NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
CRYSTAL RIVER UNIT 3	0 5 0 0 0 3 0 2	1 OF 0 6

TITLE (4) Design Error Leads to Inadequate Isolation Between Instruments in the Control Room and Remote Shutdown Panel

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)
									N/A	0 5 0 0 0
0 4	2 8	8 8	8 8	— 0 1 2	— 0 0	0 5	2 7	8 8	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)			
1	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 1 0 0	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	TELEPHONE NUMBER
L. W. MOFFATT, NUCLEAR SAFETY SUPERVISOR	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 April 28, 1988, Crystal River Unit 3 was operating in Mode 1 (Power Operation) generating 882 MWe. The Engineering Department was reviewing plant instrument drawings as part of the B&W Owner's Group Safety and Reliability Improvement Program. During this review, it was discovered that 10 CFR 50, Appendix R electrical isolation requirements for both trains of Reactor Coolant System Hot Leg temperature instrumentation in the Remote Shutdown Panel and Control Room was compromised by a recent instrumentation installation.

This event was caused by a design error in the development of Control Room instrument modifications to satisfy Florida Power Corporation commitments to Regulatory Guide 1.97.

Based on a preliminary check of other similar circuits, this appears to be an isolated occurrence. A roving fire watch, performing an hourly check of the Cable Spreading Room was established. Design changes to provide the required isolation between the Control Room and Remote Shutdown Panel T_{HOT} instrumentation were developed and then installed on May 27, 1988.

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

EVENT DESCRIPTION

On April 28, 1988, Crystal River Unit 3 was operating in Mode 1 (Power Operation) generating 882 MWe. The Engineering Department was reviewing plant instrument drawings while evaluating the B&W Owner's Group Safety and Reliability Improvement Program (SPIP) recommendation for providing the operator with unambiguous status of indicators and recorders upon loss of Integrated Control System [JA] or Non Nuclear Instrumentation power. During this review, it was discovered that 10 CFR 50, Appendix R electrical isolation requirements for both trains of Reactor Coolant System (RCS) Hot Leg temperature (T_{HOT}) instrumentation [AB,TI] in the Remote Shutdown Panel and Control Room appeared to have been compromised by a recent instrumentation installation. Electrical isolation is necessary to assure instrument availability at the Remote Shutdown Panel if a Control Room or Cable Spreading Room fire occurs. Upon additional review, it was determined the design had been compromised and on May 5, 1988 a Non-Conforming Operations Report (NCOR) was written to document this condition.

Failure to provide electrical isolation between these instruments is contrary to the Crystal River Unit 3 design basis and resulted in the potential for a single fire to affect redundant safe shutdown instrumentation, which is not in accordance with 10 CFR 50, Appendix R. This event was determined to be reportable under 10 CFR 50.73 (a) (2) (ii) (B) as a condition outside the design basis of the plant on May 24, 1988. A one hour report was made on that date, as required by 10 CFR 50.72 (b) (ii) (B).

CAUSE

This event was caused by a design error in the development of Control Room instrument modifications to satisfy Florida Power Corporation commitments to Regulatory Guide 1.97. The Regulatory Guide 1.97 design was performed and verified by a contract engineering firm. Based on a preliminary check of other similar circuits, this appears to be an isolated occurrence.

The Regulatory Guide 1.97 T_{HOT} instruments installed in the Control Room interface with the Remote Shutdown Panel and the Reactor Coolant Inventory Tracking System (RCITS). The interfaces are as follows:

- Control Room T_{HOT} instrument inputs are obtained from the RCITS T_{HOT} inputs,
- RCITS T_{HOT} inputs are obtained from the Remote Shutdown Auxiliary Cabinet T_{HOT} inputs,
- The Remote Shutdown Panel and Remote Shutdown Auxiliary Cabinets are isolated from RCITS by isolation devices inside the RCITS cabinets.

Isolation between the Control Room and Remote Shutdown Panel was compromised when the Control Room T_{HOT} instrument inputs were selected from points between the Remote Shutdown Auxiliary Cabinets and the RCITS isolation devices (See Figures 1 and 2). It should be noted that cable routing between the Remote Shutdown Auxiliary Cabinets and the RCITS cabinets meets 10 CFR 50, Appendix R separation requirements.

EVENT ANALYSIS

The affected Remote Shutdown Panel instruments were installed during the 1985 refueling outage as part of the plant fire protection upgrades done in accordance with 10 CFR 50 Appendix R. The Regulatory Guide 1.97 modifications, which compromised the isolation requirements, were installed during the 1987 refueling outage. The plant has been operating in this condition since startup from the 1987 refueling outage, in January, 1988.

Until this condition was corrected, a Control Room or Cable Spreading Room fire could have rendered both trains of T_{HOT} indication at the Remote Shutdown Panel inoperable. Loss of T_{HOT} indication would provide an obstacle to monitoring RCS subcooling margin and in verifying natural circulation cooldown conditions. However, under the operational conditions established by 10 CFR 50, Appendix R, (loss of offsite power concurrent with a Control Room or Cable Spreading Room fire) loss of subcooling margin is not expected to occur and natural circulation conditions will establish themselves. Natural circulation cooldown conditions can be verified by correlating RCS cold leg temperature T_{COLD} with Once Through Steam Generator (OTSG) saturation temperature. Instruments to monitor these variables are available at the Remote Shutdown Panel.

