Progress Energy

Crystal River Nuclear Plant
Docket No. 50-302
Operating License No. DPR-72

Ref: 10 CFR 50.73

January 11, 2006
3F0106-01

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

Subject: CRYSTAL RIVER UNIT 3 - LICENSEE EVENT REPORT 50-302/2005-005-00

Dear Sir:

Florida Power Corporation, currently doing business as Progress Energy Florida, Inc., hereby submits Licensee Event Report (LER) 50-302/2005-005-00. The LER discusses an inadvertent B Train Engineered Safeguards (ES) actuation due to inadequate guidance in shutdown procedures for removal of the ES System from service. This report is being submitted pursuant to 10CFR50.73(a)(2)(iv)(A).

No new regulatory commitments are made in this letter.

If you have any questions regarding this submittal, please contact Mr. Paul Infanger, Supervisor, Licensing and Regulatory Programs at (352) 563-4796.

Sincerely,

Jon A. Franke
Plant General Manager
Crystal River Nuclear Plant

JAF/dwh

Enclosure

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

Progress Energy Florida, Inc.
Crystal River Nuclear Plant
15760 W. Powerline Street
Crystal River, FL 34428

IE22

NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
CRYSTAL RIVER UNIT 3	05000302	1 OF 7

4. TITLE
Inadvertent B Train Engineered Safeguards Actuation Due To Inadequate Procedure Guidance

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									N/A	05000
11	14	2005	2005	- 005 -	00	01	11	2006	FACILITY NAME: N/A	DOCKET NUMBER: 05000

9. OPERATING MODE
6

10. POWER LEVEL
0%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☒ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Dennis W. Herrin – Lead Engineer (Licensing & Regulatory Programs)	(352) 563-4633

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

At 05:34, on November 14, 2005, Progress Energy Florida, Inc., Crystal River Unit 3 was operating in MODE 6 (REFUELING) at zero (0) percent RATED THERMAL POWER when an inadvertent Engineered Safeguards actuation occurred while restoring power following a planned electrical bus outage. The actuation caused the automatic start of the B Train Emergency Diesel Generator, Emergency Nuclear Service Seawater Pump, Emergency Nuclear Services Closed Cycle Cooling Pump and Decay Heat Closed Cycle Cooling Fan. All remaining equipment that would normally be actuated from this signal was removed from service due to the current refueling outage conditions and was unaffected. The cause for this event was inadequate guidance in the shutdown procedures for removal of the Engineered Safeguards System from service. The guidance only required the system to be placed in "bypass" which did not disable the system actuation in all conditions. Successful recovery from the actuation was achieved. This report is being submitted pursuant to 10CFR50.73(a)(2)(iv)(A). The equipment that was available operated as designed. There were no equipment failures or damage as a result of the inadvertent actuation. This condition does not represent a reduction in the public health and safety. No previous similar occurrences have been reported.

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

EVENT DESCRIPTION

At 05:34, on November 14, 2005, Progress Energy Florida, Inc. (PEF), Crystal River Unit 3 (CR-3) was operating in MODE 6 (REFUELING) at zero (0) percent RATED THERMAL POWER when an inadvertent Engineered Safeguards (ES) [BP/BQ] actuation occurred while restoring power following a planned bus outage. The Main Control Board (MCB) received an ES actuation of B Train High Pressure Injection (HPI) [BP] and Low Pressure Injection (LPI) [BQ] when Vital Bus Distribution Panel VBDP-3 [EF, PL], Breaker 21, [EF, BKR] was closed. The actuation caused the automatic start of the B Train Emergency Diesel Generator (EGDG-1B) [EK, DG] , the B Train Emergency Nuclear Service Seawater Pump (RWP-2B) [BI, P], the B Train Emergency Nuclear Services Closed Cycle Cooling Pump (SWP-1B) [CC, P] and B Train Decay Heat Closed Cycle Cooling Fan (AHF-15B) [CC, FAN]. All remaining equipment that would normally be actuated from this signal was removed from service due to the current refueling outage conditions and was unaffected. Reactor Operators (ROs) entered Abnormal Procedure AP-340, "Invalid Engineered Safeguards Actuation," to recover from the inadvertent ES actuation.

The ES System has three channels in the A Train and three channels in the B Train for HPI and LPI that actuate as a result of plant parameters reaching a pre-determined set point. An actuation signal in any two of these three channels will cause an ES actuation. Also, the ES channels are a "de-energized to actuate" system. The three channels are supplied from VBDP-3, VBDP-4 and VBDP-5. As a result of plant conditions, all channels of HPI and LPI were bypassed and the actuation bistables were actuated. This was a result of the plant shutdown for the current refueling outage and was the normal condition for ES in MODE 6.

