

Florida Power

CORPORATION
Crystal River Unit 3
Docket No. 50-302

July 26, 1997
3F0797-18

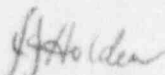
U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Subject: LICENSEE EVENT REPORT (LER) 50-302/97-018-00

Gentlemen:

Please find enclosed Licensee Event Report (LER) 50-302/97-018-00. The LER discusses the potential for losing chilled water to the Control Complex Ventilation System following a High Energy Line Break in the Intermediate Building. This report is being submitted pursuant to 10 CFR 50.73 (a) (2) (ii).

Sincerely,


J. J. Holden
Director
Nuclear Engineering and Projects

JJH/dwh

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

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LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (IT 6 F33), 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	DOCKET NUMBER (2) 05000302	PAGE (3) 1 OF 7
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TITLE (4)
A High Energy Line Break In The Intermediate Building Could Result In Loss of Chilled Water To The Control Complex Ventilation System Due To Design Error

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 NAME	DOCKET NUMBER
07	02	97	97	-- 018 --	00	07	26	97	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)								
POWER LEVEL (10)	000	20.2201(b)			20.2203(a)(2)(v)			50.73(a)(2)(i)		50.73(a)(2)(viii)
		20.2203(a)(1)			20.2203(a)(3)(i)			X 50.73(a)(2)(ii)		50.73(a)(2)(x)
		20.2203(a)(2)(i)			20.2203(a)(3)(ii)			50.73(a)(2)(iii)		73.71
		20.2203(a)(2)(ii)			20.2203(a)(4)			50.73(a)(2)(iv)		OTHER
		20.2203(a)(2)(iii)			50.36(c)(1)			50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iv)			50.36(c)(2)			50.73(a)(2)(vii)				

LICENSEE CONTACT FOR THIS LER (12)

NAME Dennis W. Herrin, Sr. Regulatory Specialist	TELEPHONE NUMBER (Include Area Code) (352) 795-6486
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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)			
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

At 1949, on July 2, 1997, Florida Power Corporation's (FPC's) Crystal River Unit 3 (CR-3) was in MODE 5 (COLD SHUTDOWN) when an issue was determined to be reportable under 10CFR50.72(b)(2)(i) (Event No. 32580) and 10CFR50.73(a)(2)(ii)(A). In 1990, FPC became aware of the potential for losing both control complex chillers following a high energy line break (HELB) in the Intermediate Building (IB). FPC implemented a Modification Approval Record (MAR) installing a manual valve for isolating the Chilled Water System from the IB. The 10CFR50.59 evaluation for the MAR considered failure of the operating chiller and a single active failure being the standby chiller. The evaluation inappropriately took credit for the nonsafety-related Appendix R chiller and a temporary chiller for concluding that an unreviewed safety question did not exist. Prior NRC approval was not requested. The cause for the initial condition was design error during construction. The cause for the current condition was an inadequate 10CFR50.59 evaluation. A loss of control complex cooling could affect the control complex habitability envelope and allow temperatures in vital areas to exceed limits for ensuring continued operation of electrical equipment. Currently, minimal safety significance is associated with the existing condition. A HELB is not credible in MODE 5. Corrective actions include re-evaluating a HELB in the Intermediate Building, continuing the System Readiness Review program, and the recent 10CFR50.59 program enhancements.

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

EVENT DESCRIPTION

On July 2, 1997, Florida Power Corporation's (FPC's) Crystal River Unit 3 (CR-3) was in MODE 5 (COLD SHUTDOWN) when the evaluation of a design basis issue concluded that the issue was reportable under 10CFR50.72(b)(2)(i) and 10CFR50.73(a)(2)(ii)(A). At 1949, on July 2, 1997, a four-hour notification was made to the NRC Operations Center (Event No. 32580).

In 1990, FPC became aware of a potential concern discovered by Gilbert Commonwealth at the V. C. Summer nuclear plant. The concern involved a high energy line break (HELB) causing the shut down of the control complex chillers [VI, CHU]. Gilbert Commonwealth indicated that CR-3 had a similarly designed control complex cooling system. Nonconforming Operations Report (NCOR) 90-025 was initiated to address this issue.