While the likelihood of disabling both T_{HOT} indications with a single fire is fairly remote, Appendix R requires the assumption that all circuits within a fire area could be affected by a single fire.

CORRECTIVE ACTION

Upon notification of this error, the Nuclear Shift Supervisor verified that a previously established roving fire watch was performing an hourly check of the Cable Spreading Room. The roving fire watch is responsible for walking established routes to look for signs of fire. The roving fire watch remained in effect until adequate electrical isolation between the affected instruments in the Control Room and Remote Shutdown Panel was provided.

A design modification which provided the required isolation between the Control Room and Remote Shutdown Panel T_{HOT} instrumentation has been developed and then installed on May 27, 1988.

A detailed review of other Regulatory Guide 1.97 modifications that interface with the Remote Shutdown Panel will be performed to determine whether any similar 10 CFR 50, Appendix R design errors are present. This review is expected to be completed by June 10, 1988. Additional design changes, if needed, will be developed and implemented upon completion of the review.

PREVIOUS SIMILAR EVENTS

No previous LER's were located which involved inadequate isolation between instruments in the Remote Shutdown Panel and the Control Room.

LER's 85-035 and 88-09 document previous events involving inconsistencies in compliance with 10 CFR 50, Appendix R requirements.

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

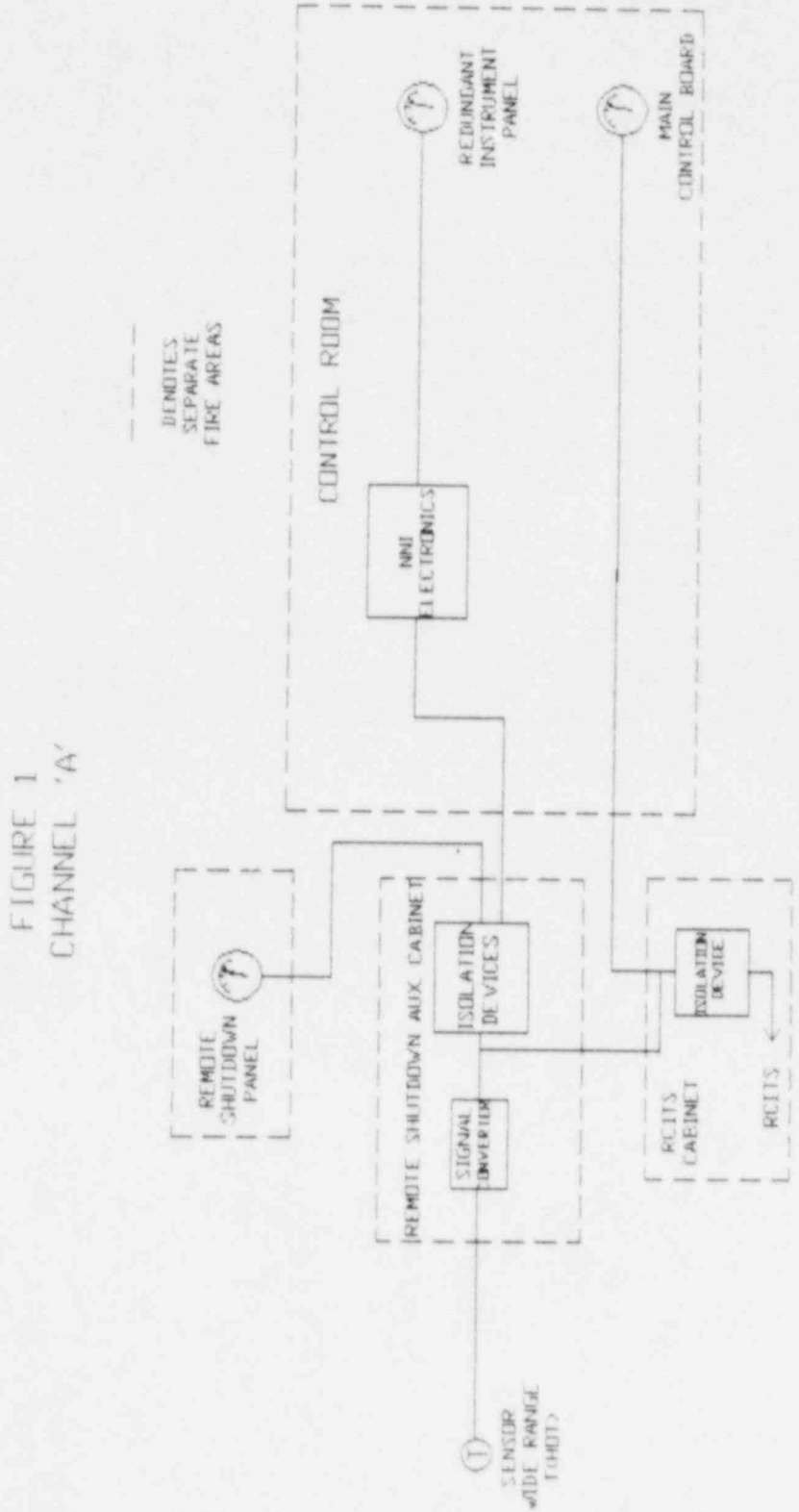

FIGURE 1
CHANNEL 'A'

