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CP-201401175
TXX-14118

10 CFR 50.73

October 20, 2014

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT (CPNPP)
DOCKET NO. 50-446
LICENSEE EVENT REPORT 446/14-005-00, CENTRIFUGAL CHARGING
PUMP INOPERABLE FOR LONGER THAN ALLOWED BY TECHNICAL
SPECIFICATIONS

Dear Sir or Madam:

Enclosed is Licensee Event Report (LER) 446/14-005-00, "Centrifugal Charging Pump Inoperable For Longer Than Allowed by Technical Specifications," for Comanche Peak Nuclear Power Plant (CPNPP) Unit 2.

This communication contains the following new licensing basis commitment regarding CPNPP Units 1 and 2.

<u>Commitment No.</u>	<u>Description</u>
4943911	The Centrifugal Charging Pump Main Lube Oil Pump (MLOP) couplings will be modified to eliminate the possibility of the shaft coupling pushing back on the MLOP shaft.

The commitment number is used by Luminant Generation Company LLC for the internal tracking of CPNPP commitments.

If there are any questions regarding this report, please contact Mr. Gary L. Merka at (254) 897-6613 or Gary.Merka@luminant.com.

A member of the STARS Alliance


Callaway . Comanche Peak . Diablo Canyon . Palo Verde . Wolf Creek

Handwritten signature: FE22 NRC

Sincerely,

Luminant Generation Company LLC

Rafael Flores

By: 
Fred W. Madden
Director, External Affairs

Enclosure

c - Marc L. Dapas, NRC Region IV
Balwant K. Singal, NRR
Resident Inspectors, CPNPP



LICENSEE EVENT REPORT (LER)
(See Page 2 for required number of digits/characters for each block)

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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@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.

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Comanche Peak

2. DOCKET NUMBER

05000 446

3. PAGE

1 OF 4

4. TITLE

Centrifugal Charging Pump Inoperable For Longer Than Allowed by Technical Specifications

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
8	20	2014	14	005	00	10	20	2014	FACILITY NAME	DOCKET NUMBER
										05000
										05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
1	<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 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)
10. POWER LEVEL	<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

LICENSEE CONTACT Timothy A. Hope, Manager, Regulatory Affairs	TELEPHONE NUMBER (Include Area Code) (254) 897-6370
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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	CB	P	Pacific	Y					

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

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)
On August 3, 2014, while starting Centrifugal Charging Pump (CCP) 2-02, the CCP 2-02 Main Lubricating Oil pump (MLOP) decoupled from its drive shaft. On August 20, 2014 an evaluation was completed that determined CCP 2-02 was inoperable from July 6, 2014 to August 3, 2014, which exceeded the completion times of Technical Specification 3.5.2. During this time, CCP 2-01 was also inoperable for 1 hour 44 minutes on July 14, 2014, and for 1 hour 4 minutes on July 18, 2014. The cause of this event was the design of the CCP MLOP coupling requires blind fitting of the drive pins into the drive pin holes and does not definitively allow for post-installation verification. Corrective actions include replacement of the CCP 2-02 MLOP shaft hub and speed increaser bushings, modification of the MLOP coupling design, procedure revisions, and Maintenance personnel training.

All times in this report are approximate and Central Time unless noted otherwise.



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NARRATIVE

I. DESCRIPTION OF THE REPORTABLE EVENT

A. REPORTABLE EVENT CLASSIFICATION

10CFR50.73(a)(2)(i)(B) "Any operation or condition which was prohibited by the plant's Technical Specifications" and 10CFR50.73(a)(2)(v)(D) "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident."

B. PLANT CONDITION PRIOR TO EVENT

On August 3, 2014, Comanche Peak Nuclear Power Plant (CPNPP) Unit 2 was in Mode 1 operating at 100% power.

C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

There were no structures, systems, or components that were inoperable at the start of the event that contributed to the event.

