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Ref. # 10CFR50.46

March 31, 2009

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

**SUBJECT:** COMANCHE PEAK STEAM ELECTRIC STATION  
DOCKET NOS. 50-445 AND 50-446  
ANNUAL REPORT OF CHANGES IN PEAK CLADDING TEMPERATURE

**REFERENCE:** Westinghouse Letter LTR-LIS-09-71, Dated February 2, 2009, Comanche Peak  
Units 1 and 2, 10CFR50.46 Annual Notification and Reporting for 2008

Dear Sir or Madam:

Pursuant to 10CFR50.46(a)(3)(ii), Luminant Generation Company LLC (Luminant Power) hereby submits the attached peak cladding temperatures (PCT) for Comanche Peak Steam Electric Station, herein referred to as Comanche Peak Nuclear Power Plant (CPNPP), Units 1 and 2. The Large-Break Loss-of-Coolant-Accident and Small-Break Loss-of-Coolant-Accident analysis for Units 1 and 2 were performed for Luminant Power with the approved Westinghouse methodologies listed in Technical Specification 5.6.5. It was determined that the PCT penalty for Unit 1 Cycle 14 is due to core design characteristics and does not represent a change or error in the Emergency Core Cooling System (ECCS) evaluation model since the most recent CPNPP analyses were approved by the NRC in License Amendment 145 on April 3 of 2008.

Luminant Power has reviewed the notification of 10CFR50.46 reporting information pertaining to the ECCS Evaluation Model changes that were implemented by Westinghouse for 2008 as described in the above Reference. The review concludes that the effect of changes to, or errors in, the Evaluation Models on the limiting transient PCT is not significant for 2008.

Therefore, the report of the ECCS Evaluation Model changes is provided on an annual basis. Attachment 1 provides an assessment of the specific changes and enhancements to the Westinghouse Evaluation Models for 2008. These model changes and enhancements do not have impacts on the PCT.

Attachment 2 provides the calculated Large Break Loss of Coolant Accident (LOCA) and Small Break LOCA PCT margin allocations in effect for the 2008 Comanche Peak Units 1 and 2 Evaluation Models. The PCT values determined in the Small Break and Large Break LOCA analysis of record, combined with all of the PCT allocations, remain well below the 10CFR50.46 regulatory limit of 2200 degrees Fahrenheit. Therefore, Comanche Peak Units 1 and 2 are in compliance with 10CFR50.46 requirements and no reanalysis or other action is required.

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

ADD1  
ADD2  
NRR

This communication contains no new licensing basis commitments regarding CPNPP Units 1 and 2.

Should you have any questions, please contact Mr. J. D. Seawright at (254) 897-0140.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

By: 

Fred W. Madden

Director, Oversight & Regulatory Affairs

- Attachments -
1. Assessment of Changes to the Westinghouse Emergency Core Cooling System (ECCS) Evaluation Models for Large and Small Break Loss of Coolant Accidents (LOCA)
  2. Emergency Core Cooling System (ECCS) Evaluation Model Peak Cladding Temperature (PCT) Margin Utilization

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

**ASSESSMENT OF CHANGES TO THE WESTINGHOUSE EMERGENCY CORE COOLING SYSTEM (ECCS) EVALUATION MODELS FOR LARGE AND SMALL BREAK LOSS OF COOLANT ACCIDENTS (LOCA)**

**NON-DISCRETIONARY CHANGES WITH PEAK CLADDING TEMPERATURE (PCT) IMPACT**

None

**NON-DISCRETIONARY CHANGES WITH NO PCT IMPACT**

Errors in Reactor Vessel Lower Plenum Surface Area Calculations (BASH / NOTRUMP)

Discrepancy in Metal Masses Used from Drawings (BASH / NOTRUMP)

HOTSPOT Burst Temperature Logic Errors (ASTRUM / Large Break LOCA Model)

CCFL Global Volume Error (ASTRUM / Large Break LOCA Model)

**DISCRETIONARY CHANGES WITH NO PCT IMPACT**

General Code Maintenance (BASH / NOTRUMP)

General Code Maintenance (ASTRUM / Large Break LOCA Model)

## **ERRORS IN REACTOR VESSEL LOWER PLENUM SURFACE AREA CALCULATIONS (Non-Discretionary Change)**

### **Background**

Two errors were discovered in the calculations of reactor vessel lower plenum surface area. The corrected values have been evaluated for impact on current licensing-basis analysis results and will be incorporated on a forward-fit basis. These changes represent a closely-related group of Non-Discretionary Changes in accordance with Section 4.1.2 of WCAP-13451.

