



Rafael Flores
Senior Vice President
& Chief Nuclear Officer
Rafael.flores@Luminant.com

Luminant Power
P O Box 1002
6322 North FM 56
Glen Rose, TX 76043

T 254 897 5550
C 817 559 0403
F 254 897 6652

CP- 201100762
Log # TXX-11069

Ref. # 10CFR50.73(a)(2)(i)(B)

June 27, 2011

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

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT
DOCKET NO. 50-446
LICENSEE EVENT REPORT 446/11-001-00, INOPERABILITY OF ECCS TRAINS DUE
TO GAS VOID

Dear Sir or Madam:

Enclosed is Licensee Event Report (LER) 446/11-001-00, "Inoperability of ECCS Trains Due to Gas Void," for Comanche Peak Nuclear Power Plant (CPNPP) Unit 2.

This letter contains no new regulatory commitments regarding CPNPP Units 1 and 2.

Should you have any questions concerning this submittal, please contact Mr. Tim Hope, Manager, Nuclear Licensing, at (254) 897-6370.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

By: 
Fred W. Madden
Director, Oversight & Regulatory Affairs

A member of the STARS (Strategic Teaming and Resource Sharing) Alliance

Callaway · Comanche Peak · Diablo Canyon · Palo Verde · San Onofre · South Texas Project · Wolf Creek

IE 22
NR 12

Enclosure

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

NRC FORM 366 (10-2010)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB: NO. 3150-0104 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 Section (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.	EXPIRES: 10/31/2013
<h2 style="margin: 0;">LICENSEE EVENT REPORT (LER)</h2> <p style="margin: 0;">(See reverse for required number of digits/characters for each block)</p>			

1. FACILITY NAME Comanche Peak Nuclear Power Plant Unit 2	2. DOCKET NUMBER <div style="display: flex; justify-content: space-around;"> 05000 446 </div>	3. PAGE <div style="display: flex; justify-content: space-around;"> 1 OF 4 </div>
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4. TITLE
 Inoperability of ECCS Trains Due to Gas Void

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
04	26	2011	2011	- 1 -	0	06	27	2011	FACILITY NAME	05000
									FACILITY NAME	05000

9. OPERATING MODE 2	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: <i>(Check all that apply)</i>			
10. POWER LEVEL 0	<input type="checkbox"/> 20.2201(b) <input type="checkbox"/> 20.2201(d) <input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(2)(i) <input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 20.2203(a)(2)(v) <input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 20.2203(a)(3)(i) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.36(c)(1)(i)(A) <input type="checkbox"/> 50.36(c)(1)(ii)(A) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.46(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(i)(A) <input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(i)(C) <input type="checkbox"/> 50.73(a)(2)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(ii)(B) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 50.73(a)(2)(iv)(A) <input type="checkbox"/> 50.73(a)(2)(v)(A) <input type="checkbox"/> 50.73(a)(2)(v)(B) <input type="checkbox"/> 50.73(a)(2)(v)(C) <input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/> 50.73(a)(2)(ix)(A) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/> 73.71(a)(4) <input type="checkbox"/> 73.71(a)(5) <input type="checkbox"/> OTHER <small>Specify in Abstract below or in NRC Form 366A</small>

12. LICENSEE CONTACT FOR THIS LER	
FACILITY NAME Timothy A. Hope, Nuclear Licensing Manager	TELEPHONE NUMBER <i>(Include Area Code)</i> (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 <input type="checkbox"/> YES <i>(If yes, complete 15. EXPECTED SUBMISSION DATE)</i> <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE <table style="width:100%; border-collapse: collapse;"> <tr> <th style="font-size: small;">MONTH</th> <th style="font-size: small;">DAY</th> <th style="font-size: small;">YEAR</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	MONTH	DAY	YEAR			
MONTH	DAY	YEAR					

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

On April 26, 2011, Comanche Peak Nuclear Power Plant (CPNPP) Unit 2 was in Mode 2 during a planned outage. At 0020, ultrasonic testing in support of Unit 2 Emergency Core Cooling System (ECCS) void verifications identified a void calculated to be approximately 3.71 ft3. Using conservative analytical methods at the time of discovery, the size and location of the void rendered both trains of the Containment Spray (CT), Safety Injection (SI), and Residual Heat Removal (RHR) systems inoperable requiring entry into Technical Specification 3.0.3. Limiting Condition for Operation Action Requirement (LCOAR) A2-11-231 was subsequently entered. The void was then vented via vent valve 2SI-8978 and the piping ultrasonically verified free of voids. LCOAR A2-11-231 was exited at 0143, April 26, 2011. The direct cause of this event was the introduction, transport, and accumulation of gases in the vicinity of 2SI-0047, resulting in a void of sufficient size that very conservative analytical methods used at the time of discovery determined the CT, SI, and RHR systems were rendered inoperable. Subsequent analysis of the event has shown that both trains of RHR and SI would have fulfilled their respective safety functions. However, the same analysis determined that one (1) train of containment spray would have been inoperable upon Unit 2 entry into Mode 4. Corrective actions include revision of the post-outage void verification program to require the conduct of preliminary void verifications at locations where potentially dual-train operability-affecting voids may form after entry into Mode 5 but prior to entry into Mode 4 and revision of STA-698 to include a requirement to periodically review fill and vent procedures to ensure all known gas intrusion mechanisms (e.g., pressure damming) are considered. In addition, vent valves 2SI-8978 and 1SI-0240 will be incorporated into the appropriate venting procedures. All times in this report are approximate and Central Daylight time unless otherwise noted.

