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

Ref 10 CFR 50.46(a)(3)(ii)

Subject: Comanche Peak Nuclear Power Plant (CPNPP)
Docket Nos. 50-445 and 50-446
Annual Report of Changes in Peak Cladding Temperature

References:
1. Letter 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 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), 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).

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. The review concludes that the effect of additional changes to, or errors in, the Evaluation Models on the limiting transient PCT were not significant.

Attachment 1 provides an assessment of the specific changes and enhancements to the Westinghouse Evaluation Models for 2022.

Attachment 2 provides the calculated LBLOCA and SBLOCA PCT margin allocations in effect for the 2022 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 Nic Boehmisch at (254) 897-5064 or nic.boehmisch@luminant.com.

Sincerely,

Jack C. Hicks

Attachment: 1. Assessments of Specific Changes and Enhancements to the Westinghouse Evaluation Models
2. CPNPP Units 1 and 2 Peak Cladding Temperatures

c (email) - Scott Morris, Region IV [Scott.Morris@nrc.gov]
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COMANCHE PEAK UNIT 1 CYCLE 23 PBOT/PMID VIOLATIONS

Background
The Comanche Peak Unit 1 Cycle 23 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 1 Cycle 23 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 1 Cycle 23 was determined via a plant-specific evaluation to be 0°F.

ERROR IN HOOP STRESS USED IN CLADDING RUPTURE MODEL

Background

Two different hoop stress variables are calculated in WCOBRA/TRAC-TF2. The first is calculated using Equation 8-40 of WCAP-16996-P-A, Revision 1 [1] and is used in the cladding elastic deformation model. The second is calculated using Equation 8-51 of WCAP-16996-P-A, Revision 1 and is used in the cladding creep deformation and cladding rupture models. For two instances within the cladding rupture logic, the hoop stress calculated using Equation 8-40 of WCAP-16996-P-A, Revision 1 is used whereas the hoop stress calculated using Equation 8-51 of WCAP-16996-P-A, Revision 1 should be used. The correction of this error represents a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Model(s)

2016 Westinghouse **FULL SPECTRUM™** LOCA Evaluation Model

Estimated Effect

The error was evaluated to have a negligible impact on the calculated results for **FSLOCA™** EM analyses, leading to an estimated peak cladding temperature (PCT) impact of 0°F.

Reference(s)

1) WCAP-16996-P-A, Revision 1, "Realistic LOCA Evaluation Methodology Applied to the Full Spectrum of Break Sizes (FULL SPECTRUM LOCA Methodology)," November 2016.

NON-CONSERVATION OF ENERGY IN THE GENERALIZED ENERGY DEPOSITION MODEL

Background

The Generalized Energy Deposition Model (GEDM) used within WCOBRA/TRAC-TF2 is described in Section 9.6.2 of WCAP-16996-P-A Revision 1 [1]. Non-conservation of the deposited energy was discovered to exist, whereby a very small fraction of the redistributed energy was not being included in the core balance rods. The energy deposited to the hot rod and hot assembly was confirmed to be conserved and correct. This item represents a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Model(s)

2016 Westinghouse FULL SPECTRUM LOCA Evaluation Model

Estimated Effect

The error was qualitatively evaluated, and the nature of the error leads to an estimated peak cladding temperature impact of 0°F.

Reference(s)

1) WCAP-16996-P-A, Revision 1, "Realistic LOCA Evaluation Methodology Applied to the Full Spectrum of Break Sizes (FULL SPECTRUM LOCA Methodology)," November 2016.

NON-CONSERVATION OF ENERGY IN THE GENERALIZED ENERGY DEPOSITION MODEL

Background

The Generalized Energy Deposition Model (GEDM) used within WCOBRA/TRAC is described in Section 8-6-2 of WCAP-12945-P-A [1] and Section 8-6-2 of WCAP-16009-P-A [2]. Non-conservation of the deposited energy was discovered to exist, whereby a very small fraction of the redistributed energy was not being included in the core balance rods. The energy deposited to the hot rod and hot assembly was confirmed to be conserved and correct. This item 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 error was qualitatively evaluated, and the nature of the error leads to an estimated peak cladding temperature impact of 0°F.

Reference(s)

1) WCAP-12945-P-A, Revision 2 Volume 1, and Revision 1 Volumes 2 - 5, “Code Qualification Document for Best Estimate LOCA Analysis,” March 1998.

2) WCAP-16009-P-A, Revision 0, “Realistic Large-Break LOCA Evaluation Methodology Using the Automated Statistical Treatment Of Uncertainty Method (ASTRUM),” January 2005.

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 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)

2016 Westinghouse FULL SPECTRUM LOCA Evaluation Model

Estimated Effect

The nature of these changes leads to an estimated peak cladding temperature impact of 0°F.

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name:	COMANCHE PEAK 1
EM:	NOTRUMP
AOR Description:	Appendix K Small Break
Summary Sheet Status:	Current

	PCT (°F)	Reference #	Note #
ANALYSIS-OF-RECORD	1013	1	

AOR + ASSESSMENTS **PCT =** 1013.0 °F

REFERENCES

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

NOTES:

(a) None

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name:	COMANCHE PEAK 1
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 licensee should determine the reportability of these assessments pursuant to 10 CFR 50.46.

** 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
EM: ASTRUM (2004)
AOR Description: Best Estimate Large Break
Summary Sheet Status: Retired

	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	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		2020

AOR + ASSESSMENTS **PCT =** 1629 °F

* The licensee should determine the reportability of these assessments pursuant to 10 CFR 50.46.