### **Affected Evaluation Model(s)**

1981 Westinghouse Large Break LOCA Evaluation Model with BASH  
1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP

### **Estimated Effect**

The differences in vessel lower plenum surface area are relatively minor and would be expected to produce a negligible effect on large and small break LOCA analysis results, leading to an estimated PCT impact of 0°F for 10 CFR 50.46 reporting purposes.

## **DISCREPANCY IN METAL MASSES USED FROM DRAWINGS (Non-Discretionary Change)**

### **Background**

Discrepancies were discovered in the use of metal masses from drawings. The updated reactor vessel metal masses and fluid volumes have been evaluated for impact on current licensing-basis analysis results and will be incorporated on a forward-fit basis. These changes represent a closely-related group of Non-Discretionary Changes in accordance with Section 4.1.2 of WCAP-13451.

### **Affected Evaluation Model(s)**

1981 Westinghouse Large Break LOCA Evaluation Model with BASH  
1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP

### **Estimated Effect**

The differences in the reactor vessel metal mass and fluid volume are relatively minor and would be expected to produce a negligible effect on large and small break LOCA analysis results, leading to an estimated PCT impact of 0°F for 10 CFR 50.46 reporting purposes.

**GENERAL CODE MAINTENANCE  
(Discretionary Change)**

**Background**

Various changes have been made to enhance the usability of the codes and to help preclude errors in analyses. This includes items such as modifying input variable definitions, units, and defaults; improving the input diagnostic checks; enhancing the code output; optimizing active coding; and, eliminating inactive coding. These changes represent Discretionary Changes that will be implemented on a forward fit basis in accordance with Section 4.1.1 of WCAP-13451.

**Affected Evaluation Model(s)**

1981 Westinghouse Large Break LOCA Evaluation Model with BASH  
1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP

**Estimated Effect**

The nature of these changes leads to an estimated PCT impact of 0°F.

**GENERAL CODE MAINTENANCE  
(Discretionary Change)**

**Background**

A number of coding changes were made as part of normal code maintenance. Examples include additional information in code outputs, improved automation and diagnostics in the codes, increased code dimensions, and general code cleanup. All of these changes are considered to be Discretionary changes in accordance with Section 4.1.1 of WCAP-13451.

**Affected Evaluation Model(s)**

1996 Westinghouse Best Estimate Large Break LOCA Evaluation Model  
1999 Westinghouse Best Estimate Large Break LOCA Evaluation Model, Application to PWRs with Upper Plenum Injection  
2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

**Estimated Effect**

The nature of these changes leads to an estimated PCT impact of 0°F for 10 CFR 50.46 reporting purposes.

## **HOTSPOT BURST TEMPERATURE LOGIC ERRORS (Non-Discretionary Change)**

### **Background**

The HOTSPOT code has been updated to incorporate the following corrections to the burst temperature logic: (1) change the rod internal pressure used to calculate the cladding engineering hoop stress from the value in the previous time step to the value in the current time step; (2) revise the average cladding heatup rate calculation to reset selected variables to zero at the beginning of each trial and use the instantaneous heat-up rate when fewer than five values are available; and, (3) reflect the assumed saturation of ramp rate effects above 28°C/s for Zircaloy-4 cladding from Equation 7-66 of Reference 1. These changes represent a closely-related group of Non-Discretionary Changes in accordance with Section 4.1.2 of WCAP-13451.

### **Affected Evaluation Model(s)**

1996 Westinghouse Best Estimate Large Break LOCA Evaluation Model  
1999 Westinghouse Best Estimate Large Break LOCA Evaluation Model, Application to PWRs with Upper Plenum Injection  
2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

### **Estimated Effect**

Sample calculations for each change showed no effect on peak cladding temperature, leading to an estimated impact of 0°F for 10 CFR 50.46 reporting purposes.

### **Reference(s)**

1. WCAP-12945-P-A, Volume 1 (Revision 2) and Volumes 2-5 (Revision 1), "Code Qualification Document for Best Estimate LOCA Analysis," S. M. Bajorek et al., March 1998.

## **CCFL GLOBAL VOLUME ERROR (Non-Discretionary Change)**

### **Background**

An error was identified during the course of a recent Best Estimate Large Break LOCA analysis in which the volume between the core barrel and the baffle plates in the CCFL region above the active fuel length was modeled incorrectly. The corrected values have been evaluated for impact on the current licensing basis analysis results. This error represents a non-discretionary change in accordance with Section 4.1.2 of WCAP-13451.