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CONTINUATION SHEET**

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NARRATIVE

I. DESCRIPTION OF THE REPORTABLE EVENT

A. REPORTABLE EVENT CLASSIFICATION

Based on preliminary review of the event, the event was reported under the following criteria:

10CFR50.73(a)(2)(v) "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to: (B) Remove residual heat; or (D) Mitigate the consequences of an accident" and 10CFR50.73(a)(2)(vii) "Any event where a single cause or condition caused at least one independent train or channel to become inoperable in multiple systems or two independent trains or channels to become inoperable in a single system designed to: (B) Remove residual heat; or (D) Mitigate the consequences of an accident."

"Subsequent analysis of the event has shown that both trains of RHR and SI would have fulfilled their respective safety functions. However, the same analysis determined that one (1) train of containment spray would have been inoperable upon Unit 2 entry into Mode 4 contrary to Technical Specifications 3.3.6 and 3.0.4, thus this event is being reported under 10CFR50.73(a)(2)(i)(B) "Any operation or condition which was prohibited by the plant's Technical Specifications."

B. PLANT CONDITION PRIOR TO EVENT

On April 26, 2011, CPNPP Unit 2 was in Mode 2 during a planned outage.

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 inoperable structures, systems, or components that contributed to the event.

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

CPNPP Unit 2 was performing a reactor power ascension from refueling outage 2RF12. Unit 2 entered Mode 2 at 1538, April 25, 2011, and was critical at 1754. At 0020, April 26, 2011, during post-outage void verification inspections, a 3.71 ft3 void was discovered in the high point piping run containing Refueling Water Storage Tank Isolation Valve 2SI-0047 [EHS: (BQ)(TK)(ISV)] and vent valve 2SI-8978 [EHS: (BQ)(V)]. Unit 2 entered Limiting Condition for Operation Action Requirement (LCOAR) A2-11-231 for LCO 3.0.3, Two Trains of Containment Spray[EHS: (BE)], Safety Injection [EHS: BQ], and Residual Heat Removal [EHS: (BP)] Inoperable. The void was removed by aligning temporary tubing from 2SI-8978 to a drain and venting the system until a steady stream of water was observed flowing from 2SI-8978. Void elimination was then verified via ultrasonic inspection. LCOAR A2-11-231 was exited at 0143, April 26, 2011.

Prior to the April 2011 2RF12 refueling outage, various sections of piping were ultrasonically tested to verify the absence of gas voiding. The high point piping containing 2SI-0047 and 2SI-8978 was verified free of gas voids on March 31, 2011.

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Further analysis demonstrated that the declaration of inoperability was a conservative action, and RHR and SI would have fulfilled their respective safety functions and been operable. The analysis confirmed that one (1) train of containment spray was inoperable, however the containment spray safety function would have been fulfilled with the remaining operable CT train.

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

This condition was identified as a result of void verification inspections required by CPNPP procedure STA-698, "Gas Intrusion Program." The inspections are required to be conducted following the isolation of the Residual Heat Removal (RHR) system from the Reactor Coolant System (RCS).

II. COMPONENT OR SYSTEM FAILURES

A. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

Not applicable - No component failures were identified during this event.

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

Not applicable - No component failures were identified during this event.

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

Not applicable - No component failures were identified during this event.

D. FAILED COMPONENT INFORMATION

Not applicable - No component failures were identified during this event.

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

One (1) train of Containment Spray was inoperable upon Unit 2 entry into Mode 4 on April 24, 2011 at 0518 until the LCOAR was exited on April 26, 2011 at 0143.

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C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

The primary function of the ECCS is to remove the stored and fission product decay heat from the reactor core during accident conditions. The analysis methodology used to determine system operability in this event conservatively postulates that the entirety of the discovered void would enter the suction of a single pump, thereby preventing the pump from performing its designated safety function. Further analysis demonstrated that the declaration of inoperability was a conservative action, and RHR and SI would have fulfilled their respective safety functions and been operable. This analysis is based on detailed study of the void transport and piping design. The analysis confirmed that one (1) train of containment spray was inoperable, however the containment spray safety function would have been fulfilled with the remaining operable CT train. 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 direct cause of this event was the introduction, transport, and accumulation of gases in the vicinity of 2SI-0047, resulting in a void of sufficient size that very conservative analytical methods used at the time of discovery determined the Containment Spray, Safety Injection, and Residual Heat Removal systems were rendered inoperable. The gas void was the result of the RHR system fill and vent evolution and subsequent RHR operation that transmitted the void to its final location. Contributing to this event was the fact that vent valve 2SI-8978 (located in the section of piping where the void was discovered) was not included in applicable venting procedures. The cause of this event was the failure to identify a unique system configuration and the untimely identification and removal of a gas void that could have potentially rendered both trains of the Containment Spray, Safety Injection, and Residual Heat Removal systems inoperable.

V. CORRECTIVE ACTIONS

Immediate corrective action was the venting of the gas void and returning the ECCS systems to operability. After vent valve 2SI-8978 was discovered not to be in the applicable venting procedures, the Unit 1 vent valve counterparts were also reviewed. The review discovered Unit 1 vent valve 1SI-0240 was also not included in applicable venting procedures. Consequently, 2SI-8978 and 1SI-0240 will be incorporated into the appropriate venting procedures. Subsequent corrective actions include revision of the post-outage void verification program to require the conduct of preliminary void verifications at locations where potentially dual-train operability-affecting voids may form after entry into Mode 5 but prior to entry into Mode 4 and revision of STA-698 to include a requirement to periodically review fill and vent procedures to ensure all known gas intrusion mechanisms (e.g., pressure damming) are considered.