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Ref. # 10CFR50.73(a)(2)(v)(D)
10CFR50.73(a)(2)(vii)

January 30, 2013

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

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT (CPNPP)
DOCKET NO. 50-445 and 50-446
POTENTIAL FOR STEAM VOIDING CAUSING RESIDUAL HEAT REMOVAL SYSTEM INOPERABILITY
LICENSEE EVENT REPORT 445/11-001-01, SUPPLEMENT 1

Dear Sir or Madam:

Enclosed is Supplement 01 to Licensee Event Report (LER) 445/11-001-00, "Potential For Steam Voiding Causing Residual Heat Removal System Inoperability," for Comanche Peak Nuclear Power Plant (CPNPP) Units 1 and 2.

There are no regulatory commitments contained in this letter.

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

Fred W. Madden
Director, Oversight & Regulatory Affairs

Enclosure

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

IE22
NRR

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104 EXPIRES: 8/31/2010
LICENSEE EVENT REPORT (LER) (See reverse 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 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.

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Comanche Peak Nuclear Power Plant Unit 1	05000 445	1 OF 4

4. TITLE
Potential For Steam Voiding Causing Residual Heat Removal System Inoperability

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: CPNPP Unit 2	DOCUMENT NUMBER: 05000 446
03	22	2011	2011	001	01	05	18	2011	FACILITY NAME	DOCUMENT NUMBER: 05000

9. OPERATING 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*)
Timothy A. Hope, Manager, Nuclear Licensing	(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	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES (*If yes, complete 15. EXPECTED SUBMISSION DATE*) ☒ NO				

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

In November 2009, Westinghouse issued Nuclear Safety Advisory Letter (NSAL) 09-8,"Presence of Vapor in Emergency Core Cooling System/Residual Heat Removal System in Modes 3/4 Loss-of-Coolant Accident Conditions." This NSAL clarified the guidance provided in a previous document, and was issued to ensure consideration of the significantly reduced elevation head present when the residual heat removal (RH) system supply is transferred from the refueling water storage tank (RWST) to the emergency core cooling system (ECCS) recirculation sump.

An evaluation confirmed that the temperature limit currently applied at Comanche Peak to the RH system for alignment for shutdown cooling could result in flashing of liquids in the hot leg suction lines when the RH system suction is transferred to the RWST or the ECCS recirculation sump. The evaluation concluded that the RH temperature must be reduced to eliminate the potential for flashing of hot water within the isolated hot leg suction piping during transfer to the RWST or ECCS recirculation sump.

On March 22, 2010, a review identified three occurrences (one on Unit 1 and two on Unit 2) in the past three years where both RH trains were placed into operation prior to reaching Mode 5 («/= 200 degrees F). Further review identified one additional occurrence on Unit 1 during 1RF14 on 4/3/10. The cause of this event was the failure to recognize the RHR system limitations necessary to support all modes of RHR operation (shutdown cooling, ECCS injection, and ECCS recirculation) without adversely impacting each other and the consequent failure to take steps necessary to preclude voiding in the RHR system under all postulated system operating conditions. Corrective actions included revising station operating procedures to prohibit both RHR pumps from being aligned in the Shutdown Cooling Mode with RCS temperature ≥ 200°F.

There were no actual safety consequences impacting plant or public safety as a result of the event.

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

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)(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" and 10CFR50.73(a)(2)(vii)(D) "Any event where a single cause or condition caused two independent trains to become inoperable in a single system designed to mitigate the consequences of an accident".

B. PLANT CONDITION PRIOR TO EVENT

On March 22, 2011, CPNPP Unit 1 and Unit 2 were both 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 inoperable structures, systems, or components that contributed to the event.

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

On March 22, 2011, as a result of a review of Information Notice (IN) 2010-11 and NSAL-09-8, it was determined that, while it appeared that controls had been established to adequately address the new concerns presented under NSAL-09-8, the basis for the 250 degree F temperature limitation previously imposed by the procedures could not be readily ascertained. Therefore, an engineering evaluation was initiated to confirm the temperature limits previously implemented were acceptable, and to confirm the conclusion that the limits established in response to NSAL-93-004 appropriately addressed the NSAL-09-8 concerns. The engineering evaluation could not confirm that the 250 degree F limit currently applied to the RH [EIIS: (BP)] system for alignment for ECCS injection was sufficient to prevent flashing/voiding in RH system suction piping when aligned to the RWST [EIIS: (BE)(TK)] or to the ECCS recirculation sump but could result in flashing of liquids in the hot leg suction lines. This potential exists due to the elevation differences between the RH lines at the containment penetrations and the expected containment sump level combined with the postulated containment pressure at the established 250 degree F limit. The evaluation concluded that the RH system temperature must be reduced to 210 degrees F in order to eliminate the potential for flashing of hot water within the isolated hot leg suction piping during transfer to the RWST or the ECCS recirculation sump. This information affects the manner in which the RH system will be required to be operated in Mode 3 (>/= 350 degrees F) and Mode 4 (350 degrees F > T-average > 200 degrees F).

