Entergy

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Pilgrim Nuclear Power Station
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Michael A. Balduzzi
Site Vice President

October 27, 2003

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
Docket No. 50-293
License No. DPR-35

Licensee Event Report 2003-004-00

Letter Number: 2.03.124

Dear Sir:

The enclosed Licensee Event Report (LER) 2003-004-00, "HPCI System Declared Inoperable During Surveillance Test due to Procedure Inadequacy," is submitted in accordance with 10 CFR 50.73

This letter contains no commitments.

Please feel free to contact me if there are any questions regarding this subject.

Sincerely,

Michael A Balduzzi

Michael A. Balduzzi

DWE/dm

cc: Mr. Hubert J. Miller
Regional Administrator, Region 1
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INPO Records

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1. NRC Form 366 U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-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. If 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.

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TITLE (4)

HPCI System Declared Inoperable During Surveillance Test due to Procedure Inadequacy

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
									N/A	05000
08	29	2003	2003	004	00	10	27	2003	FACILITY NAME: N/A	DOCKET NUMBER: 05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)			
POWER LEVEL (10)	100	20.2201(b)	22.2203(a)(3)(i)	50.73(a)(2)(i)(C)	50.73(a)(2)(vii)
		22.2202(d)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(A)
		20.2203(a)(1)	20.2203(a)(4)	50.73(a)(2)(ii)(B)	50.73(a)(2)(viii)(B)
		20.2203(a)(2)(i)	50.36(3)(1)(i)(A)	50.73(a)(2)(iii)	50.73(a)(2)(ix)(A)
		20.2203(a)(2)(ii)	50.36(3)(1)(ii)(A)	50.73(a)(2)(iv)(A)	50.73(a)(2)(x)
		20.2203(a)(2)(iii)	50.36(c)(2)	50.73(a)(2)(v)(A)	73.71(a)(4)
		20.2203(a)(2)(iv)	50.46(a)(3)(ii)	X 50.73(a)(2)(v)(B)	73.71(a)(5)
		20.2203(a)(2)(v)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(C)	OTHER Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(vi)	50.73(a)(2)(i)(B)	X 50.73(a)(2)(v)(D)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Bryan Ford – Licensing Manager	(508) 830-8403

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
B	BJ	SHV	SO75	Y					

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)

On August 29, 2003 at 1350 hours, the high pressure coolant injection (HPCI) system was declared inoperable. This action was taken as a result of two successive automatic turbine trips and resets that occurred about 25 minutes after the HPCI turbine-pump was started for routine surveillance testing required by Technical Specifications.

The root cause of the automatic turbine trips and resets was inadequate guidance in the procedure for inspecting and testing the HPCI turbine mechanical-hydraulic overspeed trip and reset device.

Corrective action taken included the adjustment of the spring setting in the manual trip and reset device. Corrective action planned includes revising the procedure used for inspecting and testing the HPCI overspeed trip device

This event posed no threat to public health and safety.

BACKGROUND

The high pressure coolant injection (HPCI) system is part of the core standby cooling systems and functions to ensure the reactor core is adequately cooled to limit fuel clad temperature in the event of a small break loss of coolant accident (LOCA) in the nuclear system pressure boundary that does not result in a rapid depressurization of the reactor vessel.

The HPCI system includes a steam driven turbine-pump assembly that is equipped with a mechanical-hydraulic control system. The turbine steam supply piping, located downstream of two in-series primary containment isolation valves, supplies steam to the turbine via in-series motor-operated valve (MO-2301-3), hydraulically-operated stop valve (HO-2300-23), and hydraulically-operated governor valve (HO-2301-24).

The hydraulically operated stop valve (HO-2300-23) is normally closed and is designed to open as a result of the operation of the valve's hydraulic actuator. The actuator operates as a result of hydraulic oil pressure. During a start of the HPCI turbine, the oil pressure is provided by the HPCI auxiliary oil pump and after the start, the oil pressure is provided by turbine oil pump. The stop valve is connected to the actuator via the valve stem. The stop valve is designed to close as a result of a loss of oil pressure in the actuator and the force exerted by the valve's closing spring, such as would occur due to an automatic or manual trip of the turbine.

On August 29, 2003, preparations began for a surveillance test of the HPCI system required by Technical Specification 4.5.C.1.b. As part of the pre-start checks in the surveillance procedure, the HPCI auxiliary oil pump was started at 1240 hours. The HPCI stop valve was operated satisfactorily (two separate openings and two separate closings) during the pre-start checks.

At 1324 hours on August 29, 2003, the HPCI system turbine-pump was started in accordance with the test portion of surveillance procedure 8.5.4.1 (rev. 71), "HPCI System Pump and Valve Quarterly Operability." The start and operation of the turbine-pump was normal and after equilibrium conditions were established, the system continued to run satisfactorily for about 25 minutes.

At about 1349 hours, the turbine-pump tripped automatically, with the turbine speed at about 4000 rpm when the trip occurred. The turbine control system reset automatically and the turbine speed began to increase at a normal ramp rate but again tripped automatically, with the turbine speed at about 2200 rpm. The turbine control system reset automatically and the turbine speed began to increase at a slightly higher than normal ramp rate until a turbine speed of about 2200 rpm was achieved. After a slight pause in the ramp rate, at about 2200 rpm, the speed continued to increase at or near the normal ramp rate. As a result of the anomalous operation of the turbine, the control room licensed operator initiated a manual trip of the turbine, with the turbine speed at about 3250 rpm (increasing) at the time of the manually initiated trip.

