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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Ref 10 CFR 50.46

12/18/2019

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT
DOCKET NOS. 50-445 AND 50-446
ANNUAL 10 CFR 50.46 NOTIFICATION AND REPORTING

- REFERENCES:
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"
 3. Letter logged TXX-18034, dated June 19, 2018, T. A. Hope of Luminant to the NRC regarding "Annual Report of Changes in peak Cladding Temperature"

Dear Sir or Madam:

Pursuant to 10CFR50.46(a)(3)(ii), Vistra Operations Company LLC (Vistra OpCo) 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 CPNPP 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). Reference 3 provided the previous annual PCT report.

A00Z
NRR

Vistra OpCo 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 2018. 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 2018.

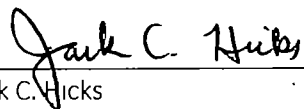
This report of the ECCS Evaluation Model changes provides an update on an annual basis. Attachment 1 provides an assessment of the specific changes and enhancements to the Westinghouse Evaluation Models for 2018

Attachment 2 provides the calculated LBLOCA and SBLOCA PCT margin allocations in effect for the 2018 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 Ken Vehstedt at (254) 897-6296 or Ken.Vehstedt@Luminat.com.

Sincerely;



Jack C. Hicks

- Attachments
1. Assessments of Specific Changes and Enhancements to the Westinghouse Evaluation Models
 2. CPNPP Units 1 and 2 Peak Cladding Temperature Summary Sheets

c - Scott Morris, Region IV
Dennis J. Galvin, NRR
Resident Inspectors, Comanche Peak

COMANCHE PEAK UNIT 2 CYCLE 18 PBOT/PMID VIOLATIONS

Background

The Comanche Peak Unit 2 Cycle 18 reload core design resulted in several violations of the PBOT/PMID box used in the Large Break LOCA analysis. These violations were evaluated for Comanche Peak Unit 2 Cycle 18 operation. This item represents a change in plant configuration or associated set points, distinguished from an evaluation model change in Section 4 of WCAP-13451.

Affected Evaluation Model(s)

2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM.

Estimated Effect

The impact of the PBOT/PMID violations for Comanche Peak Unit 2 Cycle 18 was determined via a plant-specific evaluation to be 0°F.

UO₂ FUEL PELLET HEAT CAPACITY

Background

A typographical error was discovered in the implementation of the UO₂ fuel pellet heat capacity as described by Equation C-4 of WCAP-8301 [1] for fuel rod heat-up calculations within the Appendix K Large Break and Small Break LOCA evaluation models. The erroneous formulation results in an overprediction of heat capacity that increases with fuel temperature. The corrected formulation results in a maximum decrease in heat capacity on the order of approximately 1.2% for existing analyses of record. This represents a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Model(s)

1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP.

Estimated Effect

The small over-prediction in UO₂ fuel pellet heat capacity has been evaluated to have a negligible effect on existing large and small break LOCA analysis results due to the small magnitude of the change, leading to an estimated PCT impact of 0°F.

Reference

- 1) WCAP-8301, "LOCTA-IV Program: Loss-of-Coolant Transient Analysis," June 1974.

VAPOR TEMPERATURE RESETTING

Background

In the WCOBRA/TRAC and WCOBRA/TRAC-TF2 codes, when the vapor temperature is greater than the wall temperature, and several other conditions are met, the vapor temperature is reset to the saturation temperature for heat transfer calculations. It was discovered that this vapor temperature resetting logic results in an inconsistency between the conduction solution and the hydraulic solution, such that energy is not conserved between the two solutions. The correction of this error represents a Non-Discretionary Change in the Evaluation Model as described in Section 4.1.2 of WCAP-13451.

Affected Evaluation Model(s)

2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

Estimated Effect

Engineering judgement supported by sensitivity calculations showed that correcting this error had minimal impact on LOCA transient calculations, leading to an estimated peak cladding temperature impact of 0°F.

