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United States Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

Perry Nuclear Power Plant  
Docket No. 50-440


Ladies and Gentlemen:

Enclosed is Licensee Event Report (LER) 2006-002, Scaffold Built in the Containment Pool Swel Region.

There are no regulatory commitments contained in this letter or its enclosure. Any actions discussed in this document that represent intended or planned actions are described for the NRC's information, and not regulatory commitments.

If there are any questions concerning this matter, please contact Mr. Jeffery J. Lausberg, Manager – Regulatory Compliance, at (440) 280-5940.

Very truly yours,



L.W. Pearce

Enclosure: LER 2006-002

cc: NRC Project Manager  
NRC Resident Inspector  
NRC Region III

JEa

# 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: 50 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](mailto:infocollects@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-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> Perry Nuclear Power Plant	<b>2. DOCKET NUMBER</b> 05000440	<b>3. PAGE</b> 1 OF 4
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**4. TITLE**  
Scaffold Built in the Containment Pool Swell Region

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
01	25	2006	2006	002	000	03	24	2006	FACILITY NAME	DOCKET NUMBER

<b>9. OPERATING MODE</b> 1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)</b>											
	<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)									
<b>10. POWER LEVEL</b> 100%	<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 type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A								

**12. LICENSEE CONTACT FOR THIS LER**

Tony Kledzik, Compliance Engineer, Regulatory Compliance  
 TELEPHONE NUMBER (Include Area Code)  
 (440) 280-5824

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EIPX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EIPX

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

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

During the investigation of the program used to build scaffolding inside containment, it was determined that the current evaluation was not adequate for scaffolding to be erected in the pool swell region. A condition report was written to determine if any past operability concerns existed for scaffolding that had been built within the pool swell region. This analysis was concluded on January 25, 2006 and it determined that scaffolding built on December 8, 2005 and December 28, 2005 with the plant operating in Mode 1 at 100% power was erected in the pool swell region of containment in support of maintenance activities. The initial evaluation concluded that the use of an engineering seismic evaluation and a probability risk assessment without analyzing for pool swell hydrodynamic missile hazards to justify allowing scaffolding to be built in the pool swell region is not acceptable. As a result of the inadequate reviews, scaffold installed in the pool swell region placed the plant in an unanalyzed condition with respect to potential hydrodynamic missile hazards in the event of a design basis loss of coolant accident. This was determined to be reportable per 10CFR50.73(a)(2)(ii)(B): any event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety.

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Perry Nuclear Power Plant	05000440	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2006	-- 002	-- 000	

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

**INTRODUCTION**

During the investigation of the program used to build scaffolding inside containment it was determined that the current evaluation was not adequate for scaffolding to be erected in the pool swell region. A condition report was written to determine if any past operability concerns existed for scaffolding that had been built within the pool swell region. This analysis was concluded on January 25, 2006 and it determined that scaffolding built on December 3, 2005 and December 28, 2005 with the plant operating in Mode 1 at 100% power was erected in the pool swell region of containment in support of maintenance activities. These scaffold builds were allowed based on engineering seismic evaluation and PSA risk analysis. It was later determined that this analysis was inadequate, and as a result of these reviews, the scaffold installed in the pool swell region placed the plant in an unanalyzed condition with respect to potential hydrodynamic missile hazards in the event of a design basis loss of coolant accident (LOCA).

Following a design basis LOCA in the dry well, the atmosphere is rapidly compressed due to blowdown 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 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".

**EVENT DESCRIPTION**

During the investigation of the program used to build scaffolding inside containment it was determined that the current evaluation was not adequate for scaffolding to be erected in the pool swell region. A condition report was written to determine if any past operability concerns existed for scaffolding that had been built within the pool swell region. This analysis was concluded on January 25, 2006 and it determined that scaffolding built on December 3, 2005 and December 28, 2005 with the plant operating in Mode 1 at 100% power was erected in the pool swell region of containment in support of maintenance activities. The initial evaluation concluded that the use of an engineering seismic evaluation and a probability risk assessment without analyzing for pool swell hydrodynamic missile hazards to justify allowing scaffolding to be built in the pool swell region is not acceptable. The investigation further determined that a review of systems, structures, and components (SSC) operability must be performed and appropriate Technical Specification Limiting Conditions of Operation (LCO) must be entered to allow scaffold builds in the pool swell region. As a result of the inadequate reviews, the scaffold installed in the pool swell region placed the plant in an unanalyzed condition with respect to potential hydrodynamic missile hazards in the event of a design basis loss of coolant accident. This was determined to be reportable per 10CFR(a)(2)(ii)(B): Any event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety.

**CAUSE OF EVENT**

Multiple procedure changes were implemented as a result of 10CFR50.59 rule changes. Based on interpretation of the new rule, barriers were removed from existing procedures that prevented scaffold from being built in the pool swell region without proper evaluation. Specifically, procedure changes were implemented that did not require analysis of potential hydrodynamic missile hazards in the event of a design basis loss of coolant accident. As a result, the necessary assessment of SSC operability was not performed and appropriate Technical Specification LCOs were not entered.

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Perry Nuclear Power Plant	05000440	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
		2006	-- 002 --	000	

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

**EVENT ANALYSIS**

Scaffolding built in the containment pool swell region has been analyzed from a Probabilistic Risk Assessment (PRA) perspective and is documented in Calculation PSA-009, Revision 3. This calculation assumes that if a large or intermediate Loss of Coolant Accident (LOCA) were to occur between the time a scaffold is built until it is removed that catastrophic damage would occur to mitigating systems and containment. The consequences of the damage assumed to be incurred by the mitigating systems is core damage and a large early release of radioactivity to the environment. This is a bounding assumption. A realistic expectation is that some of the mitigating systems will survive and core damage could be prevented. However, even with the bounding assumption, the PRA calculation concludes that the risk associated with work in the pool swell region of the containment for a limited duration is acceptable. The actual duration of work performed in the pool swell region for December 8, 2005 and December 28, 2005 is 6.5 hours and 8.25 hours respectively. This duration did not exceed the acceptable limit established in PSA-009 of 125 hours.