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
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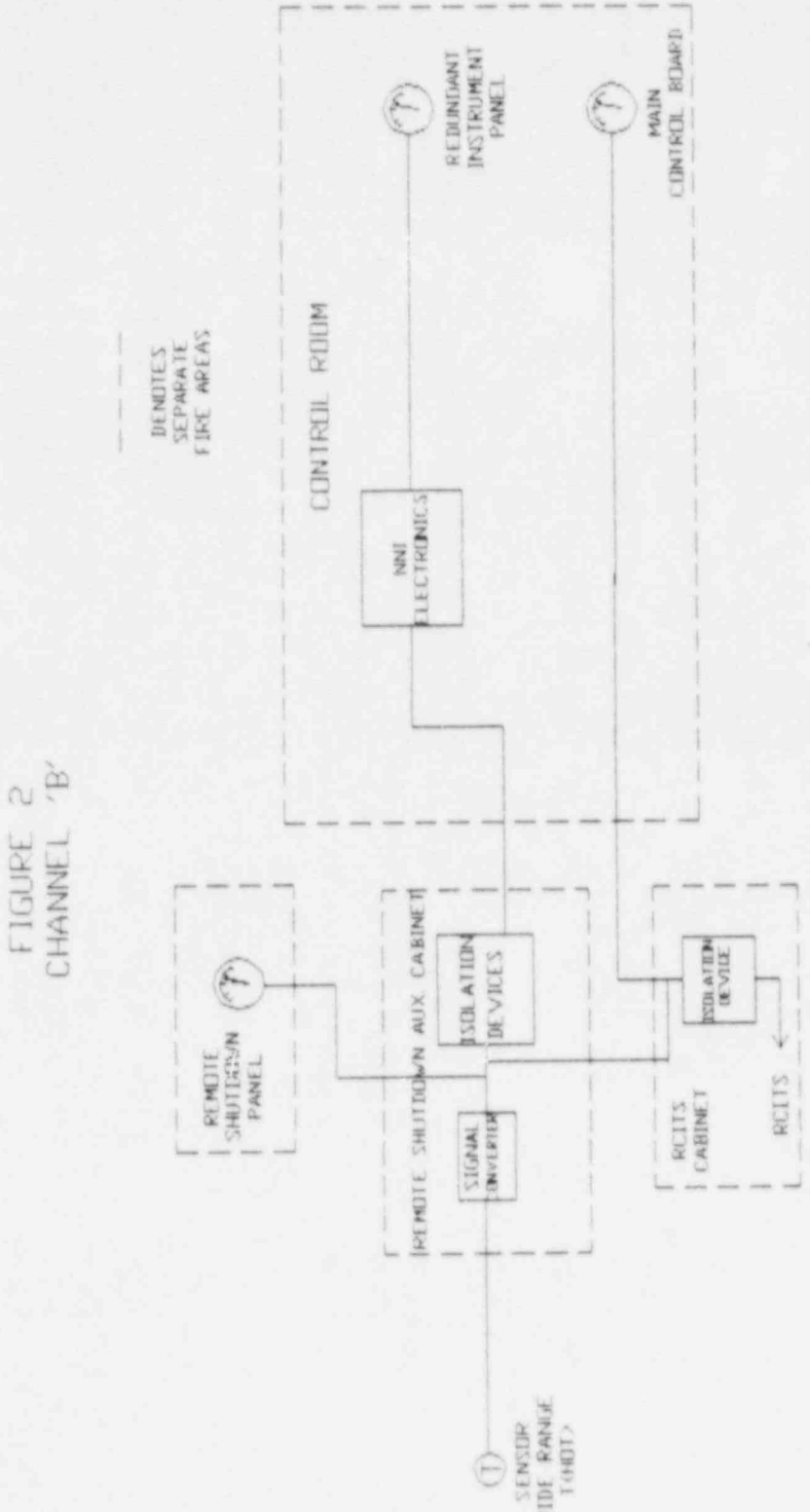
CRYSTAL RIVER UNIT 3	0 5 0 0 0 3 0 2	8 8	0 1 2	0 0	0 6 OF 0 6

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

FIGURE 2
CHANNEL 'B'



Florida Power
CORPORATION

May 27, 1988
3F0588-15

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. 88-012-00

Dear Sir:

Enclosed is Licensee Event Report (LER) 88-012-00 which is submitted in accordance with 10 CFR 50.73.

Should there be any questions, please contact this office.

Sincerely,

R. C. Widell
Director,
Nuclear Operations Site Support

WLR:mag

Enclosure

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

Mr. T. F. Stetka
Senior Resident Inspector

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