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Serial: RA-21-0042
April 21, 2021

10 CFR 52, Appendix D, X.B
10 CFR 50.59
10 CFR 52.97
10 CFR 50.46

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

WILLIAM STATES LEE III NUCLEAR STATION, UNITS 1 AND 2
COMBINED LICENSE NOS NPF-101 AND NPF-102
DOCKET NOS. 52-018 AND 52-019

SUBJECT: Submission of Periodic Reports

REFERENCES:

1. Letter from Joseph W. Donahue (Duke Energy) to U.S. Nuclear Regulatory Commission (NRC), dated October 8, 2018, "Submission of Periodic Reports and Annual UFSAR Update," Serial: NPD-NRC-2018-010.

The purpose of this letter is to submit periodic reports for William States Lee III Nuclear Station (WLS), Units 1 and 2 as required by NRC regulations and/or license conditions for a Part 52 combined license holder. These reports address various annual or semi-annual reporting requirements. The following reports are addressed by this letter:

- Semi-Annual Changes, Tests, and Experiments Report
- Semi-Annual Departures Report
- Semi-Annual Schedule for Implementation of Operational Programs
- Annual 10 CFR 50.46 Report

Semi-Annual Departures Report and Semi-Annual Changes, Tests, and Experiments Report. For the WLS Units 1 and 2, in accordance with the requirements of 10 CFR 50.59(d)(2) and 10 CFR 52, Appendix D, paragraphs X.B.1 and X.8.3.b, during the period of September 24, 2020 through April 22, 2021:

- no changes, tests or experiments were implemented pursuant to 10 CFR 50.59(c), and
- no plant-specific departures were implemented under 10 CFR 52, Appendix D, Section VIII.

Semi-Annual Schedule for Implementation of Operational Programs. Pursuant to the WLS COL Section 2.D.(11), a schedule for implementation of operational programs is required to be submitted within one year of the date of COL issuance, with subsequent reports submitted on a

semi-annual basis until the 10 CFR 52.103(g) finding. There are no changes to the schedule since the letter sent in Reference 1. Therefore, the previously submitted schedule continues to be current.

Annual 10 CFR 50.46 Report. In accordance with 10 CFR 59.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors," for the WLS Units 1 and 2. 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 combined license (COL) holder and COL applicant. The Duke Energy COL for WLS Units 1 and 2 incorporate 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 the WLS Units 1 and 2.

This letter contains no new regulatory commitments.

Please address any comments or questions regarding this matter to Art Zaremba, Manager – Fleet Licensing at (980) 373-2062.

Sincerely,

M. Christopher Nolan
Vice President, Nuclear Regulatory Affairs, Policy & Emergency Preparedness

Enclosure:
Letter from Zachary S. Harper, Westinghouse Electric Company (WEC), to the U. S. Nuclear Regulatory Commission, 10 CFR 50.46 Annual Report for the AP1000 Plant Design, Letter No. DCP_NRC_003344, dated March 24, 2021.

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

Enclosure

Letter from Zachary S. Harper, Westinghouse Electric Company (WEC), to the U. S. Nuclear Regulatory Commission, 10 CFR 50.46 Annual Report for the AP1000 Plant Design, Letter No. DCP_NRC_003344, dated March 24, 2021.

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USA

U.S. Nuclear Regulatory Commission
Document Control Desk
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Your Ref: Docket No. 52-006
Our Ref: DCP_NRC_003344

March 24, 2021

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 2020 Model Year (i.e., 01/01/2020 – 12/31/2020) that affect the peak cladding temperature (PCT) calculations for the AP1000 plant design.

As described below, two AP1000 analyses of record (AORs) are 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 2020 (DCP_NRC_003340) which presented an estimated PCT of 2010°F for the LBLOCA evaluation. There are no new ECCS model changes that impact PCT for the 2020 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.

AP1000 Vogtle Units 3 & 4 AOR:
In addition to the AOR for the AP1000 Design Certification, the NRC has approved the AP1000 Core Reference Report (WCAP-17524-P-A), a generic topical which includes an ECCS "reanalysis" in the context of 10 CFR 50.46. The AOR contained in the Core Reference Report (CRR) has also been approved for incorporation into the Vogtle Units 3 & 4 licenses via NRC License Amendment 52. Westinghouse last provided an annual reporting letter to the NRC in March 2020 (DCP_NRC_003340) which presented an estimated PCT of 2046°F for the LBLOCA evaluation. There are no new ECCS model changes that impact the limiting LBLOCA PCT for

the 2020 model year. As such, the estimated PCT for LBLOCA is 2046°F and does not exceed the 10 CFR 50.46 (b)(1) acceptance criterion of 2200°F.

Additionally, changes as part of the Automatic Depressurization System (ADS) and Core Makeup Tank (CMT) design parameters changes included in LAR-19-009 constitute a "reanalysis" in the context of 10 CFR 50.46 for the small break loss of coolant accident (SBLOCA) analysis and have been approved for incorporation into the Vogtle Units 3&4 licenses via NRC License Amendments 176 (Unit 3) and 175 (Unit 4). The estimated LBLOCA PCT continues to be the limiting estimated PCT following the SBLOCA reanalysis.

The summary of the PCT margin allocations and their bases for the AP1000 Vogtle Units 3 & 4 AOR are provided in the Attachment 2.

