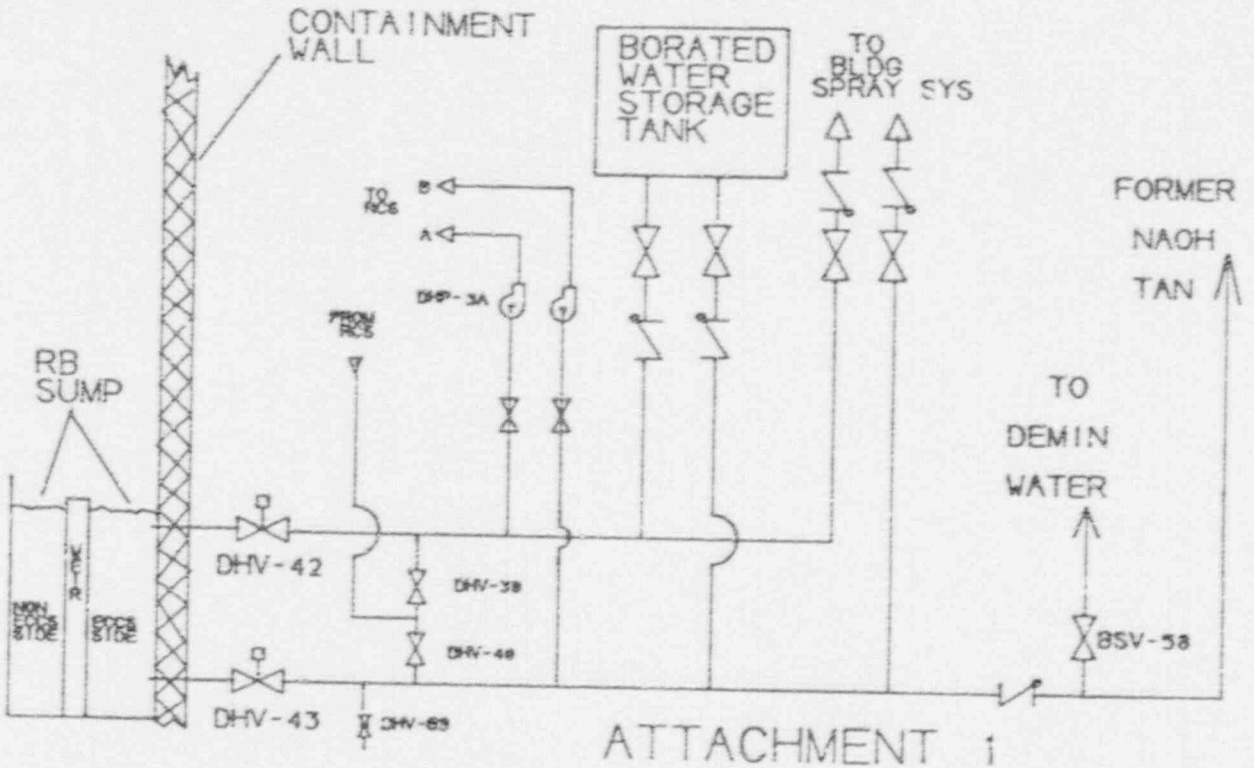
1. Include this event and the purpose of the "closed" light and torque switch in the first operator requalification cycle of 1991. The parallel between valves like DHV-43 and throttle-type valves, where it is commonly known that switches must be held in the closed position for a period of time after the "closed" light illuminates, will be emphasized;

2. Enhance the basic training given in non-licensed operator training on Limitorque valves to emphasize the operation of closed lights and torque-switches; and

3. Immediately disseminate this information to the operating shifts through an Operations Study Book entry, emphasizing the containment integrity aspect of this event.

PREVIOUS SIMILAR EVENTS

There have been no previous similar events recorded in the operating history of CR-3.



ATTACHMENT 1