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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 2000-003, "Battery Age Determination Results in Technical Specification Violation of Surveillance Requirement."

No regulatory commitments were identified in this report. If you have questions or require additional information, please contact Mr. Gregory A. Dunn, Manager - Regulatory Affairs, at (440) 280-5305.

Very truly yours,



for John K. Wood

Enclosure

cc: NRC Project Manager
NRC Resident Inspector
NRC Region III

JE22 1/1

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION (6-1998)	APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001 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.
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)	

FACILITY NAME (1) PERRY NUCLEAR POWER PLANT, UNIT 1	DOCKET NUMBER (2) 050000440	PAGE (3) 1 OF 3
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TITLE (4)
 Battery Age Determination Results In Technical Specification Violation of Surveillance Requirement

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
2	19	1999	2000	-- 003	-- 000	4	19	2000	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
		20.2201(b)		20.2203(a)(2)(v)	<input checked="" type="checkbox"/>	50.73(a)(2)(i)		50.73(a)(2)(viii)		
POWER LEVEL (10)	96	20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)		
		20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71		
		20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER		
		20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below		
		20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		or in NRC Form 366A		

LICENSEE CONTACT FOR THIS LER (12)	
NAME Bruce A. Luthanen, Compliance Engineer	TELEPHONE NUMBER (Include Area Code) (440) 280-5389

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURE	REPORTABLE TO EPIX	

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)		
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) (16)

On February 19, 1999, an operability determination was performed for the Division 3 Unit 1 battery based on a question regarding installation dates. Testing frequency for the battery to meet Surveillance Requirements is determined by the age of the battery. This battery was installed in November 1984, and was assumed to be at 72 percent of a 20-year service life.

Further investigation indicated that the battery cells had been stored on trickle charge since January 11, 1978, and many of the original individual cells had been replaced. This information was used in determining the service life of the batteries.

Based on the engineering analysis performed, the overall life of the Division 3 Unit 1 battery was determined to be 9.7 years by calculating the arithmetic average of the age of the individual battery cells, and also by battery curve comparisons and performance test results. The Division 3 Unit 1 battery was concluded to be OPERABLE, and the required surveillances were continued at the less restrictive frequency (60 months vice 18 months).

The Senior Resident Inspector questioned the approach used for calculation of battery age, and referred this to Office of Nuclear Reactor Regulation staff for evaluation. The staff concluded that this approach for calculating battery age was not acceptable, and stated that the more restrictive surveillance frequency should have been observed.

A Non-Cited Violation was issued in Inspection Report 50-440/99015, dated March 19, 2000. Therefore, this event is being reported under 10 CFR 50.73 (a)(2)(i) as a condition prohibited by Technical Specifications.

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

I. INTRODUCTION

The Perry Nuclear Power Plant (PNPP) utilizes two redundant trains of batteries [BTRY] within Division 3 to provide emergency 125 Volt Direct Current (VDC) for the safety-related divisional subsystems. The batteries are composed of 60 individual cells (20 jars) which are examined visually and electrically to verify the absence of corrosion, or deterioration of any cells. As conditions warrant, individual cells within a battery may be replaced. Division 3 batteries exist for both Perry Unit 2 (for which construction was never completed) as well as Unit 1. The Division 3 Unit 2 battery has the capacity to act as a back-up to the Unit 1 battery.

The age of a battery determines the frequency at which a battery Surveillance Requirement must be performed. Technical Specifications (TS) require that a battery at 85 percent or less of its service life meet a 60-month surveillance requirement. Once past 85 percent of its service life, a battery must meet a more restrictive surveillance requirement to pass a performance discharge test once every 18 months.

At the time of the event, PNPP was in Mode 1 at approximately 96 percent rated thermal power, coasting down at the end of an operating cycle in preparation for a scheduled refueling outage. The reactor vessel was at approximately 1024 pounds per square inch gauge, with the reactor coolant at saturated conditions. There were no inoperable systems, structures or components that contributed to this condition.