The bus outages planned for the current and previous refueling outages were carried out using a script. This script is used along with the refueling outage schedule and various operating procedures to remove individual electrical systems from service. The script is a guideline for timing the use of various procedure sections. The script contains a listing of expected loads to be lost and compensatory measures developed as a result of those losses, if required. The last several refueling outages have successfully utilized a script specific to the refueling outage in progress.

For this event, VBDP-3 and VBDP-5 were both de-energized as a result of planned refueling outage activities. When VBDP-3 was de-energized, all MCB indication went out for the A Train and AB Train ES Status Light sections. When VBDP-5 was de-energized, the B Train ES train was affected. When VBDP-5 was de-energized, the B Train HPI and B Train LPI bypass lights and the bistable trip lights went out. This placed the B Train of HPI and B Train of LPI in a 1 out of 3 tripped condition, requiring only one more channel (both of which were bypassed) to trip to actuate ES. These actions and responses were part of the pre-planned evolution.

The ES actuation should have been prevented by guidance provided in the restoration steps. When the power restoration sequence was initiated, an ES actuation occurred. VBDP-5 was re-energized prior to VBDP-3. When VBDP-3, Breaker 21, was energized, the bypass lights for two of the B Train ES channels went out, allowing an actuation of B Train HPI and B Train LPI. The A Train was out of service for planned refueling outage activities and was therefore unaffected. The actuation caused the previously listed pieces of equipment to automatically start.

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As a result of the restoration sequence, the ROs were not able to bypass HPI or LPI in the conventional manner and used the HPI Test switches to gain control of the ES equipment and shut it down. The ROs then completed the procedure for restoration of VBDP-3 and VBDP-5. The ES cabinets were re-energized per Operating Procedure OP-507, "Operation of the ES, RPS (Reactor Protection System) and ATWAS (Anticipated Transient Without A Scram) Systems." When the ES cabinets were re-energized, the normal ES bypass permit lights were back on, allowing the ROs to bypass ES in the normal method using the "Bypass/Reset" switches on the MCB. Following this bypass, the test switches were returned to normal, and AP-340 was exited.

No structures, systems or components were inoperable at the start of the event that contributed to the event. No other pertinent maintenance or surveillance activities were in progress. Plant systems operated normally during the B Train ES actuation.

The inadvertent B Train ES actuation was not based on actual plant conditions or parameters satisfying the requirements for the initiation of the safety function of the system. Based on the guidance contained in NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73," Revision 2, this event is not reportable to the NRC under 10CFR50.72(b)(3)(iv)(A). This report is being submitted pursuant to 10CFR50.73(a)(2)(iv)(A).

SAFETY CONSEQUENCES

The event was not safety significant. Most of the ES equipment normally affected by a HPI/LPI actuation was not required to be in service due to plant status and was administratively defeated. The equipment that was available (EGDG-1B, RWP-2B, SWP-1B, and AHF-15B) operated as designed. There were no equipment failures or damage as a result of the inadvertent ES actuation. No water was injected into the core and no water transfer occurred. Personnel safety was not compromised by this event.

Based on the above discussion, PEF concludes that the inadvertent B Train ES actuation did not represent a reduction in the public health and safety. Since no loss of safety function occurred, this event does not meet the Nuclear Energy Institute definition of a Safety System Functional Failure (NEI 99-02, Revision 2).

CAUSE

The cause for this event was inadequate guidance in the shutdown procedures for removal of the ES System from service. The guidance only required the ES System to be placed in "bypass" which did not disable the ES actuation in all conditions. CR-3 has had a long standing philosophy that this designed bypass of the ES System was sufficient to prevent an inadvertent ES actuation. In this event, the system being placed in bypass was not sufficient to prevent an actuation during shutdown and outage conditions.

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The planned sequence of bus outages allowed relay ESCC-1-BE [EF, RLY] to cause the ES System to come out of bypass, thus causing an ES actuation. If the ES System were prevented from actuating by some means such as placing the ES test switches to the "test" position, this event would not have occurred. The ES test switches are Direct Current powered and will remain in the "test" position during an Alternating Current bus outage, such as the one under discussion in this event.

Relay ESCC-1-BE is powered from VBDP-3, Breaker 21. When VBDP-3, Breaker 21, was re-energized, it appears that relay ESCC-1-BE removed the bypass for ES Channel 1. ES Channel 2 was not bypassed due to the planned configuration for the bus outage. With ES Channels 1 and 2 de-energized and in a tripped state, a full B Train ES actuation occurred once the bypass was removed from ES Channel 1 by relay ESCC-1-BE.

