FPL Energy Point Beach, LLC, 6610 Nuclear Road, Two Rivers, WI 54241

FPL Energy
Point Beach Nuclear Plant

May 23, 2008

NRC 2008-0037
10 CFR 50.73

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Point Beach Nuclear Plant, Units 1 and 2
Dockets 50-266 and 50-301
Renewed License Nos. DPR-24 and DPR-27

One Service Water Pump Inoperable in Excess of
Technical Specification Allowed Completion Time

Enclosed is Licensee Event Report (LER) 266-2008-002-00 for Point Beach Nuclear Plant, Units 1 and 2. This LER documents a service water pump being inoperable in excess of the time allowed by Technical Specifications. This event is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B), as any operation or condition prohibited by the plant's Technical Specifications.

Very truly yours,

FPL Energy Point Beach, LLC

James H. McCarthy
Site Vice President

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Point Beach Nuclear Plant, USNRC
Resident Inspector, Point Beach Nuclear Plant, USNRC
PSCW

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 80 hours. 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, 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.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Point Beach Nuclear Plant Unit 1	05000266	1 OF 5

4. TITLE

One Service Water Pump Inoperable in Excess of Technical Specification Allowed Completion Time

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
									Unit 2	05000301
02	02	2008	2008	- 002 -	00	05	23	2008	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE

Unit 1 MODE 5
Unit 2 MODE 1

10. POWER LEVEL

Unit 1 <0.99 keff
Unit 2 100%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☒ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Tom Staskal	920-755-7621

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

	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

At 0241 hours on February 2, 2008, vibration at point M1Y, which measures upper motor vibration parallel to pump discharge flow, on service water pump P-32E was determined to be 1.2 inches per second (ips) which is in excess of the American Society of Mechanical Engineers (ASME) Code "required action" level. The pump was secured and declared inoperable. The pump was disassembled, with significant wear identified on the shaft at the Cutless bearing locations. Shaft runout was measured, with the third intermediate shaft exhibiting the largest amount, which confirmed the cause of the damage and high vibrations to be a bent shaft. Shaft straightness is verified prior to installation so rigging practices used during installation are believed to have caused the bending. The historical vibration data from P-32E was evaluated in concert with the observed bearing and shaft damage. It was determined that the ASME "required action" vibration limit of 0.421 ips would have been reached on about January 9, 2008. Had vibration data at that magnitude been obtained on January 9, 2008, the pump would have been declared inoperable. The pump was declared inoperable on February 2, 2008. The Technical Specification Action Condition (TSAC) Completion Time limit of 7 days was exceeded because 24 days had elapsed between January 9 and February 2, 2008.

A. REPORTABLE OCCURRENCE

During routine log taking, at 0054 hours on the morning of February 2, 2008, an auxiliary operator identified service water pump P-32E experiencing higher than usual vibrations. The pump was secured. Later in the morning the pump was restarted and vibration data taken. The value at location M1Y, which measures upper motor vibration parallel to pump discharge flow, was above the ASME Code 'required action' limit. The pump was subsequently declared inoperable as of 0054 hours on February 2, 2008.

A subsequent evaluation of historical vibration data and pump internal conditions observed during the repairs was performed by a consultant and was received by the site on March 28, 2008. The report predicted the "required action" vibration limit of 0.421 ips at location M1Y was exceeded on about January 9, 2008. The amount of time between January 9 and February 2 exceeds the 7 day Completion Time allowed by TSAC 3.7.8.A.

B. INITIAL CONDITIONS

Unit 1 in Mode 1 on January 9, 2008 and MODE 5 on February 2, 2008.
Unit 2 in Mode 1 on January 9, 2008 and MODE 1 on February 2, 2008.

C. CAUSE

The cause of the high vibrations was a bent pump shaft based on the as-found condition of components removed from the pump and an uncoupled motor run. The cause of the bent shaft was less than adequate procedural guidance.

Significant wear on the line shafts at the Cutless bearing locations was found. The wear was on one side of the shaft sections only and based on observation the wear was located on the same side of the shaft sections all the way up along the shaft assembly. Approximately 0.25 inch of metal was worn away at the highest wear area in the lower end of the third intermediate shaft. The high vibration condition that was occurring at a 1 times running speed frequency is consistent with the bent shaft condition.