II. EVENT DESCRIPTION

On February 17, 1999, the Division 3 Unit 2 Battery was declared inoperable due to the age of the battery exceeding the service lifetime specified by the manufacturer. The majority (44) of the 60 cells were originally installed equipment. Twenty years is the generally accepted limit for service life of this type of battery (stationary lead-calcium) battery, although not defined specifically by IEEE or other references. The Unit 2 battery had been installed in November 1984, and was originally assumed to be at 72 percent of its service life. Actually, the battery had been on trickle charge in storage since 1978, prior to installation. A performance test was conducted which determined that the Unit 2 battery was at 88.3 percent capacity. Comparison to battery age curves indicated that the Unit 2 battery was at 92 percent of its service life. This restored the Division 3 Unit 2 battery to operability in accordance with TS (> 80 percent capacity.) Questions were raised regarding the applicability of this concern to the Division 3 Unit 1 battery, which had been installed in the same timeframe.

Unlike the Unit 2 battery, the great majority (51) of the cells in the Unit 1 battery had been replaced, and were less than ten years old. At that time, the Division 3 Unit 1 battery age was calculated at 9.7 years, using the arithmetic average of the cells ages. Based on this calculated age and comparison with the results of a recently performed discharge test curve to a typical battery curve, the Division 3 Unit 1 battery was concluded to have been tested at the appropriate frequency, and was concluded OPERABLE on February 19, 1999, as a result of an Operability Determination (OD). PNPP staff also verified that the Division 3 Unit 1 battery was fully functional in February 1999, by successful completion of a performance discharge test (98.9 percent capacity), following completion of the operability determination. The divisional battery testing was increased to an 18-month surveillance frequency as a conservative measure.

The NRC questioned the practice of using arithmetic averages for determining battery age. The OD was later referred to the office of Nuclear Reactor Regulation (NRR) staff for review under a Task Interface Agreement (TIA). The results of this TIA were used as the basis for the NRC determination, and were provided to the Perry staff as an attachment to Routine Plant Inspection Report 50-440/99015. As a result, a Non-Cited Violation (NCV) 99015-001 was documented in the inspection report.

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

The TIA documented that using arithmetic averages to determine age was "not an industry practice and is not acceptable." It further stated that the licensee's approach was non-conservative, in that the OD for the Division 3 Unit 1 battery did not address this concern, but relied on an undocumented method to establish battery age.

III. CAUSE OF EVENT

This event was caused by a misunderstanding of the applicable industry standards for the determination of battery age. Although no industry precedent had been established for the use of average cell age to determine overall battery age, conservative follow-up testing validated the capability of the batteries. There was no equipment failure noted.

IV. SAFETY ANALYSIS

The divisional batteries provide DC power for safety-related equipment in the event of a loss of normal DC power supply. Control power would be lost to a number of divisional systems, if the battery was incapable of functioning as designed.

With the battery service life defined by the actual age of the oldest cell, the batteries would have reached 85 percent of their service life on January 11, 1995, and should have been placed on a more restrictive surveillance frequency. In February 1999, both Division 3 batteries still demonstrated capacity well in excess of the required 80 percent through actual load testing. They would have performed their intended safety function during the affected period of time. Therefore, either the Unit 1 or Unit 2 battery satisfied capacity requirements, and the Division 3 systems were capable of performing their intended functions, regardless of calculated battery age or surveillance frequency.

Therefore, there was no safety significance associated with this event.

V. CORRECTIVE ACTIONS

The management and engineering staffs at PNPP acknowledge that the arithmetic averaging of battery cell ages may not present an accurate representation of battery age.

The following corrective actions were instituted by the site :

- 1) In the short-term, the batteries continue to be tested on a more restrictive surveillance frequency.
- 2) As a long-term measure, new batteries have been procured and are scheduled for installation in accordance with the site's on-line maintenance program.

VI. PREVIOUS SIMILAR EVENTS

A search of industry events over the past 5 years did not show any related events.

No regulatory commitments were identified in this report.

Energy Industry Identification System (EIIS) Codes are identified in the text by square brackets [XX].