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TXX-16037

Ref. # 10CFR50.46

March 31, 2016

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

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT (CPNPP)
DOCKET NOS. 50-445 AND 50-446
ANNUAL REPORT OF CHANGES IN PEAK CLADDING TEMPERATURE

- REF:**
1. Letter logged TXX-12146, dated October 18, 2012, from Rafael Flores of Luminant Power to the NRC regarding "30-Day Report for Significant Change in Peak Clad Temperature"
 2. Letter logged TXX-14058, dated April 22, 2014, from Rafael Flores of Luminant Power to the NRC regarding "30-Day Report for Significant Change in Peak Clad Temperature"

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 Nuclear Power Plant (CPNPP), Units 1 and 2. The Large-Break Loss-of-Coolant-Accident (LBLOCA) and Small-Break Loss-of-Coolant Accident (SBLOCA) analyses for Units 1 and 2 were performed for Luminant Power with the approved Westinghouse methodologies listed in Technical Specification 5.6.5. Per Reference 1, Luminant Power previously submitted information regarding fuel pellet thermal conductivity with fuel burnup in the Westinghouse Best Estimate LBLOCA analysis methodology for CPNPP Units 1 and 2. Also, per Reference 2, Luminant Power submitted information regarding an evaluation of revised Heat Transfer Multiplier Distributions, changes to Grid Blockage Ratio and Porosity, and application of a corrected Burst Strain in the Westinghouse Best Estimate LBLOCA analysis methodology for CPNPP Unit 2 and its effect on Peak Cladding Temperature (PCT).

Luminant Power has reviewed the notification of 10CFR50.46 reporting information pertaining to the Emergency Core Cooling System (ECCS) Evaluation Model changes that were implemented by Westinghouse for 2015. The review concludes that the effect of additional changes to, or errors in, the Evaluation Models on the limiting transient PCT were not significant for 2015.

This report of the ECCS Evaluation Model changes provides an update on an annual basis. Attachment 1 provides an assessment of the specific changes and enhancements to the Westinghouse Evaluation Models for 2015.

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Attachment 2 provides the calculated LBLOCA and SBLOCA PCT margin allocations in effect for the 2015 Comanche Peak Units 1 and 2 Evaluation Models. There were no changes, error corrections, or enhancements to the 1985 Westinghouse Small Break Loss-of-Coolant Accident Evaluation Model with NOTRUMP. The PCT values determined in the LBLOCA analysis of record, combined with all of the PCT allocations, remain well below the 10CFR50.46 regulatory limit of 2200 degrees Fahrenheit. Therefore, CPNPP Units 1 and 2 are in compliance with 10CFR50.46 requirements and no other action is required.

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


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

Sincerely,

Luminant Generation Company LLC

Kenneth J. Peters

By:



Timothy A. Hope
Manager, Regulatory Affairs

- Attachments - 1. Assessment of Specific Changes and Enhancements to the
Westinghouse Evaluation Models for 2015
2. CPNPP Units 1 and 2 Peak Cladding Temperatures

c - Marc L. Dapas, Region IV
Margaret M. Watford, NRR
Resident Inspectors, Comanche Peak

Assessment of Specific Changes and Enhancements to the Westinghouse Evaluation Models for 2015

LOWER SUPPORT PLATE, CORE BARREL, AND VESSEL WALL UNHEATED CONDUCTOR ERRORS

Background

Modeling errors were discovered in the lower support plate, core barrel, and vessel cladding unheated conductors in the Best-Estimate Large Break Loss-of-Coolant Accident (BE LBLOCA) analysis-of-record. The modeling errors impacted the volume and surface area of the core barrel, the surface area and thermal resistance of the lower support plate, and the thermal resistance of the vessel wall.

The resolution of these issues represents a closely-related group of Non-Discretionary Changes in the application of the Evaluation Model as described in 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

A qualitative evaluation was completed concluding that the modeled net stored energy and heat transfer rate of the vessel wall, core barrel, and lower support plate unheated conductors were adequate. This error is estimated to have a Peak Cladding Temperature (PCT) impact of 0°F.

