Entergy

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

**Michael A. Balduzzi**
Site Vice President

September 28, 2004

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 2004-004-00

Letter Number: 2.04.084

Dear Sir:

The enclosed Licensee Event Report (LER) 2004-004-00, "RCIC System Declared Inoperable During Surveillance Testing due to Flow Controller Potentiometer Oxidation, " is submitted in accordance with 10 CFR 50.73

This letter contains no commitments.

Please feel free to contact Bryan Ford, (508) 830-8403, if there are any questions regarding this subject.

Sincerely,

Michael A. Balduzzi

DWE/dm

Enclosure: LER 2004-004-00

cc: Mr. Samuel J. Collins
Regional Administrator, Region 1
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Senior NRC Resident Inspector

Mr. Lee Licata, Project Manager
Office of Nuclear Reactor Regulation
Mail Stop: 0-8B-1
U. S. Nuclear Regulatory Commission
1 White Flint North
11555 Rockville Pike
Rockville, MD 20555-001

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.

| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| PILGRIM NUCLEAR POWER STATION | 05000-293 | 1 of 4 |

TITLE (4)
RCIC System Declared Inoperable During Surveillance Testing due to Flow Controller Potentiometer Oxidation

| 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 |
| 07 | 30 | 2004 | 2004 | 004 | 00 | 09 | 28 | 2004 | N/A | 05000 |

| OPERATING MODE (9) | N |
|---|---|
| POWER LEVEL (10) | 100 |

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

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 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) | | 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 |
| | 20.2203(a)(2)(vi) | | 50.73(a)(2)(i)(B) | X | 50.73(a)(2)(v)(D) | | Specify in Abstract below or in NRC Form 366A |

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 |
|---|---|---|---|---|---|---|---|---|---|
| X | BN | FIC | G080 | 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 July 30, 2004, the reactor core isolation cooling (RCIC) system was declared inoperable. This action was taken because the RCIC system turbine-pump did not achieve the acceptance criteria of flow rate, discharge pressure, and speed during the performance of a surveillance test of the RCIC system pump.

The cause was the potentiometer (i.e. rheostat) in the RCIC flow controller, a GEMAC type 540 manufactured by General Electric Company. The function of the potentiometer is to clamp the high limit output of the controller. The potentiometer was found to have a bad spot (i.e. "dead spot") and prevented the turbine-pump from being adjusted to achieve the acceptance criteria. Infrequent exercising of the potentiometer was identified as a contributing cause.

Corrective action taken included the replacement of the potentiometer. Corrective action planned includes the revision of procedures and the replacement of the RCIC system flow controller.

The event posed no threat to public health and safety.

BACKGROUND

The Pilgrim Station Updated Final Safety Analysis Report (UFSAR) section 4.7 pertains to the reactor core isolation cooling (RCIC) system. The system is designed to provide makeup water to the reactor vessel following reactor isolation in order to prevent the release of radioactive materials to the environment as a result of inadequate reactor core cooling. The system consists of a steam driven turbine-pump and associated valves and piping capable of delivering makeup water to the reactor vessel. The system can be operated automatically or manually, and is credited in the Pilgrim Station safety analysis for a design basis control rod drop accident. At a reactor pressure of 1126 psig, 320 gpm makeup from the RCIC system is sufficient to maintain reactor vessel water level above the top of active fuel. The RCIC system is capable of delivering 400 gpm to the reactor vessel over a range of reactor pressures, from 150 psig to 1126 psig.

On July 27, 2004 the RCIC system instruments including the turbine-pump flow controller (FI-1340-1) were calibrated per Procedure 8.E.13, "RCIC System Instruments Calibration." The flow controller circuitry includes a high limit potentiometer (R62) that functions to adjust the controller high limit output saturation value. As part of this calibration, an in-situ calibration of the flow controller potentiometer high limit setting was performed and the setting was found within the specified acceptance criteria. After the in-situ calibration, the flow controller was removed from control room panel C-904 for additional checks. The as-found high limit value was recorded, the potentiometer was adjusted, and the as-left high limit value was recorded. Because the as-found high limit output value was slightly greater than the criteria prescribed in the procedure, the potentiometer setting was decreased, and the high limit output value was left within the output range prescribed in the procedure. The flow controller was re-installed. The high limit output was subsequently checked with satisfactory results after the flow controller was re-installed. The RCIC system was returned to operable, standby status on July 27, 2004, with no further post work testing.

On July 30, 2004, at about 0925 hours, a planned surveillance test of the RCIC system was initiated. During this test the RCIC system flow controller in panel C-904 is in the automatic control mode and set at 400 gpm. After the RCIC turbine-pump was started, the flow controller (FIC-1340-1) and the system's full flow test valve were being adjusted to achieve the acceptance criteria (i.e. >/= 400 gpm at a pump discharge pressure of >/= 1250 psig with a turbine speed of </= 4600 rpm). The system did not achieve the acceptance criteria for flow rate, discharge pressure, and turbine speed.