** 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-20-233, "10 CFR 50.46 Reporting Text and LBLOCA PCT Summary Sheet Update for the Evaluation of the Comanche Peak Unit 1 Cycle 22 PBOT/PMID Violations," September 2020.

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 1
EM: ASTRUM (2004)
AOR Description: Best Estimate Large Break
Summary Sheet Status: Cycle 23

	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	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		2022

AOR + ASSESSMENTS **PCT =** 1629 °F

* The licensee should determine the reportability of these assessments pursuant to 10 CFR 50.46.

** 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. TBX-LOCA-TM-A5-000001, "10 CFR 50.46 Reporting Text and LBLOCA PCT Summary Sheet Update for the Evaluation of the Comanche Peak Unit 1 Cycle 23 PBOT/PMID Violations," March 2022.

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
EM: NOTRUMP
AOR Description: Appendix K Small Break
Summary Sheet Status: Current

	PCT (°F)	Reference #	Note #
ANALYSIS-OF-RECORD	1210	1	

AOR + ASSESSMENTS **PCT =** 1210.0 °F

REFERENCES

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

NOTES:

(a) None

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name: COMANCHE PEAK 2
EM: ASTRUM (2004)
AOR Description: Best Estimate Large Break
Summary Sheet Status: Current

	PCT (°F)	Reference #	Note #
ANALYSIS-OF-RECORD	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 and Porosity	24	4		2013
4. Error in Burst Strain Application	21	5		2013

AOR + ASSESSMENTS **PCT =** 1850.0 °F

* The licensee should determine the reportability of these assessments pursuant to 10 CFR 50.46.

** 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-13-472, "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
EM:	ASTRUM (2004)
AOR Description:	Best Estimate Large Break
Summary Sheet Status:	Cycle 20

	PCT (°F)	Reference #	Note #
ANALYSIS-OF-RECORD	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 and Porosity	24	5		2013
4.	Error in Burst Strain Application	21	6		2013
5.	PBOT/PMID Violation	0	2		2021

AOR + ASSESSMENTS **PCT =** 1850 °F

* The licensee should determine the reportability of these assessments pursuant to 10 CFR 50.46.

** 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 TCX-LOCA-TM-A5-000001, "10 CFR 50.46 Reporting Text and LBLOCA PCT Summary Sheet Update for the Evaluation of the Comanche Peak Unit 2 Cycle 20 PBOT/PMID Violations," September 2021.

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 1
EM:	FSLOCA
AOR Description:	FULL SPECTRUM LOCA EM Large Break
Summary Sheet Status:	Future

	PCT (°F)	Reference #	Note #
ANALYSIS-OF-RECORD	1566	1	(a)

AOR + ASSESSMENTS **PCT =** 1566.0 °F

REFERENCES

1 WCAP-18417-P, "Engineering Summary Report of the Comanche Peak Unit 1 Loss-of-Coolant Accident (LOCA) Analysis with the FULL SPECTRUM LOCA (FSLOCA) Methodology," February 2019.

NOTES:

(a) The analysis-of-record PCT reflects the uncertainty analysis that included the error in gamma energy redistribution uncertainty (1546°F) as well as the correction of the error (20°F).

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name:	COMANCHE PEAK 1
EM:	FSLOCA
AOR Description:	FULL SPECTRUM LOCA EM Small Break
Summary Sheet Status:	Future

	PCT (°F)	Reference #	Note #
ANALYSIS-OF-RECORD	1032	1	(a)

AOR + ASSESSMENTS **PCT =** 1032.0 °F

REFERENCES

1 WCAP-18417-P, "Engineering Summary Report of the Comanche Peak Unit 1 Loss-of-Coolant Accident (LOCA) Analysis with the FULL SPECTRUM LOCA (FSLOCA) Methodology," February 2019.

NOTES:

(a) The analysis-of-record PCT reflects the uncertainty analysis that included the error in gamma energy redistribution uncertainty (1017°F) as well as the correction of the error (15°F).

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name:	COMANCHE PEAK 2
EM:	FSLOCA
AOR Description:	FULL SPECTRUM LOCA EM Large Break
Summary Sheet Status:	Future

	PCT (°F)	Reference #	Note #
ANALYSIS-OF-RECORD	1610	1	(a)

AOR + ASSESSMENTS **PCT =** 1610.0 °F

REFERENCES

1 WCAP-18418-P, "Engineering Summary Report of the Comanche Peak Unit 2 Loss-of-Coolant Accident (LOCA) Analysis with the FULL SPECTRUM LOCA (FSLOCA) Methodology," March 2019.

NOTES:

(a) The analysis-of-record PCT reflects the uncertainty analysis that included the error in gamma energy redistribution uncertainty (1579°F) as well as the correction of the error (31°F).

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name:	COMANCHE PEAK 2
EM:	FSLOCA
AOR Description:	FULL SPECTRUM LOCA EM Small Break
Summary Sheet Status:	Future

	PCT (°F)	Reference #	Note #
ANALYSIS-OF-RECORD	1116	1	(a)

AOR + ASSESSMENTS **PCT =** 1116.0 °F

REFERENCES

1 WCAP-18418-P, "Engineering Summary Report of the Comanche Peak Unit 2 Loss-of-Coolant Accident (LOCA) Analysis with the FULL SPECTRUM LOCA (FSLOCA) Methodology," March 2019.

NOTES:

(a) The analysis-of-record PCT reflects the uncertainty analysis that included the error in gamma energy redistribution uncertainty (1113°F) as well as the correction of the error (3°F).