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Serial: RA-24-0112
April 30, 2024

10 CFR 52, Appendix D, X.B
10 CFR 50.46

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

SHEARON HARRIS NUCLEAR POWER PLANT, UNITS 2 AND 3
DOCKET NOS. 52-022 AND 52-023

SUBJECT: AP1000 Combined License Application Departure Report Update and 10 CFR
50.46 Annual Update

REFERENCE:

1. Letter from J. Scarola (Duke Energy) to U.S. Nuclear Regulatory Commission (NRC), dated February 18, 2008, "Application for Combined License for Shearon Harris Nuclear Power Plant Units 2 and 3," (ADAMS Accession No. ML080580078).
2. Letter from M. Christopher Nolan (Duke Energy) to NRC, dated November 17, 2023, "AP1000 Combined License Application (COLA) Departure Report Update," (ADAMS Accession No. ML23324A145).

Duke Energy Progress, Inc. (DEP) submitted an application, dated February 18, 2008, for a combined license (COL) for two AP1000 advanced pressurized water reactors to be located at the Shearon Harris Nuclear Power Plant (HAR) Site (Reference 1). Part 7 of the application is entitled "Departures and Exemption Requests." This letter provides an update to the report describing plant-specific departures from the AP1000 Design Control Document (i.e., Departures Report) as required by 10 CFR 52, Appendix D, paragraphs X.B.1 and X.B.3.b. The following reports are addressed by this letter:

- Semi-Annual Departures Report
- Annual 10 CFR 50.46 Report

Semi-Annual Departures Report. For the Shearon Harris Nuclear Power Plant, Units 2 and 3 during the period of November 1, 2023 (Reference 2) to April 30, 2024:

- There have been no new departures or changes to the departures described in the COLA Part 7, "Departures and Exemption Requests"

Annual 10 CFR 50.46 Report. In accordance with 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors," for HAR Units 2 and 3, a design certification holder is required to report to the NRC in accordance with 10 CFR 50.46(a)(3). This same regulation requires a similar report from any COL holder and COL applicant. The DEP COL application for HAR Units 2 and 3 incorporated by reference the

AP1000 design certification document and thus, also utilize the peak cladding temperature calculations performed by Westinghouse Electric Company (WEC). As such, the WEC report, provided in the Enclosure, is applicable to HAR Units 2 and 3.

This letter contains no new regulatory commitments.

Please address any comments or questions regarding this matter to Lee Grzeck, Licensing Manager - New Nuclear Generation at (980) 373-1530.

Sincerely,

A handwritten signature in black ink, appearing to read "Chi. Nolan", is written over a light gray rectangular background.

M. Christopher Nolan

Vice-President, New Nuclear Generation Strategy and Regulatory Engagement

Enclosure:

Letter from Zachary S. Harper, Westinghouse Electric Company, to the U.S. Nuclear Regulatory Commission, 10 CFR 50.46 Annual Report for the AP1000 Plant Design, Letter No. DCP_NRC_003348, dated March 25, 2024

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cc: L.Dudes, U.S. NRC Region II Administrator
D. Murray, U.S. NRC Project Manager

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Enclosure

Letter from Zachary S. Harper, Westinghouse Electric Company, to the U.S. Nuclear
Regulatory Commission, 10 CFR 50.46 Annual Report for the AP1000 Plant Design,
Letter No. DCP_NRC_003348, dated March 25, 2024



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U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
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e-mail: harperzs@westinghouse.com

Your Ref: Docket No. 52-006
Our Ref: DCP_NRC_003348

March 25, 2024

Subject: 10 CFR 50.46 Annual Report for the AP1000® Plant Design

Pursuant to 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors", Westinghouse Electric Company, LLC is submitting this report to document emergency core cooling system (ECCS) evaluation model changes or errors for the 2023 Model Year (i.e., 01/01/2023 – 12/31/2023) that affect the peak cladding temperature (PCT) calculations for the AP1000® plant design.