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). This letter contains site-specific evaluations for Vogtle Units 3 & 4.

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.

Very truly yours,

Zachary S. Harper
Manager, AP1000 Licensing

/Attachments

1. 10 CFR 50.46 Annual Report for the AP1000 Design Certification AOR, 2020 Model Year
2. 10 CFR 50.46 Annual Report for the AP1000 Vogtle Units 3 & 4 AOR, 2020 Model Year

Cc:

M. Dudek	- U.S. NRC	A. Zaremba	- Duke/Progress	M. Corletti	- Westinghouse
A. Bradford	- U.S. NRC	S. Franzone	- FPL	A. Schoedel	- Westinghouse
W. Ward	- U.S. NRC	R. Orthen	- FPL	M. Yuan	- Westinghouse
A. Chamberlain	- SNC	L. Oriani	- Westinghouse	D. McDevitt	- Westinghouse
M. Humphrey	- SNC	D. Weaver	- Westinghouse	M. Sheaffer	- Westinghouse
E. Grant	- SNC	A. Konig	- Westinghouse	M. Barca	- Westinghouse
Y. Arafeh	- SNC	K. Hosack	- Westinghouse	M. Patterson	- Westinghouse

Attachment 1

10 CFR 50.46 Annual Report for the AP1000 Design Certification AOR, 2020 Model Year

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name: AP1000
Utility Name: Westinghouse Nuclear Power Plants
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
Utility Name: Westinghouse Nuclear Power Plants
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.

Attachment 2

10 CFR 50.46 Annual Report for the AP1000 Vogtle Units 3 & 4 AOR, 2020 Model Year

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name: Vogtle Unit 3 and Unit 4
Utility Name: Southern Nuclear Operating Company
EM: ASTRUM (2004)
AOR Description: Best Estimate Large Break
Summary Sheet Status: Current

	PCT (°F)	Reference #	Note #	
ANALYSIS-OF-RECORD	1936	1	(a)	
ASSESSMENTS*	**Delta PCT (°ΔF)**	**Reference #**	**Note #**	**Reporting Year****
1. Revised Heat Transfer Multiplier Distributions	11	2		2013
2. Error in Burst Strain Application	23	3		2013
3. Design Change Rebaseline Evaluation	54	4,5	(b)	2018
4. Evaluation of RCP Design Changes – LAR 189	22	6,7	(c)	2019
AOR + ASSESSMENTS	**PCT =** 2046.0 °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-17524-P-A, Revision 1, "AP1000 Core Reference Report," May 2015.

2 LTR-LIS-13-357, "AP1000 Plant 10 CFR 50.46 Report for Revised Heat Transfer Multiplier Distributions," July 2013.

3 LTR-LIS-14-41, "AP1000 Plant 10 CFR 50.46 Report for the HOTSPOT Burst Strain Error Correction," January 2014.

4 LTR-LIS-18-393, "Update to the Vogtle Units 3 & 4 LBLOCA and SBLOCA 10 CFR 50.46 PCT Summary Sheets for LAR-79," November 2018.

5 ND-17-2074 (ML18029A243), "Containment Pressure Analysis (LAR-17-043)," December 2017. Approved by NRC November 7, 2018 as Amendments 147 (VEGP Unit 3) and 146 (VEGP Unit 4) (ML18289A742).

6 LTR-LIS-17-39, "AP1000 Plant Suggested 10 CFR 50.46 Reporting Text and Updated LBLOCA PCT Summary Sheet for Evaluation of Reactor Coolant Pump (RCP) Design Changes," January 2017.

7 ND-18-1147 (ML18243A459), "Reactor Coolant System (RCS) Flow Coastdown (LAR-18-025)," August 2018. Approved by NRC February 25, 2019 as Amendments 155 (VEGP Unit 3) and 154 (VEGP Unit 4)

(ML19038A450).

NOTES:

(a) Value contains 2°F bias for PCT sensitivity to PRHR isolation, per Reference 1 response to CRR-008, Table 2 and Table 15.6.5-8.

(b) The design change rebaseline evaluation used current code versions and accounts for design changes up to May 5, 2014 and plant model error corrections.

(c) The RCP design changes evaluation assesses the impact of DCP 5338 (APP-GW-GEE-5338), which is tied to DCP 4880 (APP-GW-GEE-4880). The evaluated changes include updated homologous curves and small changes to the pump rated conditions and rotor inertia.

LOCA Peak Cladding Temperature (PCT) Summary

Plant Name:	Vogtle Unit 3 and Unit 4
Utility Name:	Southern Nuclear Operating Company
EM:	NOTRUMP-AP
AOR Description:	Appendix K Small Break
Summary Sheet Status:	Current

	PCT (°F)	Reference #	Note #
ANALYSIS-OF-RECORD	1099	1	

AOR + ASSESSMENTS	**PCT =** 1099.0 °F

REFERENCES

1 ND-19-1142 (ML19273A953), "Automatic Depressurization System (ADS) and Core Makeup Tank (CMT) Design Parameters (LAR-19-009)," September 2019. Approved by NRC March 11, 2020 as Amendments 176 (VEGP Unit 3) and 175 (VEGP Unit 4) (ML20049A721/ML20049A808).

NOTES:

(a) None