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name: COMANCHE PEAK 1

Utility Name: Luminant

EM: NOTRUMP

AOR Description: Appendix K Small Break

Summary Sheet Status: Current

	PCT (°F)	Reference #	Note #
ANALYSIS-OF-RECORD	1013	1	None

AOR + ASSESSMENTS PCT = 1013.0 °F

REFERENCES

1. WCAP-16840-P, "Comanche Peak Nuclear Power Plant Stretch Power Uprate Licensing Report," August 2007.

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name: COMANCHE PEAK 1

Utility Name: Luminant

EM: ASTRUM (2004)

AOR Description: Best Estimate Large Break

Summary Sheet Status: Current

	PCT (°F)	Reference #	Note #	
ANALYSIS-OF-RECORD	1492	1		
ASSESSMENTS*				
	Delta PCT (°ΔF)	Reference #	Note #	Reporting Year*
1. Evaluation of Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown	122	2	(a)	2012
2. Revised Heat Transfer Multiplier Distributions	-6	3		2013
3. Error in Burst Strain Application	21	4		2013

AOR + ASSESSMENTS PCT = 1629.0 °F

* The "Reporting Year" refers to the annual reporting year in which this assessment was included.

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 2012.
3. LTR-LIS-13-359, "Comanche Peak Units 1 and 2 10 CFR 50.46 Report for Revised Heat Transfer Multiplier Distributions," July 2013.
4. LTR-LIS-14-43, "Comanche Peak Units 1 and 2 10 CFR 50.46 Report for the HOTSPOT Burst Strain Error Correction," January 2014.

NOTES:

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

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name: COMANCHE PEAK 1

Utility Name: Luminant

EM: ASTRUM (2004)

AOR Description: Best Estimate Large Break

Summary Sheet Status: Cycle 20

ANALYSIS-OF-RECORD	PCT (°F)	Reference #	Note #	
	1492	1		
ASSESSMENTS*	Delta PCT (°ΔF)	Reference #	Note #	Reporting Year*
1. Evaluation of Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown	122	3	(a)	2012
2. Revised Heat Transfer Multiplier Distributions	-6	4		2013
3. Error in Burst Strain Application	21	5		2013
4. PBOT/PMID Violation	0	2		2017

AOR + ASSESSMENTS PCT = 1629.0 °F

* The "Reporting Year" refers to the annual reporting year in which this assessment was included.

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-17-322, "10 CFR 50.46 Reporting Text and LBLOCA PCT Rackup Update for the Evaluation of the Comanche Peak Unit 1 Cycle 20 PBOT/PMID Violations," September 2017.
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 2012.
4. LTR-LIS-13-359, "Comanche Peak Units 1 and 2 10 CFR 50.46 Report for Revised Heat Transfer Multiplier Distributions," July 2013.
5. LTR-LIS-14-43, "Comanche Peak Units 1 and 2 10 CFR 50.46 Report for the HOTSPOT Burst Strain Error Correction," January 2014.

NOTES:

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

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name: COMANCHE PEAK 2

Utility Name: Luminant

EM: NOTRUMP

AOR Description: Appendix K Small Break

Summary Sheet Status: Current

	PCT (°F)	Reference #	Note #
ANALYSIS-OF-RECORD	1210	1	None

AOR + ASSESSMENTS PCT = 1210.0 °F

REFERENCES

1. WCAP-16840-P, "Comanche Peak Nuclear Power Plant Stretch Power Uprate Licensing Report," August 2007.

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name: COMANCHE PEAK 2

Utility Name: Luminant

EM: ASTRUM (2004)

AOR Description: Best Estimate Large Break

Summary Sheet Status: Current

ANALYSIS-OF-RECORD	PCT (°F)	Reference #	Note #	
	1632	1		
ASSESSMENTS*	Delta PCT (°ΔF)	Reference #	Note #	Reporting Year*
1. Evaluation of Fuel Pellet Thermal Conductivity				
Degradation and Peaking Factor Burndown	190	2	(a)	2012
2. Revised Heat Transfer Multiplier Distributions	-17	3		2013
3. Changes to Grid Blockage Ratio	24	4		2013
4. Error in Burst Strain Application	21	5		2013

AOR + ASSESSMENTS PCT = 1850.0 °F

* The "Reporting Year" refers to the annual reporting year in which this assessment was included.

