

Entergy Nuclear Operations, Inc. Pilgrim Nuclear Power Station 600 Rocky Hill Road Plymouth, MA 02360

Ralph A. Dodds, III Director, Nuclear Safety Assurance

March 7, 2013

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

SUBJECT: Licensee Event Report 2013-001-00, "Inadvertent Trip of Both Recirculation Pumps and Subsequent Manual Scram"

> Pilgrim Nuclear Power Station Docket No. 50-293 License No. DPR-35

LETTER NUMBER 2.13.022

Dear Sir or Madam:

The enclosed Licensee Event Report (LER) 2013-001-00, "Inadvertent Trip of Both Recirculation Pumps and Subsequent Manual Scram" is submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A).

This letter contains no commitments.

Please do not hesitate to contact Mr. Joseph R. Lynch, (508) 830-8403, if there are any questions regarding this submittal.

Sincerely,

Ralph A. Dodds, III

RAD/rmb

Enclosure: Licensee Event Report (LER) 2013-001-00, "Inadvertent Trip of Both Recirculation Pumps and Subsequent Manual Scram"

cc: Mr. William M. Dean Regional Administrator, Region 1 U. S. Nuclear Regulatory Commission 2100 Renaissance Boulevard, Suite 100 King of Prussia, PA 19406-2713

> NRC Senior Resident Inspector Pilgrim Nuclear Power Station

Mr. Richard V. Guzman Office of Nuclear Reactor Regulation U. S. Nuclear Regulatory Commission MS O-8C2A Washington, DC 20555

INPO Records 700 Galleria Parkway Atlanta, GA 30399-5957

Enclosure 1 to

PNPS Letter 2.13.022

Licensee Event Report 2013-001-00

(5 Pages)

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION				APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013											
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(10-2010)					estimate	learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Service Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of									
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NARRATIVE

BACKGROUND

The Pilgrim Station Boiling Water Reactor design includes a recirculation system that provides the drive flow of water to the jet pumps within the reactor vessel. The Recirculation System includes two loops. Each loop is located inside primary containment and is external to the reactor vessel. Each external loop contains one variable-speed, motor-driven recirculation pump and two motor operated valves, one on the suction side and one on the discharge side of the pump. The pump motor is powered by the generator portion of the respective motor-generator (MG) set. The reactor recirculation system cools the reactor core with forced water flow (forced convection).

The Residual Heat Removal (RHR) System consists of pumps, piping, and valves that provide flow paths through heat exchangers to remove post-operation energy from the nuclear system. The RHR System is designed to permit cooling of both the Drywell and the Torus which provide a heat sink for the Automatic Depressurization System (ADS), High Pressure Coolant Injection System (HPCI) and Reactor Core Isolation Cooling (RCIC) System under normal and accident conditions. The RHR System is normally aligned to the Low Pressure Coolant Injection (LPCI) mode. This mode provides a Core Standby Cooling System (CSCS) function.

Although this event involved the tripping of the recirculation pumps, it was during the performance of a Logic System Functional Test within the LPCI portion of the RHR System that caused the trip signal. This test is designed to demonstrate the RHR pressure permissive loop selection logic functions as designed. The LPCI Loop Selection Logic instrumentation is required to detect a ruptured recirculation loop and to automatically select the unbroken recirculation loop for injection into the reactor vessel. This Logic System Functional Test is a Technical Specification requirement.

Test switches and jacks are utilized and relays are manually actuated to allow simulating a Loss of Coolant Accident (LOCA), in order to test the LPCI initiation and control, and loop selection logic. The only portion of the LPCI loop selection logic circuitry which cannot be tested during plant operation, is the recirculation pump trip portion.

On January 10, 2013, Technical Specification testing via surveillance procedure 8.M.2-2.10.2-9 "RHR System Reactor Pressure Permissive Loop Selection Logic Functional Test" was performed. The purpose of this testing is to demonstrate a portion of the reactor low pressure permissive logic associated with LPCI Loop A & B.

EVENT DESCRIPTION

On Thursday, January 10, 2013 at 1534 hour [EST], with the reactor at 100% core thermal power, both reactor recirculation pumps unexpectedly tripped and a manual reactor scram was inserted as required by station procedures. Following the reactor scram, all rods were verified to be fully inserted and the Primary Containment Isolation System Group II (Reactor Building) and Group VI (Reactor Water Cleanup System) actuations occurred as designed due to the expected reactor water level shrink associated with the scram signal. All other plant systems responded as designed. The scram was uncomplicated and decay heat was released to the main condenser via the turbine by-pass valves.

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(RHR) System during surveillance testing. When the logic was reset at completion of testing, a normally open relay contact (which was inadvertently closed during test restoration) interlocked with the recirculation pumps circuit, and sent a trip signal to the drive motor breakers.							
As part of the LPCI Loop Select Logic Test, several General Electric HGA break detection relay covers were removed to allow the technicians to actuate and verify relays. As testing continued with no discrepancies, various break detection relays status/ states were verified in accordance with the procedure.							
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In preparation of "Returning to Normal", the technicians replaced the covers on the relays. Some difficulty was encountered with three of the relays including relay 10A-K105B which took multiple attempts and required the help of the 2nd technician in the back of the panel. This technician aided by compressing the retaining clips so that the cover would not get caught on the outside of the clips. The technicians finished replacing all the relay covers.