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

This condition was identified as a result of an engineering evaluation performed to confirm that temperature limits previously implemented in response to NSAL-93-004 were acceptable and appropriately addressed the concerns reported in IN-2010-11 and NSAL-09-8.

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

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

On March 29, 2011, a review of the past three years was performed to determine if CPNPP may have operated with both trains of RH shutdown cooling in service in Mode 4 (above 200 degrees F). Three occurrences were identified where both RH trains were placed into operation prior to reaching Mode 5 («/= 200 degrees F):

- Unit 2 refueling outage 2RF10 from 20:40 on 3/29/2008 to 00:05 on 3/30/2008 (approximately 3 hours and 17 minutes)
- Unit 1 refueling outage 1RF13 from 20:13 on 9/27/2008 to 21:50 on 9/27/2008 (approximately 1 hour and 37 minutes)
- Unit 2 refueling outage 2RF11 from 21:57 on 10/7/2009 to 01:42 on 10/8/2009 (approximately 3 hours and 45 minutes)

Further review of plant computer data has identified one additional occurrence of this event:

- Unit 1 refueling outage 1RF14 from 18:53 on 4/3/2010 to 22:02 on 4/3/2010 (approximately 3 hours and 9 minutes)

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

There were no actual safety consequences impacting plant or public safety as a result of this event. This issue addressed the potential for the development of steam voiding in the RH pump suction shutdown cooling piping of the RH system if the RH system had to be transitioned from shutdown cooling to the ECCS mode due to a LOCA occurring in Modes 3 or 4 at temperatures above 210 degrees F (Modes 3 and 4).

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

The potential exists for flashing/steam voiding of an RH system hot leg suction line if the RH system is aligned for ECCS injection or recirculation, following termination of shutdown cooling with an RH temperature that exceeds 210 degrees F, and the suction of the RH system is transferred to the RWST or the ECCS recirculation sump during a LOCA. Therefore, this is considered a safety system functional failure.

In the event that the RH system became inoperable, abnormal and emergency procedures exist that provide guidance to immediately secure any RH pumps aligned for shutdown cooling to prevent pump damage, to restore core cooling through alignment of a high head safety injection pump in injection mode, and restoration of the intermediate head safety injection pumps if necessary. Existing procedures also include steps to vent and refill the RH loops if necessary. In Modes 3 or 4, at least one charging pump is available and would be aligned to the RWST. Additionally, the steam generators would be available with auxiliary feedwater providing a heat sink to aid in decay heat removal.

When this issue was first identified by Westinghouse in NSAL-93-004, Westinghouse performed an Assessment of Safety Significance. Referencing prior work documented in WCAP-12476, "Evaluation of LOCA during Mode 3 and Mode 4 Operation for Westinghouse NSSS," which looked at the probabilities of a LOCA in Modes 3 or 4 and available guidance for actions to cope with a shutdown LOCA, Westinghouse concluded that this issue was not risk significant in regard to large LOCAs in Mode 3 and the relative risk was not much different whether or not flashing occurs in Mode 4. In the more recently issued NSAL-09-8, Westinghouse states that the conclusion of the previous safety significance assessments for this issue was based on the low risk of this event. This conclusion remains valid since no new information changes this condition. The consequences of RH system failure due to suction flashing in Modes 3 or 4 remained bounded by the core damage consequences of the Mode 1 LOCA events. This is because of the reduced pipe break probability due to the relatively low temperature and pressure that exists for the majority of time the plant is in these modes. It is also reflective of the time the plant is in these modes, which is very short relative to the time it is in Mode 1. Therefore, the risk significance of this event is considered to be low.

IV. CAUSE OF THE EVENT

The CPNPP organization failed to recognize the RH system limitations necessary to support all modes of RH operation (shutdown cooling, ECCS injection, and ECCS recirculation) without adversely impacting each other and consequently did not take steps necessary to preclude voiding in the RH system under all postulated system operating conditions.

V. CORRECTIVE ACTIONS

Station operating procedures were revised to prohibit both RH pumps from being aligned in the Shutdown Cooling Mode with RCS temperature ≥ 200°F. In addition, in accordance with the CPNPP Corrective Action Program, the RH system design basis document (DBD-ME-260) will be revised to address system limitations during cooldown.

VI. PREVIOUS SIMILAR EVENTS

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