Calculation PSA-009, Revision 3 evaluates the risk associated with work performed in the pool swell region and having the potential for missile generation given a design basis LOCA. These work activities include the building and disassembling of scaffolds in the pool swell region. PSA-009 covers the period from initiation of any work, including the scaffold build to complete removal of any scaffolds.

In a risk informed environment it is acknowledged that events and their consequences have a probability of occurring. The goal of risk informed applications is to limit the probability of events that result in negative consequences to an acceptable level. Using the guidance in NUMARC 93-01, Section 11.3.7.2, metrics that determine an acceptable risk level with established risk management actions are:

- " Incremental core damage probability (ICDP) less than 1.0E-05.
- " Incremental large early release probability (ILERP) less than 1.0E-06.

Normal work controls are associated with an ICDP less than 1.0E-6 and a ILERP less than 1.0E-7. The time to achieve an ILERP of 1E-7 (12.5 hours) is the limiting duration based on normal work controls. In accordance with NUMARC 93-01 the ICDP and ILERP can be increased to 1E-5 and 1E-6, respectively provided non-quantifiables (e.g., weather, etc.) and risk management actions (e.g., declaring protected trains, etc.) are established. Based on those provisions the limiting duration for work in the pool swell region can be increased to 125 hours over a 12 month period.

For work in the pool swell region of containment, core damage and a large early release will result if a large or intermediate LOCA occurs. This implies that the ICDP and ILERP are equivalent and that the acceptable risk is limited to an ICDP and ILERP of less than 1.0E-06. Based on these guidelines, PSA-009 concludes that the risk associated with work in the pool swell region of the containment, when limited in duration and governed by risk management actions, is acceptable. The actual duration of work in the pool swell region did not exceed the acceptable limits.

Based upon the above information, this event is considered to be of very low safety significance.

**CORRECTIVE ACTIONS**

- An Operations Standing Order was issued that did not allow scaffolding to be built in the pool swell region until procedure changes were completed.
- Changes to PAP-0204 "Housekeeping/Cleanliness Control Program" were implemented to clarify that temporary alterations in support of maintenance cannot adversely affect USAR credited design functions unless an assessment on Technical Specification operability has been performed.

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Perry Nuclear Power Plant	05000440	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
		2006	-- 002	-- 000	

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

- o Requirements for performing an evaluation of hydrodynamic loads for building scaffold within the pool swell region were included.
- Changes to GCI-0016 "Scaffolding Erection, Modification or Dismantling Guidelines" were implemented to clarify that temporary alterations in support of maintenance cannot adversely affect USAR credited design functions unless an assessment on Technical Specification operability has been performed.
  - o Requirements for performing an evaluation of hydrodynamic loads for building scaffold within the pool swell region were included.

**PREVIOUS SIMILAR EVENTS**

On November 23, 1987 plant personnel identified that scaffolding had been erected in the containment pool swell region without evaluating the potential hydrodynamic missile hazards. Corrective actions included changes to procedures to require a Mechanical Foreign Item (MFI) evaluation for scaffold to be built in the pool swell region.

Revision 0 of GCI-0016 "Scaffolding Erection, Modification or Dismantling Guidelines" contained the following note: "Scaffolds which are needed within the pool/weir swell region during Modes 1, 2, or 3 will require a 10CFR50.59 review and a Mechanical Foreign Item (M.F.I.) tag before installation per PAP-1402, "Temporary Modification Control". The pool/weir swell region is that area inside the Containment Wetwell below Elevation 623' 4" or in the Drywell between the Drywell wall and the Weir wall below Elevation 613' 0". This note was replaced in a later revision with a Precaution and Limitation that stated "Scaffolds installed in Containment during Modes 1, 2, or 3 may be considered a Temporary Modification. Ensure requirements of PAP-1402 are satisfied prior to installation." The current revision of GCI-0016 (revision 6) has a Precaution and Limitation that states "Scaffolds shall not be installed in the Containment during Plant Modes 1, 2, or 3 unless Engineering authorizes the scaffold with a RFA CR." Precise guidance with respect to scaffold builds in the pool swell region was replaced over time with less prescriptive information.

PAP-1402, "Temporary Modification Control", provided detailed guidance on requirements associated with scaffold builds in the pool swell region. Revision 13 of PAP-1402 (effective 8/18/04) deleted reference to pool swell scaffold requirements as these requirements were now located in PAP-0204, "Housekeeping/Cleanliness Control Program".

A 10CFR50.59 rule revision became effective in 2001. The new rule treated scaffolding as a Temporary Alteration in support of a maintenance activity. Because of this new philosophy, guidance for pool swell scaffold activities was removed from PAP-1402, "Temporary Modification Control". Guidance on responsibilities associated with Temporary Alterations was added to revision 11 of PAP-0204. This revision required only that a risk based assessment of Temporary Alterations in support of maintenance be performed in accordance with PAP-1924, "Risk-Informed Safety Assessment and Risk Management". The revision did not include the requirement to perform a Technical Specification operability evaluation in accordance with 10CFR50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants". These procedure revisions removed the administrative barrier that prevented scaffolding from being built in the pool swell region during Mode 1 and created an unanalyzed condition if a design basis loss of coolant event were to occur.

No similar previous events were identified that had been reported via a Licensee Event Report. Over the past three years, two occurrences of scaffolding being installed in the containment pool swell region were identified at Perry. These are the December, 2005 instances addressed by this LER.