The technicians were unaware that the action of installing the relay cover on relay 10A-K105B disturbed (i.e.; bumped) the relay armature such that 10A-K105B contact 1-7 closed and sealed-in the 10A-K105B relay in the energized state. With 10A-K105B unknowingly energized, the technicians continued with the procedure to restore other logic functions. The technicians then placed the "RHR Break Detection Test Reset" keylock switch (10A-S46) to the "RESET" position. This action de-energized break detection relay 10A-K104B and closed its related contact 1-2 which re-activated the recirculation pump trip circuit correctly in accordance with the procedure. However, the inadvertently energized and sealed-in 10A-K105B relay combined with the 10A-K104B relay contact 1-2 now being closed on reset (as designed), energized another break detection relay within the reactor recirculation pump trip circuit, 10A-K29B, which in turn tripped Recirculation Motor Generator Set A& B drive motor breakers as per the design of the system logic.

CAUSE

relay was found to be de-energized.

The Direct Cause of this event was the inadvertent seal-in of break detection relay 10A-K105B.

This relay was inadvertently energized during the process of relay cover re-installation. When the 10A-K104B relay was reset via key-lock switch 10A-S46, power was applied to the LPCI recirculation pump trip relay, 10A-K29B, which then tripped both Recirculation Motor Generator Set drive motor breakers.

The Root Cause of this event was that I&C Department personnel failed to ensure adequate barriers were established to mitigate potential adverse consequences. Specifically, the surveillance procedure did not contain steps to remove and re-install relay covers. The correct placement of these steps would have ensured relay state verification following cover installation and prior to resetting the logic. In this case, the known and long standing problem with difficulties experienced during relay cover installation was not addressed effectively. A tool was developed to install problematic covers, but the procedure was not reviewed and modified with sufficient detail to ensure a successful outcome.

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(10-2010) LICENSEE EVENT REPORT (LER)								
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Pilgrim Nuclear Power Station	05000293	YEAR	SEQUENTIAL NUMBER	REV N0.	4 OF 5			
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A Human Performance Error Review (HPER) Level 1 wa 10A-K105B sealed in while the cover was being re-insta relay status check but before the final logic circuit reset. trip signal to the subject drive motor breakers was initiat	lled. The relay Since the rela	y cover ins ay was sea	stallation was paled-in without	performed	after the			
CORRECTIVE ACTIONS								
The following immediate corrective actions were comple	ted.							
 PNPS Procedure 8.M.2-2.10.2-9 "RHR System F Functional Test" was revised with steps to reinsta prior to logic circuit resets. This is a Corrective A 	all relay cover	s and add	ed a verifier to	check re	Ψ			
 Initiated a Training Evaluation and Action Reque concerns with contact initiation which covers this 	• •	•	•		and the			
The following procedure improvements are planned:								
 Revise all critical maintenance I&C and electrica covers and post-installation verification of relay of 	•		steps to remov	ve / replac	e relay			
 I&C and Electrical Lab procedures are being price reviews will be completed by a lead technician or performed prior to issuing the procedure. 								
 Identify trip sensitive or positional components the sensitive of positional components the sensitive of the sen	nat should be	identified o	or protected.					
 Ensure physical work is complete prior to resetting any logic i.e. relay covers on, drawers pushed in, jumpers and lifted leads removed or landed, etc. 								
 Critical steps will be identified in accordance with existing station procedures and the reason for the critical step will be identified. 								
The corrective actions above and additional corrective a	actions are ad	dressed in	the Corrective	e Action F	rogram.			
SAFETY CONSEQUENCES								
The event occurred during normal power operation while mode switch in the "RUN" position and steady state con		ent core th	ermal power v	vith the re	actor			
There were no component or system failures that cause	ed this event.							
This event posed no threat to public health and safety.								
The plant response to the two recirculation pump trip fol described in the ESAR. The two recirculation pump trip								

described in the FSAR. The two recirculation pump trip followed the expected response from the plant analysis as as described in the Abnormal Operational Transients, Nuclear Safety Operation Analysis, and the Initial Core Station Safety Analysis sections of the FSAR.

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LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

CONTIN	UATION SHEET					
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This event is analyzed in the FSAR and does not challenge safety limits or fission product barriers. Core power was maintained within design limits. All other Engineered Safeguard System functions were operable during this event.

The conditional core damage probability of this event was calculated to be approximately 2E-7 which is low when compared to the risk significant threshold of 1E-6.

REPORTABILITY

This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A) – Any event or condition that resulted in manual or automatic actuation of any system listed in paragraph 10 CFR 50.73 (a)(2)(iv)(B). The Reactor Protection System (RPS) including: reactor scram or trip is included in 10 CFR 50.73 (a)(2)(iv)(B).

PREVIOUS EVENTS

A review for similarity was conducted of Pilgrim Station Licensee Event Reports (LERs) submitted to the NRC. The review focused on LERs involving a similar trip or cause involving both recirculation MG sets/pumps. The review identified no similar event.

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES:

SYSTEMS

CODES N/A

None

REFERENCES

Condition Report, CR-PNP-2013-0147 – Both recirculation pumps spuriously tripped and a manual reactor scram was inserted as required by station procedures.