Assessment of Specific Changes and Enhancements to the Westinghouse Evaluation Models for 2015

CORE CHANNEL GAP ERROR

Background

A modeling error was discovered in the Best-Estimate Large Break Loss-of-Coolant Accident (BE LBLOCA) analysis-of-record. The modeling error over-represented the flow area between the guide tube and non-guide tube core average channels.

The resolution of this issue represents a Non-Discretionary Change in the application of the Evaluation Model as described in 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

A qualitative evaluation was completed concluding the magnitude of the error is negligible. The error is estimated to have a Peak Cladding Temperature (PCT) impact of 0°F.

Assessment of Specific Changes and Enhancements to the Westinghouse Evaluation Models for 2015

GENERAL CODE MAINTENANCE

Background

Various changes have been made to enhance the usability of codes and to streamline future analyses. Examples of these changes include 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)

1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP

Estimated Effect

The nature of these changes leads to an estimated Peak Cladding Temperature (PCT) impact of 0°F.

Assessment of Specific Changes and Enhancements to the Westinghouse Evaluation Models for 2015

COMANCHE PEAK UNIT 2 EVALUATION OF LEAKING SPLIT FLOW BYPASS VALVES

Background

Comanche Peak Unit 2 identified that the split flow bypass valve (SFBV) was leaking which results in some portion of the auxiliary feedwater (AFW) flow being delivered to the steam generator via the main feedwater (lower) nozzle instead of the AFW (upper) nozzle. This scenario was evaluated against the Comanche Peak small-break loss-of-coolant accident (SBLOCA) analysis of record. The scenario is characterized as a change in a plant configuration, distinguished from an evaluation model change in Section 4 of WCAP-13451.

Affected Evaluation Model(s)

1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP

Estimated Effect

A qualitative evaluation was performed and concluded that this scenario will not challenge the heat removal capability of the steam generators during a SBLOCA transient. As such, this change has a negligible impact on the SBLOCA transient results, leading to an estimated peak cladding temperature (PCT) impact of 0°F.

CPNPP Units 1 and 2 Peak Cladding Temperatures

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

Plant Name: Comanche Peak Unit 1
Utility Name: Luminant
Revision Date: 2/1/2016

Analysis Information

EM:	ASTRUM (2004)	Analysis Date:	7/27/2007	Limiting Break Size:	Guillotine
FQ:	2.5	FdH:	1.6		
Fuel:	OFA	SGTP (%):	10		
Notes:					

	Clad Temp (°F)	Ref.	Notes
LICENSIS BASIS			
Analysis-Of-Record PCT	1492	1	
PCT Assessments (Delta PCT)			
A. PRIOR ECCS MODEL ASSESSMENTS			
1. Evaluation of Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown	122	2	(a)
2. Revised Heat Transfer Multiplier Distributions	-6	3	
3. Error in Burst Strain Application	21	4	
B. PLANNED PLANT MODIFICATION EVALUATIONS			
1. None	0		
C. 2015 ECCS MODEL ASSESSMENTS			
1. None	0		
D. OTHER			
1. None	0		
LICENSING BASIS PCT + PCT ASSESSMENTS	PCT = 1629		

References:

1. WCAP-16762-P, Revision 1, "Best-Estimate Analysis of the Large-Break Loss-of-Coolant Accident for the Comanche Peak Nuclear Power Plant Unit 1 Using the ASTRUM Methodology," March 2009.
2. LTR-LIS-12-410, "Comanche Peak Units 1 and 2, 10 CFR 50.46 Notification and Reporting for Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown," September 20, 2012.
3. LTR-LIS-13-359, "Comanche Peak Units 1 and 2 10CFR50.46 Report for Revised Heat Transfer Multiplier Distributions," July 2013.
4. LTR-LIS-14-43, "Comanche Peak Units 1 and 2 10CFR50.46 Report for the HOTSPOT Burst Strain Error Correction," January 2014.

