

Barry S. Allen  
Vice President

440-280-5382  
Fax: 440-280-8029

October 26, 2007  
PY-CEI/NRR-3068L

United States Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

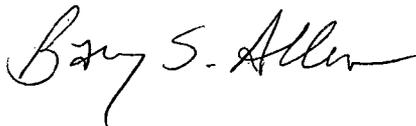
Perry Nuclear Power Plant  
Docket No. 50-440

Ladies and Gentlemen:

Enclosed is Licensee Event Report (LER) 2007-003, "Improper Containment Floor Grating Installation Results in an Unanalyzed Condition." There are no regulatory commitments contained in this letter. Any actions discussed in this document that represent intended or planned actions are described for the NRC's information, and are not regulatory commitments.

If you have questions or require additional information, please contact Mr. Jeffrey J. Lausberg, Manager – Regulatory Compliance, at (440) 280-5940.

Very truly yours



Barry S. Allen

Enclosure: LER 2007-003

cc: NRC Project Manager  
NRC Resident Inspector  
NRC Region III

IE22  
NRR

# LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory collection request: 80 hrs. 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, NEOF-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.

|  |                                     |                          |
|--|-------------------------------------|--------------------------|
| <b>1. FACILITY NAME</b><br>Perry Nuclear Power Plant | <b>2. DOCKET NUMBER</b><br>05000440 | <b>3. PAGE</b><br>1 OF 4 |
|--|-------------------------------------|--------------------------|

**4. TITLE**  
Improper Containment Floor Grating Installation Results in an Unanalyzed Condition

| 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 |
| 08            | 27  | 2007 | 2007          | - 003             | - 00    | 10             | 26  | 2007 | FACILITY NAME                | DOCKET NUMBER |

|  |  |   |  |   |  |  |  |  |  |  |
|--|--|---|--|---|--|--|--|--|--|--|
| <b>9. OPERATING MODE</b><br><br>1          | <b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply) |   |  |   |  |  |  |  |  |  |
| <b>10. POWER LEVEL</b><br><br>100          | <input type="checkbox"/> 20.2201(b)  | <input type="checkbox"/> 20.2203(a)(3)(i)             | <input type="checkbox"/> 50.73(a)(2)(i)(C)             | <input type="checkbox"/> 50.73(a)(2)(vii)     |  |  |  |  |  |  |
|  | <input type="checkbox"/> 20.2201(d)  | <input type="checkbox"/> 20.2203(a)(3)(ii)            | <input type="checkbox"/> 50.73(a)(2)(ii)(a)            | <input type="checkbox"/> 50.73(a)(2)(viii)(A) |  |  |  |  |  |  |
|  | <input type="checkbox"/> 20.2203(a)(1)   | <input type="checkbox"/> 20.2203(a)(4)                | <input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B) | <input type="checkbox"/> 50.73(a)(2)(viii)(B) |  |  |  |  |  |  |
|  | <input type="checkbox"/> 20.2203(a)(2)(i)  | <input type="checkbox"/> 50.36(c)(1)(i)(A)            | <input type="checkbox"/> 50.73(a)(2)(iii)              | <input type="checkbox"/> 50.73(a)(2)(ix)(A)   |  |  |  |  |  |  |
|  | <input type="checkbox"/> 20.2203(a)(2)(ii)   | <input type="checkbox"/> 50.36(c)(1)(ii)(A)           | <input type="checkbox"/> 50.73(a)(2)(iv)(A)            | <input type="checkbox"/> 50.73(a)(2)(x)       |  |  |  |  |  |  |
|  | <input type="checkbox"/> 20.2203(a)(2)(iii)  | <input type="checkbox"/> 50.36(c)(2)                  | <input type="checkbox"/> 50.73(a)(2)(v)(A)             | <input type="checkbox"/> 73.71(a)(4)          |  |  |  |  |  |  |
| <input type="checkbox"/> 20.2203(a)(2)(iv) | <input type="checkbox"/> 50.46(a)(3)(ii)   | <input type="checkbox"/> 50.73(a)(2)(v)(B)            | <input type="checkbox"/> 73.71(a)(5)                   |   |  |  |  |  |  |  |
| <input type="checkbox"/> 20.2203(a)(2)(v)  | <input type="checkbox"/> 50.73(a)(2)(i)(A)   | <input type="checkbox"/> 50.73(a)(2)(v)(C)            | <input type="checkbox"/> OTHER                         |   |  |  |  |  |  |  |
| <input type="checkbox"/> 20.2203(a)(2)(vi) | <input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)  | <input checked="" type="checkbox"/> 50.73(a)(2)(v)(D) | Specify in Abstract below or in NRC Form 366A          |   |  |  |  |  |  |  |

**12. LICENSEE CONTACT FOR THIS LER**

|  |   |
|--|---|
| FACILITY NAME<br>Perry Nuclear Power Plant, Kenneth Russell, Compliance Engineer | TELEPHONE NUMBER (Include Area Code)<br>(440) 280- 5580 |
|--|---|

