Westinghouse Electric Company
1000 Westinghouse Drive
Cranberry Township, Pennsylvania 16066
USA

U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Direct tel: (412) 374-5130
Direct fax: (724) 940-8542
e-mail: hosackkl@westinghouse.com

LTR-NRC-19-50

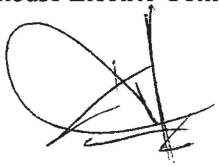
September 9, 2019

Subject: Request to Modify Safety Evaluation Report on WCAP-12472-P-A, "**BEACON**™: Core Monitoring and Operations Support System"

During the Westinghouse Fuel Performance Update Meeting (FPUM) held July 23 – 25, 2019 at Westinghouse Headquarters in Cranberry Township, Westinghouse expressed the desire to pursue a limited-scope review of WCAP-12472-P-A. The request would seek to resolve an inconsistency between WCAP-12472-P-A and the associated SER. The slides used during that discussion are available via ADAMS Accession Number ML19218A263.

Accordingly, enclosed is a non-proprietary submittal of a request to amend the Safety Evaluation for WCAP-12472-P-A, "BEACON: Core Monitoring and Operations Support System."

Correspondence with respect to this submittal should be addressed to Camille T. Zozula, Manager, Facilities and Infrastructure Licensing, Westinghouse Electric Company, 1000 Westinghouse Drive, Suite 165, Cranberry Township, PA 16066.



Korey L. Hosack, Manager
Product Line Regulatory Support

cc: Ekaterina Lenning
Dennis Morey
Robert Lukes

Enclosures

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Request to Modify Safety Evaluation Report on WCAP-12472-P-A, "BEACON: Core Monitoring and Operations Support System"

September 2019

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Request to Modify Safety Evaluation Report on WCAP-12472-P-A, "BEACON: Core Monitoring and Operations Support System"

Background

Westinghouse topical report WCAP-12472-P-A (Reference 1) requested review and approval for the use of the **BEACON**™ Core Monitoring System. The topical report was final approved by the Nuclear Regulatory Commission (NRC) in August 1994. Per Reference 1, with optimal core exit thermocouples (CETC) coverage, the BEACON system must be calibrated using a flux map at least once every 180 effective full-power days (EFPD). According to Section 2.0, Page 9, of the Safety Evaluation Report (SER) associated with WCAP-12472-P-A, and as reproduced below, the calibration interval with minimum CETC coverage is specified as 30 EFPD:

> *"The criteria for the exit thermocouples, with BEACON operable, which is presented in the example COLR section 2.4, require at least 25 percent of the thermocouples, with at least 2 per quadrant, with the added requirement that the operable pattern normally covers all internal fuel assemblies within a chess "knight" move (an adjacent plus a diagonal square away), or there must be more frequent calibration. Calibration, with the incores, is required every 180 effective full-power days. However, it is every 30 days when the knight move requirement is not satisfied."*

The standard calibration was intended to be performed every 180 EFPD, which stemmed from a rounding of 6 months of full power operation (30 days x 6 months = 180 days). The minimum CETC coverage calibration was intended to be performed every 31 EFPD, which would be consistent with the 31 EFPD interval for power distribution surveillances. However, references to the calibration interval with minimum CETC coverage vary between 30 and 31 EFPD in several locations throughout Reference 1. As a result, an unintended value of 30 EFPD was ultimately specified in the SER as shown above.

The inconsistency in the minimum CETC coverage calibration interval that exists through Reference 1 and the associated SER could create a potential verbatim compliance concern for Licensees. Additionally, due to the mismatch between the minimum CETC coverage calibration interval stated in the SER and the intended 31 EFPD to align with the power distribution surveillances, this creates a potentially error-likely situation for Licensees.

Although Licensees could potentially revise their licensing basis to reflect the 30 EFPD stated in the SER, a more efficient approach, which also eliminates a potentially error-likely situation, would be to pursue a generic change to reflect the intended 31 EFPD calibration interval for minimum CETC coverage.

