NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

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

TITLE (4)
Personnel Error During Troubleshooting Causes A Main Steam Line Isolation And Manual Reactor Trip

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
08	27	98	98	-- 009 --	00	09	22	98	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9): 1

POWER LEVEL (10): 100

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

	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)		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)	X	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	TELEPHONE NUMBER (Include Area Code)
Dennis W. Herrin, Principal Nuclear Licensing Engineer	(352) 795-6486

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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 15 single-spaced typewritten lines) (16)

At 2348, on August 27, 1998, Florida Power Corporation's (FPC) Crystal River Unit 3 (CR-3) was in MODE 1 (POWER OPERATION) at 100 percent RATED THERMAL POWER. While troubleshooting a half trip signal on Emergency Feedwater Initiation and Control (EFIC) System Channel A Main Steam Line Isolation (MSLI), both Main Steam Isolation Valves (MSIVs) from the "A" Once Through Steam Generator (OTSG) closed. The reactor operator initiated a manual reactor trip upon closure of the two MSIVs. The reactor protection system performed as expected and reactor operators responded properly per Emergency Operating Procedures (EOPs). The cause for the MSIVs closing was personnel error during the EFIC troubleshooting activity. The cause for the manual reactor trip has been reviewed with Maintenance Department personnel and Operations Department Nuclear Shift Managers. Since 1990, FPC has submitted three Licensee Event Reports involving plant equipment troubleshooting activities that resulted in a reactor trip.

EVENT DESCRIPTION

At 2348, on August 27, 1998, Florida Power Corporation's (FPC) Crystal River Unit 3 (CR-3) was in MODE 1 (POWER OPERATION) at 100 percent RATED THERMAL POWER. FPC was troubleshooting a half trip signal on the Emergency Feedwater Initiation and Control (EFIC) System Channel "A" Main Steam Line Isolation (MSLI), [JE, ANN] when both Main Steam Isolation Valves (MSIVs) (MSV-411 and MSV-412) [SB, ISV] from the "A" Once Through Steam Generator (OTSG) [SB, SG] closed. As required by Administrative Instruction AI-505, "Conduct of Operations During Abnormal and Emergency Events," the reactor operators initiated a manual reactor trip upon closure of the two MSIVs.

The EFIC System performs the following functions in conjunction with the actuation of Emergency Feedwater (EFW) [BA]:

1. Controls the rate of OTSG level increase to minimize overcooling of the reactor coolant system (RCS) [AB] .

2. Limits EFW flow to prevent exceeding maximum flow limits and EFW pump runout.

3. Isolation of the main steam lines and main feedwater lines of a depressurized OTSG.

4. Selects the appropriate OTSG(s) to supply EFW to in the event of a steam/feedwater line rupture.

5. Terminates EFW to a OTSG that approaches an overfill condition.

6. Controls the atmospheric dump valves to maintain steam pressure at a predetermined set point.

Each EFW actuation logic train actuates on a one-out-of-two taken twice combination of trip signals from the instrumentation channels. Each EFIC channel can issue an initiate command, but an EFIC actuation will take place only if two channels issue initiate commands. The one-out-of-two taken twice logic combinations are transposed between trains so that the failure of two channels prevents actuation of, at most, one train of EFW. For this event, the one-out-of-two taken twice combination was satisfied by the initial failure of the U-20 optical isolator and the inadvertent removal of the signal from the U-44 optical isolator receiver during EFIC troubleshooting activities.

This event is reportable in accordance with 10CFR50.72(b)(2)((ii) and 10CFR50.73(a)(2)(iv) as a condition that resulted in a manual or automatic actuation of any engineered safety feature (ESF), including the reactor protection system (RPS). At 0304, on August 28, 1998, FPC made a four hour notification to the NRC Operations Center required by 10CFR50.72(b)(2)(ii), Event Number 34705.

EVENT EVALUATION

The MSIVs closed as required when the second channel of EFIC tripped. Reactor operators manually tripped the reactor as required by AI-505. The reactor protection system (RPS) performed as expected to shut down the reactor. Reactor operators properly executed the Emergency Operating Procedures (EOPs) for plant shutdown. Plant systems operated as expected during the reactor trip, with the following exceptions:

> Main Steam Safety Valve (MSSV) MSV-34 [SB, RV] did not fully reseat after the trip. Atmospheric dump valve MSV-25 [SB, RV] was momentarily cycled to lower the "A" OTSG pressure and allow the valve to reseat.
>
> Condenser [SD, COND] vacuum degraded upon loss of Gland Steam [SH] pressure. Gland Steam supply was aligned from the "A" OTSG and was lost due to isolation of the "A" OTSG. The "B" OTSG Gland Steam supply through MSV-57 could not be restored by electrically opening the valve from either the main control board or the supply breaker. MSV-57 was opened manually and condenser vacuum was restored. (Valve troubleshooting and repair were not required for plant restart.)