Notes:

- (a) This evaluation credits peaking factor burndown, see Reference 2.

CPNPP Units 1 and 2 Peak Cladding Temperatures

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

Plant Name: Comanche Peak Unit 1
Utility Name: Luminant
Revision Date: 2/1/2016

Cycle 18

Analysis Information

EM: ASTRUM (2004)	Analysis Date: 7/27/2007	Limiting Break Size: Guillotine
FQ: 2.5	FdH: 1.6	
Fuel: OFA	SGTP (%): 10	
Notes:		

	Clad Temp (°F)	Ref.	Notes
LICENSIS BASIS			
Analysis-Of-Record PCT	1492	1	
PCT Assessments (Delta PCT)			
A. PRIOR ECCS MODEL ASSESSMENTS			
1. Evaluation of Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown	122	3	(a)
2. Revised Heat Transfer Multiplier Distributions	-6	4	
3. Error in Burst Strain Application	21	5	
B. PLANNED PLANT MODIFICATION EVALUATIONS			
1. PBOT/PMID Violation	0	2	
C. 2015 ECCS MODEL ASSESSMENTS			
1. None	0		
D. OTHER			
1. None	0		
LICENSING BASIS PCT + PCT ASSESSMENTS	PCT = 1629		

References:

1. WCAP-16762-P, Revision 1, "Best-Estimate Analysis of the Large-Break Loss-of-Coolant Accident for the Comanche Peak Nuclear Power Plant Unit 1 Using the ASTRUM Methodology," March 2009.
2. LTR-LIS-14-414, "LBLOCA PCT Rackup Sheet Update for the Evaluation of the Comanche Peak Unit 1 Cycle 18 PBOT/PMID Violations," September 2014.
3. LTR-LIS-12-410, "Comanche Peak Units 1 and 2, 10 CFR 50.46 Notification and Reporting for Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown," September 20, 2012.
4. LTR-LIS-13-359, "Comanche Peak Units 1 and 2 10CFR50.46 Report for Revised Heat Transfer Multiplier Distributions," July 2013.
5. LTR-LIS-14-43, "Comanche Peak Units 1 and 2 10CFR50.46 Report for the HOTSPOT Burst Strain Error Correction," January 2014.

Notes:

- (a) This evaluation credits peaking factor burndown, see Reference 3.

CPNPP Units 1 and 2 Peak Cladding Temperatures

Westinghouse LOCA Peak Clad Temperature Summary for Appendix K Small Break

Plant Name: Comanche Peak Unit 1
Utility Name: Luminant
Revision Date: 2/1/2016

Analysis Information

EM: NOTRUMP	Analysis Date: 6/8/2007	Limiting Break Size: 4 inch
FQ: 2.5	FdH: 1.6	
Fuel: OFA	SGTP (%): 10	
Notes:		

	Clad Temp (°F)	Ref.	Notes
LICENSIS BASIS			
Analysis-Of-Record PCT	1013	1	
PCT Assessments (Delta PCT)			
A. PRIOR ECCS MODEL ASSESSMENTS			
1. None	0		
B. PLANNED PLANT MODIFICATION EVALUATIONS			
1. None	0		
C. 2015 ECCS MODEL ASSESSMENTS			
1. None	0		
D. OTHER			
1. None	0		
LICENSING BASIS PCT + PCT ASSESSMENTS	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.)