### **Affected Evaluation Model(s)**

1996 Westinghouse Best Estimate Large Break LOCA Evaluation Model  
2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

### **Estimated Effect**

The CCFL global volume modeling error has been generically evaluated to have a negligible impact on PCT for affected analyses and a penalty of 0 °F is assigned.

**EMERGENCY CORE COOLING SYSTEM (ECCS) EVALUATION MODEL PEAK CLADDING  
TEMPERATURE (PCT) MARGIN UTILIZATION**

**Westinghouse LOCA Peak Clad Temperature Summary for ASTRUM Best Estimate Large Break**

**Plant Name:** Comanche Peak Unit 1  
**Utility Name:** Luminant  
**Revision Date:** 1/27/09

**Analysis Information**

**EM:** ASTRUM (2004)      **Analysis Date:** 7/27/07      **Limiting Break Size:** Guillotine  
**FQ:** 2.5      **FdH:** 1.6  
**Fuel:** OFA      **SGTP(%):** 10  
**Notes:**

	Clad Temp(°F)	Ref.	Notes
<b>LICENSIS BASIS</b>			
<b>Analysis-Of-Record PCT</b>	1492	1	
<b>PCT Assessments (Delta PCT)</b>			
<b>A. PRIOR ECCS MODEL ASSESSMENTS</b>			
1. None	0		
<b>B. PLANNED PLANT MODIFICATION EVALUATIONS</b>			
1. Reconstituted Fuel Evaluation for Cycle 14	0	2	
2. PBOT & PMID Evaluation for Cycle 14	32	2	
<b>C. 2008 ECCS MODEL ASSESSMENTS</b>			
1. None	0		
<b>D. OTHER</b>			
1. Transition Core Evaluation	0	2	a
<b>LICENSING BASIS PCT + PCT ASSESSMENTS</b>	PCT = 1524		

**References:**

1. WCAP-16762-P, "Best-Estimate Analysis of the Large-Break Loss-of-Coolant Accident for Comanche Peak Unit 1 Nuclear Plant Using the ASTRUM Methodology," July 2007.
2. LTR-LIS-08-649, "Transmittal of Updated Comanche Peak PCT Summary Sheets," September 2008.

**Notes:**

- (a) Transition core will be in effect during the transition cycles. Once a full core of 17x17 OFA(V5) with IFMs is loaded, then the assessment would be no longer applicable.

**EMERGENCY CORE COOLING SYSTEM (ECCS) EVALUATION MODEL PEAK CLADDING  
TEMPERATURE (PCT) MARGIN/UTILIZATION**

**Westinghouse LOCA Peak Clad Temperature Summary for Appendix K Small Break**

**Plant Name:** Comanche Peak Unit 1  
**Utility Name:** Luminant  
**Revision Date:** 1/27/09

**Analysis Information**

<b>EM:</b> NOTRUMP	<b>Analysis Date:</b> 6/8/07	<b>Limiting Break Size:</b> 4 inch
<b>FQ:</b> 2.5	<b>FdH:</b> 1.6	
<b>Fuel:</b> OFA	<b>SGTP(%):</b> 10	
<b>Notes:</b>		

	Clad Temp(°F)	Ref.	Notes
<b>LICENSIS BASIS</b>			
<b>Analysis-Of-Record PCT</b>	1013	1	
<b>PCT Assessments (Delta PCT)</b>			
<b>A. PRIOR ECCS MODEL ASSESSMENTS</b>			
1. None	0		
<b>B. PLANNED PLANT MODIFICATION EVALUATIONS</b>			
1. Reconstituted Fuel Evaluation for Cycle 14	0	2	
<b>C. 2008 ECCS MODEL ASSESSMENTS</b>			
1. None	0		
<b>D. OTHER</b>			
1. None	0		
<b>LICENSING BASIS PCT + PCT ASSESSMENTS</b>	PCT = 1013		

**References:**

1. WCAP-16840-P, "Comanche Peak Nuclear Power Plant Stretch Power Uprate Licensing Report," August 2007. (Results are included in TXX-07107, "Comanche Peak Steam Electric Station (CPSES), Docket Nos. 50-445 and 50-446, Submittal of the CPSES Units 1 and 2 Large and Small Break LOCA Analyses," July 31, 2007.)
2. LTR-LIS-08-649, "Transmittal of Updated Comanche Peak PCT Summary Sheets," September 2008.