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 2012.
3. LTR-LIS-13-359, "Comanche Peak Units 1 and 2 10 CFR 50.46 Report for Revised Heat Transfer Multiplier Distributions," July 2013.
4. LTR-LIS-13- LTR-LIS-13-472, "Comanche Peak Units 1 and 2 10 CFR 50.46 Reports for Changes to Grid Blockage Ratio and Porosity," October 2013
5. LTR-LIS-14-43, "Comanche Peak Units 1 and 2 10 CFR 50.46 Report for the HOTSPOT Burst Strain Error Correction," January 2014.

NOTES:

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

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name: COMANCHE PEAK 2

Utility Name: Luminant

EM: ASTRUM (2004)

AOR Description: Best Estimate Large Break

Summary Sheet Status: Retired Cycle 17

ANALYSIS-OF-RECORD	PCT (°F)	Reference #	Note #	
	1632	1		
ASSESSMENTS*	Delta PCT (°ΔF)	Reference #	Note #	Reporting Year*
1. Evaluation of Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown	190	3	(a)	2012
2. Revised Heat Transfer Multiplier Distributions	-17	4		2013
3. Changes to Grid Blockage Ratio	24	5		2013
4. Error in Burst Strain Application	21	6		2013
5. PBOT/PMID Violation	0	2		2017

AOR + ASSESSMENTS PCT = 1850.0 °F

* The "Reporting Year" refers to the annual reporting year in which this assessment was included.

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-17-124, "10 CFR 50.46 Reporting Text and LBLOCA PCT Rackup Update for the Evaluation of the Comanche Peak Unit 2 Cycle 17 PBOT/PMID Violations," March 2017.
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 2012.
4. LTR-LIS-13-359, "Comanche Peak Units 1 and 2 10 CFR 50.46 Report for Revised Heat Transfer Multiplier Distributions," July 2013
5. LTR-LIS-13-472, "Comanche Peak Units 1 and 2 10 CFR 50.46 Reports for Changes to Grid Blockage Ratio and Porosity," October 2013
6. LTR-LIS-14-43, "Comanche Peak Units 1 and 2 10 CFR 50.46 Report for the HOTSPOT Burst Strain Error Correction," January 2014.

NOTES:

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

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name: COMANCHE PEAK 2

Utility Name: Luminant

EM: ASTRUM (2004)

AOR Description: Best Estimate Large Break

Summary Sheet Status: Cycle 18

ANALYSIS-OF-RECORD	PCT (°F)	Reference #	Note #	
	1632	1		
ASSESSMENTS*	Delta PCT (°ΔF)	Reference #	Note #	Reporting Year*
1. Evaluation of Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown	190	3	(a)	2012
2. Revised Heat Transfer Multiplier Distributions	-17	4		2013
3. Changes to Grid Blockage Ratio	24	5		2013
4. Error in Burst Strain Application	21	6		2013
5. PBOT/PMID Violation	0	2		2017

AOR + ASSESSMENTS PCT = 1850.0 °F

* The "Reporting Year" refers to the annual reporting year in which this assessment was included.

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-18-338, "10 CFR 50.46 Reporting Text and LBLOCA PCT Summary Sheet Update for the Evaluation of the Comanche Peak Unit 2 Cycle 18 PBOT/PMID Violations," November 2018.
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 2012.
4. LTR-LIS-13-359, "Comanche Peak Units 1 and 2 10 CFR 50.46 Report for Revised Heat Transfer Multiplier Distributions," July 2013
5. LTR-LIS-13-472, "Comanche Peak Units 1 and 2 10 CFR 50.46 Reports for Changes to Grid Blockage Ratio and Porosity," October 2013
6. LTR-LIS-14-43, "Comanche Peak Units 1 and 2 10 CFR 50.46 Report for the HOTSPOT Burst Strain Error Correction," January 2014.

NOTES:

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