Notes:

None

CPNPP Units 1 and 2 Peak Cladding Temperatures

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

Plant Name: Comanche Peak Unit 2
Utility Name: Luminant
Revision Date: 2/1/2016

Analysis Information

EM: ASTRUM (2004)	Analysis Date: 7/27/2007	Limiting Break Size: Guillotine
FQ: 2.5	FdH: 1.6	
Fuel: OFA	SGTP (%): 10	
Notes:		

	Clad Temp (^o F)	Ref.	Notes
LICENSIS BASIS			
Analysis-Of-Record PCT	1632	1	
PCT Assessments (Delta PCT)			
A. PRIOR ECCS MODEL ASSESSMENTS			
1. Evaluation of Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown	190	2	(a)
2. Revised Heat Transfer Multiplier Distributions	-17	3	
3. Changes to Grid Blockage Ratio and Porosity	24	4	
4. Error in Burst Strain Application	21	5	
B. PLANNED PLANT MODIFICATION EVALUATIONS			
1. None	0		
C. 2015 ECCS MODEL ASSESSMENTS			
1. None	0		
D. OTHER			
1. None	0		
LICENSING BASIS PCT + PCT ASSESSMENTS	PCT = 1850		

References:

1. WCAP-16763-P, Revision 1, "Best-Estimate Analysis of the Large-Break Loss-of-Coolant Accident for the Comanche Peak Nuclear Power Plant Unit 2 Using the ASTRUM Methodology," March 2009.
2. LTR-LIS-12-410, "Comanche Peak Units 1 and 2, 10 CFR 50.46 Notification and Reporting for Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown," September 20, 2012.
3. LTR-LIS-13-359, "Comanche Peak Units 1 and 2 10CFR50.46 Report for Revised Heat Transfer Multiplier Distributions," July 2013.
4. LTR-LIS-13-472, "Comanche Peak Units 1 and 2 10CFR50.46 Reports for Changes to Grid Blockage Ratio and Porosity," October 2013.
5. LTR-LIS-14-43, "Comanche Peak Units 1 and 2 10CFR50.46 Report for the HOTSPOT Burst Strain Error Correction," January 2014.

Notes:

- (a) This evaluation credits peaking factor burndown, see Reference 2.

CPNPP Units 1 and 2 Peak Cladding Temperatures

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

Plant Name: Comanche Peak Unit 2
Utility Name: Luminant
Revision Date: 2/1/2016

Cycle 16

Analysis Information

EM: ASTRUM (2004)	Analysis Date: 7/27/2007	Limiting Break Size: Guillotine
FQ: 2.5	FdH: 1.6	
Fuel: OFA	SGTP (%): 10	
Notes:		

	Clad Temp (°F)	Ref.	Notes
LICENSIS BASIS			
Analysis-Of-Record PCT	1632	1	
PCT Assessments (Delta PCT)			
A. PRIOR ECCS MODEL ASSESSMENTS			
1. Evaluation of Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown	190	3	(a)
2. Revised Heat Transfer Multiplier Distributions	-17	4	
3. Changes to Grid Blockage Ratio and Porosity	24	5	
4. Error in Burst Strain Application	21	6	
B. PLANNED PLANT MODIFICATION EVALUATIONS			
1. PBOT/PMID Evaluation	0	2	
C. 2015 ECCS MODEL ASSESSMENTS			
1. None	0		
D. OTHER			
1. None	0		
LICENSING BASIS PCT + PCT ASSESSMENTS	PCT = 1850		

References:

1. WCAP-16763-P, Revision 1, "Best-Estimate Analysis of the Large-Break Loss-of-Coolant Accident for the Comanche Peak Nuclear Power Plant Unit 2 Using the ASTRUM Methodology," March 2009.
2. LTR-LIS-15-317, "LBLOCA PCT Rackup Sheet Update for the Evaluation of the Comanche Peak Unit 2 Cycle 16 PBOT/PMID Violations" September 2015.
3. LTR-LIS-12-410, "Comanche Peak Units 1 and 2, 10 CFR 50.46 Notification and Reporting for Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown," September 20, 2012.
4. LTR-LIS-13-359, "Comanche Peak Units 1 and 2 10CFR50.46 Report for Revised Heat Transfer Multiplier Distributions," July 2013.
5. LTR-LIS-13-472, "Comanche Peak Units 1 and 2 10CFR50.46 Reports for Changes to Grid Blockage Ratio and Porosity," October 2013.
6. LTR-LIS-14-43, "Comanche Peak Units 1 and 2 10CFR50.46 Report for the HOTSPOT Burst Strain Error Correction," January 2014.