Plant conditions at the time of the event are as follows. The reactor was operating at 100% (2028 MWt) with the reactor mode selector switch in the RUN position. The reactor vessel pressure was normal, at about 1035 psig, with the reactor water temperature at the saturation temperature for that pressure. The reactor water level was normal, at about +28" (narrow range).

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

EVENT DESCRIPTION

On August 29, 2003, at about 1350 hours, the HPCI system was declared inoperable. This action was taken as a result of the two successive automatic turbine trips and resets that occurred during the surveillance test, after about 25 minutes of steady state operation. Until the automatic turbine trips and resets, the turbine-pump operated as expected during the 25 minutes of steady state operation.

Initial investigation revealed the HPCI turbine stop valve in the open position with the stop valve stem separated (failure) at the coupling that connects the stem on the valve's hydraulic actuator.

The NRC Operations Center was notified of the event in accordance with 10 CFR 50.72 at 1612 hours on August 29, 2003.

CAUSE

An actual HPCI turbine overspeed condition did not occur during the event.

The root cause for the automatic turbine trips and resets was determined to be that the overspeed spring was found to have a trip setting at less than the desired 2-5 pounds. This condition was due to the fact that the procedure for testing the trip setting of the device contained inadequate guidance.

Contributing cause(s) included: the as-found trip setting of the Robertshaw valve, that is part of the HPCI turbine hydraulic oil system, was 7.0 psig decreasing which is less then the desired 10.0 psig trip setting; and, a non-licensed operator did not depress the overspeed trip reset knob during the pre-start checks that were conducted immediately before the HPCI turbine-pump was started for the surveillance test. These contributing causes by themselves would not cause a turbine trip.

Investigation revealed that the failure of the stop valve in the open position did not contribute to the automatic turbine trips. The stem valve failure is believed to be caused by a fabrication deficiency. The stop valve was manufactured by the Schutte & Koerting Company, model 68-XC-71. The stop valve disc and stem were replaced, and the stop valve was repaired. Additional actions planned for the HPCI stop valve are being tracked by the corrective action program.

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CORRECTIVE ACTION

Corrective action taken for the automatic turbine trips and resets include:

- The spring setting in the manual trip and reset device was adjusted.
- The mechanical overspeed trip device was inspected, flushed, cleaned, and inspected for correct movement and proper setting.
- The setscrews on the overspeed governor were checked.
- The orifices in the hydraulic portion of the turbine control system were inspected and cleaned, the oil filters were replaced, and the oil was filtered.
- The hydraulic system oil pressures at each portion of the system were verified.
- The Robertshaw valve was replaced. The replacement valve was calibrated and functionally tested.

The HPCI system was returned to service at 0656 hours on September 2, 2003.

Corrective actions planned for the automatic turbine trips and resets includes revising the procedure used for inspecting the HPCI overspeed trip device. The focus of this action is to clearly describe the proper method of setting the reset spring tension, and functionally checking the trip and reset function of the overspeed trip device. Other corrective actions to address the contributing causes will be tracked in the corrective action program.

SAFETY CONSEQUENCES

This event posed no threat to public health and safety.

The HPCI system was declared inoperable due to the automatic trips and resets that occurred during the surveillance test on August 29, 2003. As part of the HPCI pump pre-start checks that were conducted immediately before the surveillance test, the HPCI turbine overspeed trip reset knob is to be lifted and depressed. After the reset knob was lifted, the stop valve was verified closed. The reset knob was not depressed because the stop valve had closed. If the reset knob had been depressed during the pre-start checks, the automatic trips experienced during the surveillance test would not have occurred. The HPCI system was operable up to the time of the surveillance test, approximately 1245 hours on August 29, 2003.

The core standby cooling systems (CSCS) consist of the HPCI system, automatic depressurization system (ADS), core spray system, and residual heat removal (RHR) system low pressure coolant injection (LPCI) mode. Although not part of the CSCS, the reactor core isolation cooling (RCIC) system is capable of providing high pressure core cooling, similar to the HPCI system. Except for a period of about 19 hours for the LPCI mode, the other CSCS systems and the RCIC system were operable during the period of time the HPCI system was inoperable.

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The LPCI mode was inoperable for about 19 hours because the RHR system train 'A' was started on two occasions for the suppression pool cooling (SPC) mode while the HPCI system was inoperable. The RHR system was started in the SPC mode to remove the heat that was added to the suppression pool from HPCI turbine operation during the surveillance test on August 29, 2003. The RHR system was started in the SPC mode late on September 1, 2003 in anticipation of the heat that would be added to the suppression pool due to HPCI turbine operation during surveillance testing. The HPCI system surveillance testing was completed following repairs early on September 2, 2003.

REPORTABILITY

This report was submitted in accordance with 10 CFR 50.73(a)(2)(v)(B) and (D) because the HPCI system was made inoperable – not a planned part of the surveillance test.

SIMILARITY TO PREVIOUS EVENTS

A review for similarity was conducted of Pilgrim Station Licensee Event Reports (LERs) submitted since 1984. The focus of the review was on HPCI turbine overspeed trips.

The review identified HPCI turbine overspeed trips that were reported in LER 85-008-01 (faulty connector in the cable connecting the electrical control system to the electro-mechanical hydraulic actuator), LER 89-028-00 (failure of the ramp generator signal converter module), and LER 90-017-01 (stiff pilot relay valve spring and misalignment of the pilot relay valve oil porting holes).

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this report are as follows:

COMPONENTS	CODE
Device, overspeed	12
Turbine	TRB
Valve, shutoff (stop valve)	SHV

SYSTEMS	CODE
High pressure coolant injection system (HPCI)	BJ