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CP-200800701
Log # TXX-08071

Ref. # 50.73(a)(2)(iv)(A)

May 12, 2008

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

SUBJECT: **COMANCHE PEAK STEAM ELECTRIC STATION**
DOCKET NO. 50-446
ACTUATION OF REACTOR PROTECTION SYSTEM
LICENSEE EVENT REPORT 446/08-001-00

REFERENCE:

Dear Sir or Madam:

Enclosed is Licensee Event Report (LER) 08-001-00 for Comanche Peak Steam Electric Station (herein referred to as Comanche Peak Nuclear Power Plant) Unit 2, "Reactor Trip Due to a Sheared Condenser Vacuum Instrument Sensing Line."

This communication contains no new licensing basis commitments regarding Comanche Peak Nuclear Power Plant (CPNPP) Unit 2.

IE22
NRR

Sincerely,

Luminant Generation Company LLC

Mike Blevins

By: Fred W. Madden

Fred W. Madden
Director, Oversight & Regulatory Affairs

Enclosure

c - E. E. Collins, Region IV
B. K. Singal, NRR
Resident Inspectors, Comanche Peak

Enclosure to TXX-08071

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

APPROVED BY OMB NO. 3150-0104 EXPIRES: 8/31/2010

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)

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COMANCHE PEAK NUCLEAR POWER PLANT UNIT 2	05000446	1 OF 4

4. TITLE
Reactor Trip Due to a Sheared Condenser Vacuum Instrument Sensing Line

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	DOCUMENT NUMBER
									N/A	05000
03	16	2008	2008	001	00	05	12	2008	FACILITY NAME N/A	DOCUMENT NUMBER 05000

9. OPERATING MODE
Mode 1

10. POWER LEVEL
100%

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

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

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (*Include Area Code*)
Tim Hope – Nuclear Licensing Manager	(254) 897-6370

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

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*)

On March 16, 2008, Comanche Peak Nuclear Power Plant (CPNPP) Unit 2 was in Mode 1 operating at 100% power. At 1137 hours, the Unit 2 Main Turbine tripped due to a sensed loss of condenser vacuum and the Main Turbine trip caused an automatic reactor trip. All control rods fully inserted, and all three Auxiliary Feedwater pumps started as expected as a result of the reactor trip. All systems responded normally during and following the reactor trip.

The cause of this event was a sheared common vacuum instrument sensing line to the Main Condenser 2B due to the sensing line being designed and installed without adequate flexibility. The failure was ultimately the result of a combination of residual stress induced by condenser movement and cyclic stress due to vibration. Immediate corrective actions included repair of the sheared vacuum instrument sensing line and modification of the supports on the Unit 1 and 2 sensing lines. The passive single point failure vulnerability was removed on Unit 2 during the tenth refueling outage and it will be removed on Unit 1 during the next refueling outage.

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

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

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

I. DESCRIPTION OF THE REPORTABLE EVENT

A. REPORTABLE EVENT CLASSIFICATION

10CFR50.73(a)(2)(iv)(A); "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B)."

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

On March 16, 2008, 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 March 16, 2008, CPNPP Unit 2 was in Mode 1 operating at 100% power. At 1123 hours, Operators (utility, licensed) in the Unit 2 control room received alarms that indicated Main Condenser B vacuum [EIIS: (SH)(COND)] was less than 24 inches on Channels 1, 2 and 3 and slowly trending down. By verifying alternate indications, the Operators found that condenser vacuum was actually stable at 28 inches. At 1137 hours, Operators received an automatic "low vacuum" trip on the Main Turbine [EIIS: (TA)(TRB)]. The turbine trip initiated an automatic reactor trip. All control rods fully inserted, and all three Auxiliary Feedwater pumps [EIIS: (BA)(P)] started as expected as a result of the reactor trip. All systems responded normally during and following the reactor trip.

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

Operators (utility, licensed) in the Unit 2 Control Room received alarms that indicated Main Condenser B vacuum was less than 24 inches on Channels 1, 2 and 3 and trending down.

II. COMPONENT OR SYSTEM FAILURES

A. FAILURE MODE, MECHANISM, AND EFFECT OF EACH FAILED COMPONENT

Not applicable – there were no component failures associated with this event.

B. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

Not applicable - there were no component failures associated with this event.

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

Not applicable - there were no component failures associated with this event.

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

D. FAILED COMPONENT INFORMATION

Not applicable - there were no component failures associated with this event.

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

Both Motor Driven Auxiliary Feedwater Pumps and the Turbine Driven Auxiliary Feedwater Pump started as expected as a result of the reactor trip.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

Not applicable – there was no safety system train inoperability that resulted from this event.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

This event is bounded by the CPNPP Final Safety Analysis Report (FSAR) accident analysis which assumes conservative initial conditions which bound the plant operating range and other assumptions which reduce the capability of safety systems to mitigate the consequences of the transient.

This event is bounded by the analysis of the turbine trip presented in Section 15.2.3 of the CPNPP FSAR. The analysis uses conservative assumptions to demonstrate the capability of pressure relieving devices and to demonstrate core protection margins. The event of March 16, 2008, occurred at 100 percent reactor power, and all systems and components functioned as designed.

Based on the above, it is concluded that the health and safety of the public were unaffected by this condition and this event has been evaluated to not meet the definition of a safety system functional failure per 10CFR50.73(a)(2)(v).

IV. CAUSE OF THE EVENT

The cause of this event was a sheared common vacuum instrument sensing line to the Main Condenser 2B due to the sensing line being designed and installed without adequate flexibility. The failure was ultimately the result of a combination of residual stress induced by condenser movement and cyclic stress due to vibration.

As a part of the Turbine Generator (TG) Protection System Reliability Digital Upgrade Project, the existing TG mechanical hydraulic control system was replaced with a new digital control system during the eleventh refueling outage on Unit 1 and the ninth refueling outage on Unit 2. A common vacuum source to each Main Condenser shell was installed to supply three transmitters with a 2/3 trip logic. This resulted in a passive single point failure vulnerability for a loss of the common sensing line. During this event, loss of the Main Condenser shell B common sensing line due to inadequate flexibility and high vibration caused all three transmitters to sense a low condenser vacuum, and this led to a low vacuum trip on the Main Turbine and an automatic reactor trip.

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

V. CORRECTIVE ACTIONS

Immediate corrective actions included repair of the sheared vacuum instrument sensing line and modification of the supports on the Unit 1 and 2 sensing lines to add flexibility to the lines. These support modifications reduced the bending moments, which in turn reduced the chronic stresses that led to the failure of the sensing line on March 16, 2008.

To reduce the probability of similar events occurring in the future, the passive single point failure vulnerability was addressed on Unit 2 during the tenth refueling outage by removing the common line and installing separate sensing lines to the transmitters. As a part of this modification, the condenser pipe segments were also modified to reduce vibration.

As a part of the CPNPP Corrective Action Program, a similar modification to remove the common line and install separate sensing lines will also be performed on the Unit 1 Main Condensers during the next refueling outage. Engineering will issue a lessons learned on this event and will also review other similar passive single point failure vulnerabilities in both units.

VI. PREVIOUS SIMILAR EVENTS

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