D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES

On August 3, 2014, Centrifugal Charging Pump (CCP) 2-02 [EIS: (CB)(P)] was started per SOP-103, Section 5.5.18, "Alternating Centrifugal Charging Pumps", which provides operating guidance for starting and stopping the CCPs biweekly. Per procedure, prior to startup the CCP 2-02, Auxiliary Lube Oil Pump (ALOP) was started to provide lubrication until the Main Lube Oil Pump (MLOP) generated sufficient pressure to provide lubrication to the CCP, at which time the ALOP would automatically stop. However, following startup of CCP 2-02, the ALOP remained in operation, indicating either an issue with the ALOP controller or the MLOP. CCP 2-02 was secured for troubleshooting.

The CCP MLOP drive coupling is a pin-in-hole (pin type) coupling where pins located in the MLOP side hub (driven hub) are inserted into pin holes located in the CCP side hub (drive hub). The drive hub is located at one end of the speed increaser low speed shaft, while the motor coupling is located at the other end of the low speed shaft. The drive hub and speed increaser shaft comprise an integral unit that is replaced as a unit; it is impossible to replace either of the two elements without replacing the entire unit. The drive pin holes are bored into the speed increaser shaft. All four CCPs share this design.

Troubleshooting discovered that the driven hub had been pushed back onto the MLOP shaft approximately 1/2 inch, sufficient to allow the drive pins to disengage from the pin holes in the drive hub. Inspection of the driven hub and MLOP shaft revealed that the drive pins exhibited no wear other than at the trailing edge of the tips, the set screw was present and tight, and the shaft key exhibited two distinctly different scoring patterns: a continuous scrape of slightly greater than 1/4 inch in length, and a series of horse shoe shaped skip marks. Inspection of the drive hub revealed that the drive pin bushings exhibited no internal wear and had no grease on their inner surface, the tops of the bushings had been sheared off by the drive pins, the drive pin bushings exhibited no deformation other than the damage sustained to their tops, the drive pin holes exhibited signs of recent wear on the extreme edge of their trailing sides, and the drive hub had a shallow groove worn into it, the width of which matched the diameter of the drive pins.

The CCP 2-02 MLOP driven hub and speed increaser bushings were removed and replaced and CCP 2-02 was declared operable. On August 20, 2014, an evaluation was completed that determined CCP 2-02 was inoperable from July 6, 2014 through August 3, 2014 due to the inability to successfully start the pump, or to restart the pump if it had been secured as the result of load shedding. It was also determined that CCP 2-01 had been inoperable for 1 hour 44 minutes on July 14, 2014, and for 1 hour 4 minutes on July 18, 2014. Therefore, this event is reportable per 10CFR50.73(a)(2)(i)(B) "Any operation or condition which was prohibited by the plant's Technical Specifications" and 10CFR50.73(a)(2)(v)(D) "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident."

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E. THE METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE, OR PROCEDURAL PERSONNEL ERROR

During performance of SOP-103, Section 5.5.18, "Alternating Centrifugal Charging Pumps," Maintenance personnel (Utility, Non-Licensed) determined that the driven hub had been pushed back onto the MLOP shaft approximately 1/2 inch, sufficient to allow the drive pins to disengage from the pin holes in the drive hub.

II. COMPONENT OR SYSTEM FAILURES

A. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

The design of the CCP MLOP coupling requires blind fitting of the drive pins into the drive pin holes and does not definitively allow for post-installation verification. The drive hub of the CCP MLOP coupling is located in a recess approximately 5 inches deep. This design does not afford Maintenance personnel a means by which to definitively verify proper reassembly of the coupling.

B. FAILURE MODE, MECHANISM, AND EFFECTS OF EACH FAILED COMPONENT

The driven hub was pushed back onto the MLOP shaft approximately 1/2 inch, sufficient to allow the drive pins to disengage from the pin holes in the drive hub. The tops of the bushings had been sheared off by the drive pins, the drive pin bushings exhibited no deformation other than the damage sustained to their tops, the drive pin holes exhibited signs of recent wear on the extreme edge of their trailing sides, and the drive hub had a shallow groove worn into it, the width of which matched the diameter of the drive pins.

C. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS

Reactor Coolant Pump (RCP) shaft seal cooling is supplied from the CCPs. The CCPs also serve as the high-head pumps for the Emergency Core Cooling System (ECCS). In the event of a Loss Of Coolant Accident (LOCA), the CCPs inject borated water into the reactor core.

D. FAILED COMPONENT INFORMATION

The CCPs are horizontal, centrifugal type pumps, model RLII, manufactured by Pacific Pumps.

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

Not applicable - No safety system responses occurred as a result of this event.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

CCP 2-02 was inoperable from July 6, 2014 through August 3, 2014 due to the inability to successfully start the pump, or to restart the pump if it had been secured as the result of load shedding. It was also determined that CCP 2-01 was inoperable for 1 hour 44 minutes on July 14, 2014, and for 1 hour 4 minutes on July 18, 2014.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

The CCPs are part of the ECCS. The primary function of the ECCS is to remove the stored and fission product decay heat from the reactor core during accident conditions. During the time that CCP 2-02 was inoperable, the Residual Heat Removal and Safety Injection systems would have fulfilled their respective ECCS safety functions. Except for 1 hour 4 minutes on July 18, 2014, it was determined that one CCP train would have been available to perform its ECCS safety function.

The potential unavailability of both CCPs for one hour and 4 minutes on July 18, 2014 would have most likely resulted in loss of the high-pressure injection ECCS function during that interval. Specifically, had a secondary pipe break occurred inside containment (sufficient in size to generate a phase B isolation signal) concurrent with a loss of offsite power, then the 2-01 CCP would have been the sole source of RCP seal cooling.

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Reactor Coolant System (RCS) pressure 'recovers' after an initial period of decrease (during which CCP 2-01 would have provided seal injection flow). Approximately 1000 seconds into the postulated accident, RCS pressure is predicted to recover to the point where operability of the alternate mini-flow valve would be demanded in order to ensure continued pump operation. As continued pump operation is required to ensure RCP seal integrity, the effective loss of CCP 2-01 under the stated conditions is conservatively considered to constitute a loss of the high-pressure ECCS function during the interval of interest. Therefore, this event is reportable per 10CFR50.73(a)(2)(v)(D) "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident."

A probabilistic risk assessment of the inoperability of the CCPs found a negligible effect on core damage frequency and large early release frequency. In addition, there were no events which required an ECCS actuation during the time that CCP 2-02 was inoperable. Based on these considerations, there was no adverse effect on plant safety or on the health and safety of the public.

IV. CAUSE OF THE EVENT

The CCP 2-02 speed increaser low speed shaft driven MLOP coupling hub was pushed back approximately 1/2 inch onto the MLOP shaft, resulting in disengagement of the drive pins from the pin holes.

The design of the CCP MLOP coupling requires blind fitting of the drive pins into the drive pin holes and does not allow for post-installation verification. The drive hub of the CCP MLOP coupling is located in a recess approximately 5 inches deep. This design does not afford Maintenance personnel a means by which to definitively verify proper reassembly of the coupling.

V. CORRECTIVE ACTIONS

Immediate corrective actions included removing and replacing the CCP 2-02 MLOP driven hub and speed increaser bushings. The CCP MLOP couplings will be modified to eliminate the possibility of the shaft coupling pushing back on the MLOP shaft. Procedure SOP-103 Section 5.5.18, "Alternating Centrifugal Charging Pumps" will be revised to ensure the ALOP stops automatically upon CCP start and procedure MSM-P0-4703, "Centrifugal Charging Pump Speed Increaser Lube Oil Pump Coupling Inspection" will be revised to include best CCP maintenance practices including use of guide rods, checking for grease in bushing following first fit, and locating the driven hub flush with the end of the MLOP shaft. The MLOPs for CCP 1-01, CCP 1-02 and CCP 2-01 will be inspected to verify that the coupling hub pins are aligned with the inserts and that the MLOP coupling hubs are positioned near the end of the MLOP shafts. Maintenance personnel received just in time training regarding CCP MLOP maintenance prior to CCP 1-01 and 1-02 work during the 17th refueling outage on Unit 1.

VI. PREVIOUS SIMILAR EVENTS

There have been no previous similar reportable events at CPNPP in the last three years.