The Chilled Water System [KM] provides the cooling medium for the control complex heat exchangers [VI, HX], penetration cooling heat exchangers [NF, HX], turbine building switchgear rooms [VK, FLT] and post-accident sample coolers [IP, CLR]. The Chilled Water System is vital to maintaining the Control Room [NA] and other enclosures within the control complex, particularly those which contain electronic components, at a temperature and humidity level that affords personnel comfort and is compatible for electronic equipment.

The control complex heat exchangers are part of the Control Complex Ventilation System [VI]. This system provides the safety function of maintaining vital area temperatures within design values and providing protection for the Control Room operators during emergency conditions.

The penetration cooling heat exchangers are located within a plenum (protective shroud) in Zone 19 of the Intermediate Building [NF] and are part of the Penetration Cooling System [VF]. This system carries cooled air to the reactor building penetrations [NH, PEN]. No safety functions are associated with this system.

In the event of a large steam line break in Zone 19, steam will enter the penetration cooling fan [VF, FAN] plenum through relief dampers [VF, DMP]. Steam in the plenum will cause the fire dampers [VF, DMP] to close. With the plenum fan running, steam will be continuously drawn through the relief dampers and will subject the penetration cooling heat exchanger coils to a steam load in excess of normal loads. The additional steam load will cause the penetration cooler heat exchanger loop water (chilled water) temperature to rise continuously to a point where the operating chiller trips. With the chiller tripped, the chilled water pump [KM, P] will continue to operate, causing the chilled water temperature to rise at a faster rate. The rising chilled water temperature will eventually cause the chiller rupture disc [KM, RPD] to blow to relieve vessel pressure, disabling the operating chiller. The time to failure was estimated by FPC to be approximately five minutes. This same failure scenario could cause failure of the standby chiller, should it be called into service, resulting in a complete loss of chilled water.

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Modification Approval Record (MAR) 90-03-02-01 was initiated to resolve the above concern. The MAR installed a manual valve (CHV-229) [KM, SHV] to provide the capability of isolating the reactor building penetration coolers from the Chilled Water System in the event of a HELB in the Intermediate Building. The MAR assumed the operating chiller would fail due to the HELB, the operator would close manual valve CHV-229, and the operator would start the standby chiller.

The 10CFR50.59 safety evaluation for the MAR considered a single active failure in the standby chilled water system. The safety evaluation stated, in part: "Should both CC Chillers and/or chilled water pumps be inoperable, operations personnel may utilize the Appendix R Chilled Water System [KM] to cool the control complex. Since the initiating event resulted in immediate plant shutdown, this mode of control complex cooling is acceptable. Equipment has been staged and procedures developed to supply temporary control complex cooling in the event that the Appendix R chiller is also unavailable, though such methods are considered non-safety."

On April 17, 1997, a question was raised by the Emergency Operating Procedure (EOP) Enhancement Program personnel regarding the operator action to close manual valve CHV-229 in the event of a HELB in the Intermediate Building, as specified in EOP-5, "Excessive Heat Transfer." The question raised was whether or not nonsafety-related equipment (the Appendix R Chilled Water System and temporary control complex cooling system) could be credited for ensuring control complex temperatures are maintained within design limits following a HELB in the Intermediate Building.

On June 23, 1997, FPC determined that taking credit for the Appendix R Chilled Water System and temporary control complex cooling system as replacements for the control complex chillers without prior NRC review and approval was not appropriate.

This report is being submitted pursuant to 10CFR50.73(a)(2)(ii).

EVENT EVALUATION

A complete loss of the Chilled Water System following a HELB in the Intermediate Building could affect the ability to maintain the control complex habitability envelope. Additionally, temperatures in vital areas may exceed those limits necessary to ensure continued operation of critical electrical equipment.

Currently, minimal safety significance is associated with the existing conditions. A HELB in the Intermediate Building is not a credible accident in MODE 5.