Prior to the design outage of 1997, a new single failure was identified and added as credible. CR-3 Engineering discovered that the loss of 125/250 Volt Direct Current Distribution Panel DPDP-1A [EJ, PL], with a loss of off site power, would result in a B Train ES actuation of HPI and LPI which could not be bypassed and controlled. This was due to loss of VBDP-3 and VBDP-5. During the design outage, a plant modification to ES Channel 1 was made. Relay ESCC-1-BE was installed so that on a loss of power to Channel 1, contacts close which allow the RO to bypass HPI and LPI on the B Train of the ES panel. Relay ESCC-1-BE is only installed to allow bypass of the B Train and no counterpart exists or is required in the A Train.

A contributing cause was the review of the affect of the bus outage on relay ESCC-1-BE. The initial recommendation from Engineering was to place the B Train ES test switches in the TEST 1, TEST 2 or TEST 3 position to prevent an inadvertent ES actuation when the A Train Vital Buses were re-energized. After learning that the B Train ES actuations were going to be manually bypassed, the recommendation was changed to leave the test switches in the OFF position. At that time, the affect that de-energizing and re-energizing VBDP-3 would have on relay ESCC-1-BE and the manual bypass of B Train ES actuation was not understood. After the fact, it appears that under the existing plant conditions, de-energizing and re-energizing VBDP-3 resulted in ESCC-1-BE changing states and removing the manual bypass of B Train ES Channel 1. This lack of understanding allowed inadequate guidance to be placed in the bus removal and restoration sequence.

CORRECTIVE ACTIONS

1. AP-340 was implemented and successful recovery from the B Train ES actuation was achieved. No equipment failures or damage resulted from the inadvertent B Train ES actuation.

2. An extent of condition review was performed for other emergency systems that operate automatically. Other systems are prevented from actuation by more positive means. The Emergency Feedwater Initiation and Control System [JB] is prevented from actuation during a plant shutdown by physically opening the breakers that allow an actuation. The RPS [JC] is prevented from actuation by physically tripping the system and opening the Control Rod Drive breakers on a plant shutdown. If the system is desired to be placed back in service, key parameters are blocked from an inadvertent actuation by placing the system in "shutdown bypass" which physically removes multiple items from the trip circuit. The opposite train of ES is unaffected by the ESCC-1-BE relay, and has no identical part due to the configuration of the opposite bus power supply arrangement in the ES System.

3. Other actions associated with this event are being addressed in CR-3 Corrective Action Program Nuclear Condition Report NCR 175996.

PREVIOUS SIMILAR EVENTS

No previous similar events involving an inadvertent B Train ES actuation due to relay ESCC-1-BE have been reported to the NRC by CR-3. The only other opportunity for this event to have occurred was during Refueling Outage 12 in October 1999. During that refueling outage, the A Bus outage was completed without an ES actuation when VBDP-3 and VBDP-5 were de-energized and then re-energized. CR-3 is not able to retrieve the actual sequence of events that were used during that bus outage to prevent a B Train ES actuation. Refueling Outage 13 in 2003 is not relevant since alternate train bus outages are scheduled for every other refueling outage. For Refueling Outage 13, the A Train busses were removed from service. This event is B Train specific.

ATTACHMENTS

Attachment 1 - Abbreviations, Definitions, and Acronyms
Attachment 2 - List of Commitments

ATTACHMENT 1

ABBREVIATIONS, DEFINITIONS AND ACRONYMS

AHF-15B	Decay Heat Closed Cycle Cooling Fan
AP	Abnormal Procedure
ATWAS	Anticipated Transient Without A Scram
CFR	Code of Federal Regulations
CR-3	Crystal River Unit 3
DPDP	125/250 Volt Direct Current Distribution Panel
EGDG	Emergency Diesel Generator
ES	Engineered Safeguards
HPI	High Pressure Injection System
LPI	Low Pressure Injection System
MCB	Main Control Board
NCR	Nuclear Condition Report
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
NUREG	Nuclear Regulation
OP	Operating Procedure
PEF	Progress Energy Florida, Inc.
RO	Reactor Operator
RPS	Reactor Protection System
RWP	Emergency Nuclear Service Seawater Pump
SWP	Emergency Nuclear Services Closed Cycle Cooling Pump

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., reactor building penetration [NH, PEN]}.

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ATTACHMENT 2

LIST OF COMMITMENTS

The following table identifies those actions committed to by PEF in this document. Any other actions discussed in the submittal represent intended or planned actions by PEF. They are described for the NRC's information and are not regulatory commitments. Please notify the Supervisor, Licensing & Regulatory Programs, of any questions regarding this document or any associated regulatory commitments.

RESPONSE SECTION	COMMITMENT	DUE DATE
	No regulatory commitments are being made in this submittal.	