



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

September 24, 2018

Mr. James A. Gresham, Manager  
Regulatory Compliance and  
Plant Licensing  
Westinghouse Electric Company  
1000 Westinghouse Drive  
Cranberry Township, PA 16066

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RE: WESTINGHOUSE  
ELECTRIC COMPANY WCAP-16260-P/WCAP-16260-NP, REVISION 2, "THE  
SPATIALLY CORRECTED INVERSE COUNT RATE (SCICR) METHOD FOR  
SUBCRITICAL REACTIVITY MEASUREMENT" TOPICAL REPORT – SECOND  
ROUND (EPID NO. L-2017-TOP-0064)

Dear Mr. Gresham:

By letter dated December 14, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17348B293), Westinghouse Electric Company (Westinghouse) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review and approval Topical Report (TR) WCAP-16260-P/WCAP-16260-NP, Revision 2, "The Spatially Corrected Inverse Count Rate (SCICR) Method for Subcritical Reactivity Measurement." By letter dated August 9, 2018 (ADAMS Accession No. ML18207A226), the NRC issued its first round of the requests for additional information (RAI). By letter dated September 13, 2018 (ADAMS Accession No. ML18257A061), Westinghouse provided responses to these RAIs. Upon review of the TR the NRC staff has determined that additional information is needed to complete the review. Enclosed are the NRC staff's second round of RAI questions. On September 20, 2018, James Smith, Westinghouse, and NRC staff agreed that the NRC staff will receive your response to the enclosed second set of the RAI questions within 30 days of the receipt of the second round of RAIs.

If you have any questions regarding the enclosed questions, please contact me at 301-415-3151.

Sincerely,

***/RA Holly Cruz for/***

Ekaterina Lenning, Project Manager  
Licensing Processes Branch  
Division of Licensing Projects  
Office of Nuclear Reactor Regulation

Enclosure:  
RAIs (Non-proprietary version)

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<b>DATE</b>	9/24/2018	9/24/2018	

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U.S. NUCLEAR REGULATORY COMMISSION  
SECOND ROUND OF THE REQUESTS FOR ADDITIONAL INFORMATION  
OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO THE REVIEW OF WESTINGHOUSE ELECTRIC COMPANY  
TOPICAL REPORT WCAP-16260-P/WCAP-16260-NP, REVISION 2,  
“THE SPATIALLY CORRECTED INVERSE COUNT RATE (SCICR) METHOD  
FOR SUBCRITICAL REACTIVITY MEASUREMENT”  
EPID L-2017-TOP-0064

**Introduction**

By letter dated December 14, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17348B293), Westinghouse Electric Company (Westinghouse) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review and approval Topical Report (TR) WCAP-16260-P/WCAP-16260-NP, Revision 2, “The Spatially Corrected Inverse Count Rate (SCICR) Method for Subcritical Reactivity Measurement.” By letter dated August 9, 2018 (ADAMS Accession No. ML18207A226), the NRC requested additional information. By letter dated September 13, 2018 (ADAMS Accession No. ML18257A061), Westinghouse responded to the request for additional information (RAI). Upon review of the TR, the NRC staff has determined that additional information is needed to complete the review. Enclosed are the NRC staff’s second round of RAI questions.

**Regulatory Basis**

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.34 “Energy”, “Contents of Applications; Technical Information,” requires that safety analysis reports be submitted that analyze the design and performance of structures, systems, and components provided for the prevention of accidents and the mitigation of the consequences of accidents. As part of the core-reload-design process, licensees or supporting vendors perform reload safety evaluations to ensure the safety analyses remain applicable to the as-designed cycle. Testing provides further assurance that the cycle will operate in conformance with its design, and hence within the constraints of the safety analyses and supporting evaluations.

Section XI, “Test Control,” of 10 CFR Part 50 Appendix B, “Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants,” requires that a test program be established to ensure that structures, systems, and components will perform satisfactorily in service. All functions necessary to ensure that the specified design conditions are not exceeded during normal operation and anticipated operational occurrences must be tested. This testing is an integral part of the design, construction, and operation of the plant.

**Second round of Requests for Additional Information**

1. Appendix E of WCAP-16260-P/WCAP-16260-NP, Revision 2, provides a cross-reference to previous responses to RAIs for Revision 1 of the TR. This

Enclosure

cross-reference states that the responses to the instrumentation and control (I&C) RAI have been addressed in Revision 2. However, Revision 2 of WCAP-16260-P/WCAP-16260-NP appears to reference only a portion of this information contained in those RAIs responses. It is not clear if all, or just part of this information has been incorporated by referencing these RAI responses. Please explain what parts of the I&C RAI responses are applicable to Revision 2. Please describe any changes to the I&C information previously provided regarding the detectors and associated instrumentation. Alternatively, submit the applicable portions of those responses.

2. Section 5.1.1 of WCAP-16260-P/WCAP-16260-NP, Revision 2, states: "SCICR measurement functionality extends to simultaneous acquisition of the flux signal at either or both of the two signal processing stages..."
  - (a) Please describe any differences in the processing of these signals.
  - (b) Please describe any differences in the "additional measures [that] are required to confirm the suitability of the NIS output for the SPT application."
3. Section 5.1.2 of WCAP-16260-P/WCAP-16260-NP, Revision 2, states in part that "...additional measures are required to confirm the suitability of the NIS output for the SPT application," but does not describe these "additional measures."
  - (a) Please describe the necessary and sufficient "additional measures."
  - (b) Given that the detectors and associated electronics performance can degrade over time, please describe the frequency and method the "additional measures" must be taken, periodically, to verify performance.
  - (c) Please describe the "suitability" acceptance criteria. Also, clarify the criteria that can lead to "disqualification" of a detector signal from SCICR-based physics testing.
4. Section 5.1.3 of WCAP-16260-P/WCAP-16260-NP, Revision 2, states: "...it is conceivable that a conservative bias could be inserted during the calibration process. In addition, it is likely that due to instrumentation limitations, some amplification non-linearity could remain after reasonable attempts to calibrate isolation amplifiers." Please describe how source range nuclear instrumentation uncertainty information (e.g., from calibrations and/or setpoint calculations) is used in subcritical physics testing or SCICR?
5. Section 5.1.4 of WCAP-16260-P/WCAP-16260-NP, Revision 2, states: "Detection methods described in Reference 17 are considered for employment where appropriate." There are many methods described in Reference 17; therefore, it is not clear which methods are used. Also, it is not clear what it means for a method to be "considered."
  - (a) Which methods are employed?
  - (b) How and where are the methods used?
6. Section 5.1.5 states: "Although the SCICR methodology benefits from the use of multiple data channels and paths..."
  - (a) Please describe how the SCICR methodology benefits from the use of multiple data channels and paths.
  - (b) Are these individual signals each used separately to determine the parameters of interest? or are they combined (and if so, how?) before the determination of the

parameters of interest? If each signal is used separately to determine the outputs, how are the separate outputs used?

7. Section 5.1.7 of WCAP-16260-P/WCAP-16260-NP, Revision 2, states, in part, that “The SCICR system functionality includes procedural controls, enforced by work instructions or software coding, that ensure:”
  - (a) Please describe in more detail the procedural controls, work instructions, and software coding.
  - (b) Please describe in more detail how the items are ensured.
  
8. Section 5.1.8 of WCAP-16260-P/WCAP-16260-NP, Revision 2, states: “The SCICR system employs a variety of controls in order to accomplish design objectives with respect to signal validation.”
  - (a) Please describe in more detail the controls employed.
  - (b) Please explain, in more detail, how the controls accomplish the design objectives.