The routine maintenance procedure for service water pump removal, installation and maintenance lacked adequate installation and rigging requirements for shaft installation to ensure excessive force was not applied to the shaft that could potentially result in shaft bending. The shaft was most likely bent during field installation on June 7, 2006, because shaft straightness had been checked by procedure in the shop prior to field installation.

D. CORRECTIVE ACTIONS

P-32E was replaced using new shafts and returned to service at 1623 hours on February 6, 2008. During the replacement work, additional shaft inspections were performed to ensure shaft end perpendicularity and special care was taken to ensure no shaft bending occurred during assembly.

Corrective actions to prevent shaft bending and to better detect a bent shaft during future installation work are being implemented. Routine Maintenance Procedure RMP 9216-2 was revised to include assembly practices to prevent bending a shaft during installation. Changes are being made to Routine Maintenance Procedure RMP 9216-6 to check for shaft end perpendicularity.

E. SAFETY ASSESSMENT

The plant response during and following the abnormal condition was as expected and the station was able to maintain the plant in a safe, controlled condition. Prior to securing P-32E, pump P-32F was started, which maintained at least three Service Water (SW) pumps running at all times. There was no loss of the required service water flow to any equipment due to this event.

With P-32E inoperable, Unit 2 entered Technical Specification Action Condition 'A' for not meeting the requirements of Limiting Condition for Operation (LCO) 3.7.8, as required by Technical Requirements Manual (TRM) 3.7.7 Condition D. The assessment of Unit 2 on-line risk with P-32E out of service was green for all measures of on-line risk CDF, LERF and FIRE. Unit 1 was in MODE 5 at the time of discovery. Therefore, the requirements of LCO 3.7.8 were initially met. Unit 1 startup activities were in progress and a risk assessment was required per LCO 3.0.4.b for Unit 1 in order to change modes with P-32E inoperable. The risk assessment was performed and concluded that all shutdown safety key safety function criteria remained green. Unit 1 entry into MODE 4 resulted in both units not meeting LCO 3.7.8 and entering TSAC "A," which requires the pump to be restored within 7 days and 14 days from discovery of failure to meet the LCO. A second risk assessment allowing Unit 1 to transition to MODES 3, 2 and 1 with P-32E and 1P-2B charging pump inoperable was performed and concluded that all measures of on-line risk remained green.

At the time P-32E was declared out of service, the pump had been running for the previous 12 days and supplying flow to the service water system. In addition, after the pump was secured, it was successfully restarted. Evaluation of the as-found pump conditions and vibration trends was performed by an independent consultant and reviewed by the plant and corporate staff. The evaluation concluded that P-32E would have run for more than an additional 24 hours after it was secured, thereby meeting the PRA mission time for a SW pump. The P-32E inoperability event had very low PRA safety significance because the pump had been running and supplying flow to the SW system until it was turned off, was capable of restarting, and would have met its 24-hour PRA mission time.

The service water system has a design basis mission time of thirty days in order to support long term post design basis accident (DBA) sump recirculation cooling. This long term cooling design function is provided by the SW system as a whole and thirty days of operation does not directly apply to each pump

individually. The evaluation of the as-found conditions of P-32E indicate the pump would have run for at least 24 hours more and there was also reasonable assurance of up to five days continued operation.

The most limiting design basis accident from a SW flow standpoint is a design basis loss-of-coolant-accident (LOCA) on one unit, with continued normal operation of the other, non-accident, unit, in conjunction with a single failure of one safeguards train as described in FSAR Chapter 9.6. In such an event, three SW pumps are required to supply the necessary cooling water to all required equipment. For evaluation of the P-32E event, a single failure of the Train "A" SW pumps P-32A, B and F would be the most limiting failure because the Train "B" SW pumps P-32C, D and E would be required to run and supply the required cooling water.

Having the non-accident unit remain at power places a more limiting condition on the SW system and pumps. This is because the circulating water (CW) pumps would continue to operate, and the service water pump suction bays are accordingly lower. Because the limiting concern for service water in a design basis accident (DBA) situation is maintaining sufficient pressure in the highest elevation containment fan coolers (CFCs) to prevent flashing and steam binding, reducing the suction pressure to the pumps has an impact on system performance.