Request

Westinghouse is requesting that the NRC revise the SER included in Reference 1 to reflect agreement with the 31 EFPD calibration interval when a plant is operating at or less than the minimum core exit thermocouple coverage. The suggested update to the content from Section 2.0 of the SER for Reference 1 is shown below:

> *"The criteria for the exit thermocouples, with BEACON operable, which is presented in the example COLR section 2.4, require at least 25 percent of the thermocouples, with at least 2 per quadrant, with the added requirement that the operable pattern normally covers all internal fuel assemblies within a chess "knight" move (an adjacent plus a diagonal square away), or there must be more frequent calibration. Calibration, with the incores, is required every 180 effective full-power days. However, it is every ~~30 days~~* ***31 EFPD*** *when the knight move requirement is not satisfied."*

Supporting Information

When a utility applies for approval from the NRC to implement BEACON Technical Specification Monitoring (TSM) or Direct Margin Monitoring (DMM) with moveable incore detectors, the License Amendment Request (LAR) references WCAP-12472-P-A for which the NRC SER specifies a 30 EFPD minimum CETC coverage calibration interval. As mentioned previously, the minimum CETC coverage calibration was intended to be performed every 31 EFPD, which would be consistent with the 31 EFPD interval for power distribution surveillances.

Some utilities' proposed Technical Specification (TS) changes were based on the sample TS included in Reference 1, which correctly specify 31 EFPD (as opposed to the 30 EFPD stated in the SER for Reference 1). More specifically, the sample TS provided in Section 7 of Reference 1, Surveillance Requirement 4.3.3.12.4 states:

> *"4.3.3.12.4 Calibration of the Beacon system is required at least every* ***31*** *Effective Full Power Days when the number of the core exit thermocouples are less than the number described in the COLR"*

In cases where the calibration interval in the TS (31 EFPD) was reviewed and approved by the NRC via plant-specific LARs, the LAR-approved values are considered to supersede the interval of 30 EFPD specified in the SER for Reference 1. This scenario also applies to plants that originally had a calibration interval of 31 EFPD in their TS but have since moved it to their Technical Requirements Manual (TRM).

It is recognized that if a Licensee currently has a calibration interval of 30 EFPD listed in their TS and seeks to utilize the interval of 31 EFPD they must determine the additional licensing basis changes that

are necessary and take the appropriate actions to implement those changes into their licensing basis prior to extending the interval.

Other Licensees have placed this requirement directly into their TRM and so did not received explicit approval by the NRC to utilize 31 EFPD. There is therefore a potential verbatim compliance concern for some licensees. To resolve this, and to eliminate a potentially error likely situation, it is requested that the SER of Reference 1 be revised to reflect 31 EFPD for the calibration interval with minimum CETC coverage.

The NRC approved methods in Reference 1 will continue to ensure that the change from 30 EFPD to 31 EFPD in the SER will not have any impact on the past, or current operation of a plant. The final uncertainties applied to BEACON core monitoring are dynamic and determined as a function of method accuracy, plant conditions, sensor availability, and burnup since calibration. The uncertainties are discussed in Chapter 5 of Reference 1. One component of the uncertainties is the interval of model calibration, which is discussed in Section 5.4.2 of Reference 1. This uncertainty is a function of the cycle burnup increment since the last calibration. The uncertainty will increase as the burnup increases between 30 EFPD to 31 EFPD as described in Equation 5-12 of Reference 1.

Therefore, a revision to the SER to change the calibration interval with minimum CETC coverage from 30 to 31 EFPD does not pose a risk to the health and safety of the public.

Conclusion

The NRC approved methods in Reference 1 will continue to ensure that the change from 30 EFPD to 31 EFPD in the SER will not have any impact on the past, or current operation of a plant. The BEACON system already applies a calibration uncertainty that is a function of burnup. Therefore, a revision to the SER to change the calibration interval with minimum CETC coverage from 30 to 31 EFPD does not pose a risk to the health and safety of the public.

References

1. WCAP-12472-P-A, “BEACON: Core Monitoring and Operations Support System,” August 1994.