CAUSE

The cause for the initial plant configuration was inadequate design during the original construction of CR-3. The effects of a HELB in the Intermediate Building for impact on the Chilled Water System were not evaluated.

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The failure to resolve the original design issue in 1990 was caused by preparation of an inadequate 10CFR50.59 safety evaluation. Lack of a formal program for the training and qualification of personnel associated with the preparation and review of 10CFR50.59 safety evaluations led to errors in the application of 10CFR50.59 concepts.

IMMEDIATE CORRECTIVE ACTIONS

A HELB is not a credible accident in MODE 5. No immediate corrective actions were required.

ADDITIONAL CORRECTIVE ACTIONS

A HELB in the Intermediate Building will be evaluated for impact on the Chilled Water System. If the evaluation concludes that sufficient time exists for the operator to isolate the penetration coolers prior to failure of the operating Chilled Water System chiller, a single active failure of the standby Chilled Water System chiller will not cause the loss of all chilled water to the control complex. This evaluation will be completed by September 1, 1997.

If the evaluation concludes that sufficient time does not exist for the operator to isolate the penetration coolers prior to failure of the operating Chilled Water System chiller, a single active failure of the standby Chilled Water System chiller will cause the loss of all chilled water to the control complex. Actions will be taken to preclude chiller failure by October 30, 1997.

ACTIONS TO PREVENT RECURRENCE

The System Readiness Review (SRR) Plan has been developed to conduct extent of condition reviews to assure that safety-related systems are in compliance with the licensing and design basis of CR-3.

Compliance Procedure CP-213, "Preparation of a Safety Assessment and Unreviewed Safety Question Determination," Revision 3 became effective on July 3, 1997. This procedure established an enhanced process that properly implements the requirements of 10CFR50.59.

CP-213 initial training to over 180 staff personnel was completed in June 1997.

PREVIOUS SIMILAR EVENTS

A review has been performed of previously submitted Licensee Event Reports (LERs). LERs 50-302/96-020-00 and 50-302/96-24-01 are associated with inadequate design conditions created through the preparation of inadequate 10CFR50.59 evaluations. LERs 50-302/95-019-00, 50-302/96-015-00, 50-302/97-004-00 and 50-302/97-009-00 are associated with inadequate design conditions that were created during original construction of CR-3.

ATTACHMENTS

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Attachment 1 - Abbreviations, Definitions, and Acronyms

Attachment 2 - List of Commitments

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ATTACHMENT 1

ABBREVIATIONS, DEFINITIONS AND ACRONYMS

- CC Control Complex
- CFR Code of Federal Regulations
- CHV Chilled Water Valve
- CR-3 Crystal River Unit 3
- EOP Emergency Operating Procedure
- FPC Florida Power Corporation
- HELB High Energy Line Break
- LER Licensee Event Report
- MAR Modification Approval Record
- NCOR Nonconforming Operations Report

NOTES: Improved Technical Specifications defined terms appear capitalized in LER text {e.g., MODE 1}

Defined terms/acronyms/abbreviations appear in parenthesis when first used {e.g., Reactor Building (RB)}.

EIIS codes appear in square brackets {e.g., Makeup Tank [CB, TK]}.

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ATTACHMENT 2

LIST OF COMMITMENTS

RESPONSE SECTION	COMMITMENT	DUE DATE
Page 4	A HELB in the Intermediate Building will be formally evaluated for impact on the Chilled Water System. If the formal evaluation concludes that sufficient time exists for the operator to isolate the penetration coolers prior to failure of the operating Chilled Water System chiller, a single active failure of the standby Chilled Water System chiller will not cause the loss of all chilled water to the control complex.	September 1, 1997
Page 4	If the formal evaluation concludes that sufficient time does not exist for the operator to isolate the penetration coolers prior to failure of the operating Chilled Water System chiller, a single active failure of the standby Chilled Water System chiller will cause the loss of all chilled water to the control complex. Actions will be taken to preclude chiller failure.	October 30, 1997