**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 |
|-------|--------|-----------|---------------|--------------------|-------|--------|-----------|---------------|--------------------|
|       |        |           |               |                    |       |        |           |               |                    |

|   |                                     |       |     |      |
|---|-------------------------------------|-------|-----|------|
| <b>14. SUPPLEMENTAL REPORT EXPECTED</b><br><input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE). <input checked="" type="checkbox"/> NO | <b>15. EXPECTED SUBMISSION DATE</b> | MONTH | DAY | YEAR |
|   |                                     |       |     |      |

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

On August 27, 2007, a three by seven foot section of grating located in the reactor containment building was found to be missing the required hold down fasteners. The grating had been removed in July 2007, to support a reactor recirculation system pump motor replacement. An engineering review determined that this grating could become dislodged, during a postulated Loss of Coolant Accident. The grating could impact the emergency core cooling system suction strainer resulting in one or more of the following systems becoming inoperable: residual heat removal, B, C, or high pressure core spray. The grating was subsequently restored to design configuration. The cause of the error was determined to be inadequate detail in the work order, inadequate turnover of the work, and inadequate training for configuration control. Corrective actions include: revision of the "Post Maintenance Test Manual" to include verification of the restoration of structural steel components, review of work order content requirements by the work planners, lessons-learned presentation for work turnover requirements between work groups and lessons-learned presentation for configuration control. This event is being reported in accordance with 10CFR50.73(a)(2)(ii)(B), an unanalyzed condition, 10CFR50.73(a)(2)(v)(D), prevention of a safety function of a system necessary to mitigate consequences of an accident and 10CFR50.73(a)(2)(i)(B), any operation or condition prohibited by Technical Specifications.

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

| 1. FACILITY NAME          | 2. DOCKET | 6. LER NUMBER |                   |         | 3. PAGE |
|---------------------------|-----------|---------------|-------------------|---------|---------|
| Perry Nuclear Power Plant | 05000440  | YEAR          | SEQUENTIAL NUMBER | REV NO. | 2 OF 4  |
|                           |           | 2007          | -- 003 --         | 00      |         |

**NARRATIVE**

Energy Industry Identification System Codes are identified in the text as [XX].

**I. INTRODUCTION**

At 1645 hours on August 27, 2007, an engineering review determined that a section of grating in the reactor containment building [NH] suppression pool swell region was not properly restrained. When the grating condition was discovered, the plant was in Mode 1 at approximately 100% power. All emergency closed cooling systems (ECCS) and emergency diesel generators [EK], except for residual heat removal (RHR)[BO] B, C and high pressure core spray (HPCS)[BG], were operable. RHR B, C and HPCS were in standby and available for operation. At 2044 hours on August 27, 2007, an eight-hour Non-Emergency notification (ENF Number 43603) was made to the NRC Operations Center as required by 10CFR50.72(b)(3)(ii)(B) and 10CFR50.72(b)(3)(v)(D). The condition also meets the reporting requirements for a Licensee Event Report in accordance with 10CFR50.73(b)(3)(ii)(B), "Any event or condition that resulted in: (B) The nuclear power plant being in an unanalyzed condition that significantly degrades plant safety." This event was also determined to meet the reporting criteria for 10CFR 50.73(a)(2)(v)(D), "Any event or condition that could have prevented the fulfillment of the safety function of systems needed to (D) mitigate the consequences of an accident" (i.e. HPCS was made inoperable). Since the inoperability of RHR B, C and HPCS was unrecognized, Limiting Condition for Operation (LCO) 3.5.1 Required Action Completion Time was exceeded and Mode changes were made with inoperable equipment from Mode 4 to Mode 2 and 1 which is prohibited by LCO 3.0.4. This condition is reportable per 10CFR50.73(a)(2)(i)(B), any operation or condition prohibited by Technical Specifications.

**II. EVENT DESCRIPTION**

On August 26, 2007, a plant roving operator discovered that a three by seven foot section of grating was not properly fastened down. The grating is located in the plant containment building on the 599 foot elevation near the lower containment air lock door. The fasteners required to hold the piece of grating in place were not installed as required. The grating had been removed in July 2007, to support the reactor recirculation system [AD] pump motor [MO] replacement. As a result of the engineering review, Technical Specification Limiting Condition for Operation (LCO) 3.5.1, ECCS – Operating, was entered and Required Actions taken within the specified completion time. The grating was subsequently restored to design configuration and the Technical Specification LCO was exited at 1838 hours on August 27, 2007.