Notes:

- (a) This evaluation credits peaking factor burndown, see Reference 3.

CPNPP Units 1 and 2 Peak Cladding Temperatures

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

Plant Name: Comanche Peak Unit 2
Utility Name: Luminant
Revision Date: 2/1/2016

Cycle 15 Retired

Analysis Information

EM: ASTRUM (2004)	Analysis Date: 7/27/2007	Limiting Break Size: Guillotine
FQ: 2.5	FdH: 1.6	
Fuel: OFA	SGTP (%): 10	
Notes:		

	Clad Temp (°F)	Ref.	Notes
LICENSIS BASIS			
Analysis-Of-Record PCT	1632	1	
PCT Assessments (Delta PCT)			
A. PRIOR ECCS MODEL ASSESSMENTS			
1. Evaluation of Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown	190	3	(a)
2. Revised Heat Transfer Multiplier Distributions	-17	4	
3. Changes to Grid Blockage Ratio and Porosity	24	5	
4. Error in Burst Strain Application	21	6	
B. PLANNED PLANT MODIFICATION EVALUATIONS			
1. PBOT/PMID Evaluation	0	2	
C. 2015 ECCS MODEL ASSESSMENTS			
1. None	0		
D. OTHER			
1. None	0		
LICENSING BASIS PCT + PCT ASSESSMENTS	PCT = 1850		

References:

1. WCAP-16763-P, Revision 1, "Best-Estimate Analysis of the Large-Break Loss-of-Coolant Accident for the Comanche Peak Nuclear Power Plant Unit 2 Using the ASTRUM Methodology," March 2009.
2. LTR-LIS-14-173, "LBLOCA PCT Rackup Sheet Update for the Evaluation of the Comanche Peak Unit 2 Cycle 15 PBOT/PMID Violations" March 2014.
3. LTR-LIS-12-410, "Comanche Peak Units 1 and 2, 10 CFR 50.46 Notification and Reporting for Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown," September 20, 2012.
4. LTR-LIS-13-359, "Comanche Peak Units 1 and 2 10CFR50.46 Report for Revised Heat Transfer Multiplier Distributions," July 2013.
5. LTR-LIS-13-472, "Comanche Peak Units 1 and 2 10CFR50.46 Reports for Changes to Grid Blockage Ratio and Porosity," October 2013.
6. LTR-LIS-14-43, "Comanche Peak Units 1 and 2 10CFR50.46 Report for the HOTSPOT Burst Strain Error Correction," January 2014.

Notes:

- (b) This evaluation credits peaking factor burndown, see Reference 3.

CPNPP Units 1 and 2 Peak Cladding Temperatures

Westinghouse LOCA Peak Clad Temperature Summary for Appendix K Small Break

Plant Name: Comanche Peak Unit 2
Utility Name: Luminant
Revision Date: 2/1/2016

Analysis Information

EM:	NOTRUMP	Analysis Date:	6/8/2007	Limiting Break Size:	4 inch
FQ:	2.5	FdH:	1.6		
Fuel:	OFA	SGTP (%):	10		
Notes:					

	Clad Temp (°F)	Ref.	Notes
LICENSIS BASIS			
Analysis-Of-Record PCT	1210	1	
PCT Assessments (Delta PCT)			
A. PRIOR ECCS MODEL ASSESSMENTS			
1. None	0		
B. PLANNED PLANT MODIFICATION EVALUATIONS			
1. None	0		
C. 2015 ECCS MODEL ASSESSMENTS			
1. None	0		
D. OTHER			
1. None	0		
LICENSING BASIS PCT + PCT ASSESSMENTS	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.)

Notes:

None