In conclusion, this event did not impact the public health and safety.

CAUSE

The cause for MSIVs closing was personnel error. Use of the maintenance bypass circuit for the EFIC System during troubleshooting activities was not well understood. Maintenance personnel were troubleshooting a half trip signal on EFIC Channel "A" MSLI in accordance with Maintenance Procedure MP-531, "Troubleshooting Plant Equipment."

Isolation cable U-20 did not appear to have light. When isolation cable U-44 was lifted to reset Trip Bus 2, the two MSIVs to the "A" OTSG closed. Maintenance personnel did not recognize that isolation cable U-44 was associated with Trip Bus 1 and that the output breaker for Trip Bus 1 should have been opened prior to lifting isolation cable U-44. When isolation cable U-44 was lifted, the one-out-of-two taken twice logic was completed for a Channel "A" MSLI signal.

IMMEDIATE CORRECTIVE ACTIONS

The plant was stabilized in MODE 3 (HOT STANDBY).

ADDITIONAL CORRECTIVE ACTIONS

The preliminary root cause evaluation for the manual reactor trip was reviewed with the Maintenance Department Supervisor and Technicians involved with the MP-531 EFIC troubleshooting activity.

The failed optical isolation cable (U20) was replaced prior to plant startup.

An Interoffice Correspondence (IOC) was issued on August 28, 1998, stating that prior to obtaining Operations approval to start work, MP-531 troubleshooting plans will require a second party review by an individual knowledgeable of the tasks to be performed and independent of the troubleshooting plan development. This IOC and the preliminary root cause evaluation for the manual reactor trip were either discussed with or provided to Maintenance Department personnel.

Apparent causes for the manual reactor trip and lesson learned from that event have been provided to the Operations Department Nuclear Shift Managers.

Engineering evaluated the performance of the MSSVs following the manual reactor trip. The engineering evaluation concluded that the MSSVs, including MSV-34, operated satisfactorily and that no corrective action or maintenance is required.

ACTIONS TO PREVENT RECURRENCE

The EFIC Training Module will be revised to include a discussion on the use of Performance Testing procedure PT-146, "EFIC Optical Isolator Replacement," for EFIC troubleshooting and a special training session will be conducted on the use of PT-146 by October 30, 1998.

An assessment of the MP-531 process will be performed by October 30, 1998. The assessment will include, but not be limited to, risk assessments, independent review of troubleshooting plans, and troubleshooting plan development.

PREVIOUS SIMILAR EVENTS

Since 1990, FPC has submitted three (3) Licensee Event Reports (LERs) involving plant equipment troubleshooting activities that resulted in a reactor trip.

LER 50-302/91-001-00: Relay Design Combined with Maintenance Trouble Shooting Leads to De-energized ES Busses, Reactor Trip, and Emergency Diesel Generator Start.

LER 50-302/91-017-00: Reactor Trip Caused by Feedwater Reduction Due to Nuclear Power Instrumentation Channel Being Selected for Control Which Contained a Failed Detector.

LER 50-302/92-001-00: Relay Design Combined with Maintenance Trouble Shooting Leads to De-energized ES Busses, Reactor Trip, and Emergency Diesel Generator Start.

ATTACHMENTS

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

ATTACHMENT 1
ABBREVIATIONS, DEFINITIONS AND ACRONYMS

AI	Administrative Instruction
CFR	Code of Federal Regulations
CR-3	Crystal River Unit 3
EFIC	Emergency Feedwater Initiation and Control System
EFW	Emergency Feedwater System
EOP	Emergency Operating Procedure
ESF	Engineered Safety Feature
FPC	Florida Power Corporation
FWP	Feedwater Pump
IOC	Interoffice Correspondence
LER	Licensee Event Report
MP	Maintenance Procedure
MSIV	Main Steam Isolation Valve
MSLI	Main Steam Line Isolation
MSSV	Main Steam Safety Valve
OTSG	Once Through Steam Generator
RCS	Reactor Coolant System
RPS	Reactor Protection System

NOTE: Improved Technical Specifications defined terms appear capitalized in LER text. Defined terms/acronyms/abbreviations appear in parenthesis when first used. EIIS codes appear in square brackets.

ATTACHMENT 2
LIST OF COMMITMENTS

RESPONSE SECTION	COMMITMENT	DUE DATE
Actions to Prevent Recurrence	The EFIC Training Module will be revised to include a discussion on the use of Performance Testing procedure PT-146, "EFIC Optical Isolator Replacement," for EFIC troubleshooting and a special training session will be conducted on the use of PT-146 by October 30, 1998.	October 30, 1998
Actions to Prevent Recurrence	An assessment of the MP-531 process will be performed by October 30, 1998. The assessment will include, but not be limited to, risk assessments, independent review of troubleshooting plans, and troubleshooting plan development.	October 30, 1998