EVENT DESCRIPTION

On July 30, 2004, at 0945 hours, the RCIC system was declared inoperable. This action was taken because the RCIC system turbine-pump did not achieve the acceptance criteria of flow rate, discharge pressure, and speed during the planned performance of a surveillance procedure.

A Technical Specification 3.5.D.2 limiting condition for operation was entered because the RCIC system was inoperable.

The NRC Operations Center was notified of the event in accordance with 10 CFR 50.72 at 1251 hours on July 30, 2004.

The event occurred during power operation while at 100 percent reactor power. The reactor mode selector switch was in the RUN position. The reactor vessel pressure was approximately 1030 psig with the reactor vessel water temperature at the saturation temperature for that pressure.

CAUSE

An equipment failure analysis identified the cause was the potentiometer of the RCIC flow controller FIC-1340-1, a GEMAC type 540 manufactured by General Electric Company. The potentiometer (R62), also called a rheostat, is used to clamp the output of the controller. The potentiometer was found to have a bad spot (i.e. "dead spot") and was the direct cause of the problem. The "dead spot" in the potentiometer prevented the RCIC system turbine-pump from being adjusted to 4500 rpm.

Infrequent exercising of the potentiometer (R62) was identified as a contributing cause. The potentiometer is maintained in a position for long periods of time, and this causes corrosion to build up between the wiper and slip ring. The corrosion products can break loose and lodge between the wiper and slip ring, causing a partial or total loss of wiper contact.

CORRECTIVE ACTION

The following corrective actions have been taken. The potentiometer (R62) in the RCIC system flow controller was replaced. The RCIC system was tested and was returned to operable, standby service by 1705 hours on July 31, 2004.

The following corrective actions are planned.

- Revision of the RCIC and HPCI systems instrumentation calibration procedures to require moving the potentiometer (R62) through its full adjustment band several times and adjusting the potentiometer high limit output to a pre-established output including tolerance. Also, these procedures will be modified to require the performance of the applicable operability test following the calibration.

- Evaluation of the other three GEMAC controllers installed in the RCIC and high pressure coolant injection (HPCI) systems. This action will determine if the other potentiometers (R62) should be replaced or tested to determine susceptibility to this type of failure mode.

- Replacement of the flow controllers installed in the RCIC and HPCI systems. The remaining RCIC system flow controller is currently scheduled for replacement during 2005. The HPCI system flow controllers are expected to be replaced in 2006.

These planned actions may be modified in accordance with the corrective action program.

EXTENT OF PROBLEM

The extent is limited to GEMAC Type 540 flow controllers used in the RCIC system and the HPCI systems. These systems contain four flow controllers, two in each system.

SAFETY CONSEQUENCES

The event posed no threat to public health and safety.

The RCIC system functions to provide high pressure makeup water to the reactor vessel after isolation of the vessel. Although the RCIC system did not achieve the acceptance criteria during the test, the system achieved about 295 gpm at 4391 rpm and 1126 psig, versus the requirement of 320 gpm at 1126 psig in UFSAR section 4.7.5. The HPCI system was operable while the RCIC system was inoperable. The HPCI system is designed to provide high pressure core cooling similar over a range of reactor pressures, similar to the RCIC system. If the HPCI system were to become inoperable while the RCIC system was inoperable and core cooling was necessary, the automatic depressurization system functions to depressurize the reactor vessel for low pressure core cooling provided independently by the residual heat removal system (low pressure coolant injection mode) and/or core spray system.

REPORTABILITY

This report was submitted in accordance with 10 CFR 50.73(a)(2)(v)(D) because the RCIC system, a single train system that is credited in the Pilgrim Station design basis control rod drop accident analysis, was inoperable.

SIMILARITY TO PREVIOUS EVENTS

A review was conducted of Pilgrim Station LERs issued since 2000. The review focused on LERs that involved a similar event involving a flow controller(s) in the RCIC or HPCI systems. The review identified a similar problem with the potentiometer in the HPCI system flow controller FIC-2340-1 that occurred on June 5, 2000 and for which the flow controller was replaced.

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this report are as follows:

| COMPONENTS | CODES |
|---|---|
| Control, Indicating, Flow (FIC-1340-1) | FIC |
| Panel (C-904) | PNL |
| Pump | P |
| Rheostat (Potentiometer, R62) | 70 |
| Turbine | TRB |

SYSTEMS

| | |
|---|---|
| Reactor Core Isolation Cooling System (RCIC) | BN |