As described below, the following AP1000 analysis of record (AORs) is reported:

AP1000 Design Certification AOR:

On December 30th, 2011, the U.S. Nuclear Regulatory Commission certified an amendment to the Design Certification Rule for the AP1000 plant. As such, AP1000 Design Control Document (DCD) Revision 19 documents the AOR for the AP1000 Design Certification. The limiting transient for the AP1000 Design Certification is the Best Estimate Large Break Loss-of-Coolant Accident (LBLOCA). Westinghouse last provided an annual reporting letter to the NRC in March 2023 (DCP_NRC_003347) which presented an estimated PCT of 2010°F for the LBLOCA evaluation. There are no new ECCS model changes that impact PCT for the 2023 model year. The estimated PCT for LBLOCA remains at 2010°F and does not exceed the 10 CFR 50.46 (b)(1) acceptance criterion of 2200°F.

The summary of the PCT margin allocations and their bases for the AP1000 Design Certification AOR are provided in the Attachment 1.

By copy of this letter, COL Holders and COL Applicants are hereby notified of any changes or errors in the AP1000 standard plant design PCT calculations as required by 10 CFR 50.46(a)(3)(iii).

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Questions or requests for additional information related to content and preparation of this information should be directed to Westinghouse. Please send copies of such questions or requests to the respective COL Holders and COL Applicants referencing the amended AP1000 Design Certification Rule for the AP1000 nuclear power plant. A representative for each COL Holder and COL Applicant is included on the cc: list of this letter.

Sincerely,



Zachary S. Harper
Manager, Licensing Engineering

/Attachments

1. 10 CFR 50.46 Annual Report for the AP1000 Design Certification AOR, 2023 Model Year

Cc:

M. Hayes	- U.S. NRC	J. Douglass	- SNC	R. Christian	- Westinghouse
B. Gleaves	- U.S. NRC	A. Quarles	- SNC	D. McDevitt	- Westinghouse
K. Lowery	- SNC	A. Zaremba	- Duke	M. Sheaffer	- Westinghouse
R. Joyce	- SNC	A. Brown	- NextEra	M. Barca	- Westinghouse
A. Chamberlain	- SNC	C. Zozula	- Westinghouse	L. Conner	- Westinghouse
J. Baker	- SNC	M. Arnold	- Westinghouse		

Attachment 1

10 CFR 50.46 Annual Report for the AP1000 Design Certification AOR, 2023 Model Year

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)

2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

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: AP1000
EM: ASTRUM (2004)
AOR Description: Best Estimate Large Break
Summary Sheet Status: DCD

	PCT (°F)	Reference #	Note #
ANALYSIS-OF-RECORD	1837	1	

ASSESSMENTS*	Delta PCT (°ΔF)	Reference #	Note #	Reporting Year**
1. Evaluation of Pellet Thermal Conductivity Degradation and Peaking Factor Burndown	139	2		2012
2. Revised Heat Transfer Multiplier Distributions	11	3		2013
3. Error in Burst Strain Application	23	4		2013

AOR + ASSESSMENTS **PCT =** 2010.0 °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 APP-GW-GL-700, Revision 19, “AP1000 Design Control Document,” June 2011.
- 2 LTR-LIS-12-288, “Information Regarding the Evaluation of Fuel Pellet Thermal Conductivity Degradation and Peaking Factor Burndown Including Analysis Input Changes for AP1000 Large Break LOCA Analysis,” June 2012.
- 3 LTR-LIS-13-357, “AP1000 Plant 10 CFR 50.46 Report for Revised Heat Transfer Multiplier Distributions,” July 2013.
- 4 LTR-LIS-14-41, “AP1000 Plant 10 CFR 50.46 Report for the HOTSPOT Burst Strain Error Correction,” January 2014.

NOTES:

- (a) None

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name: AP1000
EM: NOTRUMP-AP
AOR Description: Appendix K Small Break
Summary Sheet Status: DCD

	PCT (°F)	Reference #	Note #
ANALYSIS-OF-RECORD	1370	1	(a)

ASSESSMENTS*	Delta PCT (°ΔF)	Reference #	Note #	Reporting Year**
1. Adiabatic Heat-up Calculation	264	2	(a)	2010

AOR + ASSESSMENTS **PCT =** 1634.0 °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 APP-GW-GL-700, Revision 19, “AP1000 Design Control Document,” June 2011.
- 2 LTR-LIS-10-373, “10 CFR 50.46 Report for the Evaluation of AP1000 SBLOCA 10-inch Transient Adiabatic Heat-up Calculation,” June 2010.

NOTES:

- (a) This is an adiabatic heat-up calculated PCT.