Placing the non-accident unit in a hot shutdown condition with use of service water to supply the auxiliary feedwater pumps is bounded by the more limiting CFC design conditions. Actively cooling down the non-accident unit using the residual heat removal system combined with a DBA on the other unit is specifically excluded by Appendix C of the FPL Energy Point Beach Operating License.

During the first 24 hours following a DBA, the most demand is placed on the SW system because high decay heat load and high containment temperature will exist. The service water system is required to provide cooling water to the containment fan coolers and component cooling heat exchangers to reduce containment temperature and remove the decay heat. The worst case scenario would have been a DBA occurring just prior to declaring P-32E inoperable. In this case P-32E would have been expected to run for at least 24 hours and possibly for five days, such that all three Train "B" SW pumps were initially running and providing the flow required to remove decay heat and to reduce containment pressure. After the initial transient portion of the accident, the required SW flow to accommodate long-term steady state conditions is significantly reduced.

At the time P-32E was declared inoperable, the other five SW pumps were all operable, and had been operable for the seven day period prior to declaring P-32E inoperable. If one or more pumps had failed to start due to a loss of their alternate AC power supply such as an emergency diesel generator (EDG) failing to start or an EDG failing to run, or due to a failure of automatic actuating circuitry the pumps would have been started by manual action. Manual starting would have been performed after an alternate AC power supply had been restored or re-aligned from an alternate EDG. Emergency operating procedures verify all six SW pumps are running and direct the operators to manually start SW pumps found not running. Specifically, EOP-0, "Reactor Trip or Safety Injection," Attachment A, "Automatic Action Verification," contains this step. Other emergency procedures also perform this verification when appropriate, for example EOP 1.3 "Transfer to Containment Sump Recirculation – Low Head" and EOP 1.4 "Transfer to Containment Sump Recirculation – High Head."

A review of the operating history of the EDGs for the week prior to declaring P-32E out of service found only G-04 was unavailable for a little over five hours due to the performance of Technical Specification required surveillance testing. P-32E can be powered from either "B" train EDG, G-03 or G-04. Therefore, even though G-04 was out of service for a short time during the period of interest the potential inoperability of P-32E had no compounding safety impact. Had G-03 failed to start or run with G-04 out of service, the limiting effect would have been the loss of only three SW pumps, one of which was P-32E.

Because both Train "A" EDGs, G-01 and G-02, were operable prior to declaring P-32E out of service, a single failure of one Train "A" EDG would result in the initial loss of emergency power to only one or two SW pumps because P-32A and B are supplied by G-01 and P-32F is supplied by G-02. Therefore in the most limiting case of the loss of G01, G-02 would immediately be available to provide power to one Train "A" SW pump, P-32F. This is in addition to the three Train "B" pumps that would initially be operating assuming only a failure on Train "A." Manual action to realign G02 to supply emergency power to all three Train "A" SW pumps could then be taken if G01 could not be recovered.

Since a minimum of three SW pumps would have started and continued to run during the critical period of post-LOCA response, and additional SW pumps could have been restored prior to P-32E having failed, the safety function of the SW system would have been met. This is a direct result of the redundancy and diversity designed into the SW system by having multiple alternate AC power sources and multiple SW pumps to provide the minimum required pressure and flow. Individual SW pumps do not, in and of themselves, have a specified or implied mission time. As discussed earlier, it is the SW system as a whole that has a mission time of 30 days.

SW flow calculations for responding to an Appendix R fire show that only two SW pumps are required to place both units in safe shutdown, and to take both units to cold shutdown. Therefore, the demand on the SW system from a postulated Appendix R event is bounded by a DBA LOCA.

The safety consequences and impact on safety margin of this event are evaluated as minimal.

F. ADDITIONAL INFORMATION

A review of LERs submitted during the past three years identified two other events that involved less than adequate guidance in maintenance procedures.

LER 266/2007-004 Manual Reactor Trip Due To Loss of Feedwater Regulating Valve Control
LER 266/2007-005 Manual Reactor Shutdown Required by Technical Specification; LCO 3.7.5 Auxiliary Feedwater Not Met