**III. CAUSE OF EVENT**

The cause of the error was determined to be inadequate detail in the work order, inadequate turnover of the work, and inadequate training for configuration control. The standards necessary to assure configuration control for the plant were not executed or enforced with the appropriate rigor. The work order should have provided detailed steps to remove and reinstall structural components; provide proper storage of removed components for accountability and reinstallation and provide for a formal turnover of partially completed work from one work organization to another. The lack of rigor resulted in:

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

| 1. FACILITY NAME          | 2. DOCKET | 6. LER NUMBER |                   |         | 3. PAGE |
|---------------------------|-----------|---------------|-------------------|---------|---------|
| Perry Nuclear Power Plant | 05000440  | YEAR          | SEQUENTIAL NUMBER | REV NO. | 3 OF 4  |
|                           |           | 2007          | -- 003 --         | 00      |         |

**NARRATIVE**

- Not providing adequate detail in the work order to remove and reinstall the structural interferences for the Reactor Recirculation System motor replacement or to remove and reinstall the structural components and store the removed material properly for accountability and reinstallation.
- Not performing a formal turnover of the partially completed work from the contractor organization to the plant organization as required by plant procedures that provided for the disassembly and subsequent reassembly of the grating.
- Inadequate training received by the contractor personnel to ensure the recognition of the need to maintain proper configuration control or to understand the necessity for accurate segregation and labeling of the parts, components and hardware that were disassembled and would subsequently be needed for final installation and design configuration control.

**IV. EVENT ANALYSIS**

Following a postulated design basis Loss of Coolant Accident (LOCA) in the dry well, the atmosphere is rapidly compressed due to blow-down mass and energy addition to the dry well volume. This compression is transmitted to the water in the weir annulus in the form of a compressive wave which propagates through the horizontal vent system into the suppression pool. Following vent clearing, the air-steam-water mixture flows from the dry well through vents and is injected into the suppression pool. During vent flow the steam component of the flow mixture condenses in the suppression pool while the air, since it is non-condensable, is released to the suppression pool in the form of high pressure air bubbles. The continued addition and expansion of air within the suppression pool causes the pool volume to swell resulting in acceleration of the pool surface vertically upwards. The area in containment where this occurs is called the "pool swell region". The grating with the missing hold down fasteners is located in the pool swell region.

During this postulated event, the grating could become dislodged and subsequently impact the emergency core cooling system (ECCS) suction strainer [STR] located in the suppression pool below the grating. An engineering review determined that the force of the impact could be larger than the impingement forces that had been previously evaluated. The resulting damage could cause one or more of the following systems to be inoperable as a result of debris being allowed through the damaged strainer and cause fouling of the connected pumps: RHR B, C or HPCS. The improperly restrained grating resulted in an unanalyzed condition for part of the ECCS suction strainer and the connected ECCS systems. Since HPCS is considered a single train safety system, the improperly restrained grating is also considered to have caused a loss of safety function for this high pressure system.

An evaluation was performed assuming the aforementioned conditions occurred using the plant's Probabilistic Risk Assessment model. The worst case scenario would be that the grating could damage ECCS suction strainers in the area of the grating and result in the unavailability of all three of the affected pumps. The duration that the grating was not properly

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

| 1. FACILITY NAME          | 2. DOCKET | 6. LER NUMBER |                   |         | 3. PAGE |
|---------------------------|-----------|---------------|-------------------|---------|---------|
| Perry Nuclear Power Plant | 05000440  | YEAR          | SEQUENTIAL NUMBER | REV NO. | 4 OF 4  |
|                           |           | 2007          | -- 003 --         | 00      |         |

**NARRATIVE**

fastened with the potential of a large or intermediate LOCA was from the time the plant entered Mode 2 at 1643 hours on July 23, 2007, until the grating was restored to full qualification at 1838 hours on August 27, 2007. This was a period of 841.92 hours, which is rounded up to 842 hours for this assessment. This evaluation calculated the Conditional Core Damage Probability at 2.6 E-08. Therefore, this event was determined to be of a very low safety significance.

**V. CORRECTIVE ACTIONS**

The grating was restored to proper design configuration at 1838 hours on August 27, 2007.

The planning organization will review the requirements of the "Order Planning Process" procedure which requires a sign-off in the work order after each important attribute including verification that fasteners and locking devices are installed properly and verification of configuration control activities.

The "Post Maintenance Test Manual" will be changed to include verification of the restoration of structural steel components. Specifically, a caution will be added for verification of structural items such as removable grating, including hold down plates, handrails and other components in the pool swell region.

A lessons-learned presentation will be provided to the plant supervisory staff regarding work in the pool swell region, configuration control and formal turnover of work between work groups.

A lessons-learned presentation will be developed and presented to the Maintenance Organization, Construction Management and the Project Support Team to ensure that the process for configuration control in the plant is reviewed and understood. The lessons-learned presentation will include training on process barriers such as the walk-down process, order documentation, material accountability, housekeeping, turnovers and briefings, configuration control, post maintenance testing and sensitivity to un-secured material in the pool swell region.

A supervisor from each maintenance shop will perform at least one configuration control observation per month for six months.

**VI. PREVIOUS SIMILAR EVENTS**

LER 2006-002, identified an issue with improper controls and analysis for scaffold that was built in the containment pool swell region, the region immediately above the grating discussed in LER 2007-003. The corrective actions and added procedural controls for scaffold building in the containment would not have been expected to prevent the improper grating installation.

**VII. COMMITMENTS**

There are no regulatory commitments contained in this report. Actions described in this document represent intended or planned actions, are described for the NRC's information, and are not regulatory commitments.