**Notes:**  
None

**EMERGENCY CORE COOLING SYSTEM (ECCS) EVALUATION MODEL PEAK CLADDING  
TEMPERATURE (PCT) MARGIN UTILIZATION**

**Westinghouse LOCA Peak Clad Temperature Summary for ASTRUM Best Estimate Large Break**

**Plant Name:** Comanche Peak Unit 2  
**Utility Name:** Luminant  
**Revision Date:** 1/27/09

**Analysis Information**

<b>EM:</b> ASTRUM (2004)	<b>Analysis Date:</b> 7/27/07	<b>Limiting Break Size:</b> Guillotine
<b>FQ:</b> 2.5	<b>FdH:</b> 1.6	
<b>Fuel:</b> OFA	<b>SGTP(%):</b> 10	
<b>Notes:</b>		

	Clad Temp( <sup>o</sup> F)	Ref.	Notes
<b>LICENSIS BASIS</b>			
<b>Analysis-Of-Record PCT</b>	1632	1	
<b>PCT Assessments (Delta PCT)</b>			
<b>A. PRIOR ECCS MODEL ASSESSMENTS</b>			
1. None	0		
<b>B. PLANNED PLANT MODIFICATION EVALUATIONS</b>			
1. Reconstituted Fuel Evaluation for Cycle 11	0	2	
2. PBOT & PMID Evaluation for Cycle 11	0	2	
<b>C. 2008 ECCS MODEL ASSESSMENTS</b>			
1. None	0		
<b>D. OTHER</b>			
1. Transition Core Evaluation	0	2	a
<b>LICENSING BASIS PCT + PCT ASSESSMENTS</b>	PCT = 1632		

**References:**

1. WCAP-16763-P, "Best-Estimate Analysis of the Large-Break Loss-of-Coolant Accident for Comanche Peak Unit 2 Nuclear Plant Using the ASTRUM Methodology," July 2007.
2. LTR-LIS-08-191, "Comanche Peak Unit 2 (TCX) Cycle 11 LOCA Reload Evaluation," March 2008.

**Notes:**

- (a) Transition core will be in effect during the transition cycles. Once a full core of 17x17 OFA (V5) with IFMs is loaded, then the assessment would be no longer applicable.

**EMERGENCY CORE COOLING SYSTEM (ECCS) EVALUATION MODEL PEAK CLADDING  
TEMPERATURE (PCT) MARGIN UTILIZATION**

**Westinghouse LOCA Peak Clad Temperature Summary for Appendix K Small Break**

**Plant Name:** Comanche Peak Unit 2  
**Utility Name:** Luminant  
**Revision Date:** 1/27/09

**Analysis Information**

<b>EM:</b> NOTRUMP	<b>Analysis Date:</b> 6/8/07	<b>Limiting Break Size:</b> 4 inch
<b>FQ:</b> 2.5	<b>FdH:</b> 1.6	
<b>Fuel:</b> OFA	<b>SGTP(%):</b> 10	
<b>Notes:</b>		

	Clad Temp( <sup>o</sup> F)	Ref.	Notes
<b>LICENSIS BASIS</b>			
<b>Analysis-Of-Record PCT</b>	1210	1	
<b>PCT Assessments (Delta PCT)</b>			
<b>A. PRIOR ECCS MODEL ASSESSMENTS</b>			
1. None	0		
<b>B. PLANNED PLANT MODIFICATION EVALUATIONS</b>			
1. Reconstituted Fuel Evaluation for Cycle 11	0	2	
<b>C. 2008 ECCS MODEL ASSESSMENTS</b>			
1. None	0		
<b>D. OTHER</b>			
1. None	0		
<b>LICENSING BASIS PCT + PCT ASSESSMENTS</b>	PCT = 1210		

**References:**

1. WCAP-16840-P, "Comanche Peak Nuclear Power Plant Stretch Power Uprate Licensing Report," August 2007. (Results are included in TXX-07107, "Comanche Peak Steam Electric Station (CPSES), Docket Nos. 50-445 and 50-446, Submittal of the CPSES Units 1 and 2 Large and Small Break LOCA Analyses," July 31, 2007.)
2. LTR-LIS-08-191, "Comanche Peak Unit 2 (TCX) Cycle 11 LOCA Reload Evaluation," March 2008.

**Notes:**  
None