

February 1, 2016

MEMORANDUM TO: Kevin Hsueh, Chief  
Licensing Processes Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

FROM: Joseph J. Holonich, Senior Project Manager /*William MacFee for RA*/  
Licensing Processes Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF DECEMBER 15, 2015, PUBLIC MEETING WITH  
ELECTRIC POWER RESEARCH INSTITUTE ON EPRI REPORT  
1025203 "UTILIZATION OF THE EPRI DEPLETION BENCHMARKS FOR  
BURNUP CREDIT VALIDATION" AND EPRI REPORT 1022909  
"BENCHMARKS FOR QUANTIFYING FUEL REACTIVITY DEPLETION  
UNCERTAINTY"

On December 15, 2015, U.S. Nuclear Regulatory Commission (NRC) staff met with representatives of the Electric Power Research Institute (EPRI) in an audio conference. The enclosure provides a list of those in attendance.

The public meeting followed NRC staff concerns about the request for additional information (RAI) responses from EPRI regarding the submittal EPRI Report 1025203 "Utilization of the EPRI Depletion Benchmarks for Burnup Credit Validation" and EPRI Report 1022909 "Benchmarks for Quantifying Fuel Reactivity Depletion Uncertainty." The intent of the meeting was to discuss the open items remaining after reviewing the RAI responses from EPRI.

#### Summary of Discussion Topics

The NRC staff began by addressing a proposed statistical approach submitted by EPRI on August 7, 2015, and the supplemental information submitted by EPRI on September 12, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML15232A531 and ML15257A129). The NRC staff believes that there is a reasonable chance of success going forward with the proposed statistical approach. EPRI committed to completing the analysis detailed in the statistical approach. EPRI also committed to quantifying what the range of burnups is within each sub-batch and to qualifying the uncertainty associated with the sub-batch versus the individual fuel assembly. The NRC staff noted a concern on applying the results of benchmarks developed using quarter core symmetry to asymmetric cores. The discussion resulted in both sides agreeing that this may be better covered under the review of the document NEI 12-16, Revision, 1, "Guidance for Performing Criticality Analyses of Fuel Storage at Light-Water Reactor Power Plants." The NRC staff then asked for clarification about what inputs to the benchmarks were measurements and which inputs were calculated. EPRI clarified that the flux maps used as inputs to the benchmarks were measurements taken by Duke Energy at their reactors.

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The NRC staff also had questions about the range of applicability specifically applying the benchmarks developed using one type of fuel to all types of fuel currently in use (and future designs) and noted that the EPRI reports did not cover extrapolating to different fuel designs. EPRI explained that a statement clarifying the extrapolation of the benchmarks to other fuel designs is necessary and will be included in supplemental information supplied to the NRC. The NRC staff also noted concerns on the range of applicability with respect to the use of the benchmarks with different depletion codes. For example, if an analyst goes to perform a spent fuel pool criticality safety calculation and finds the agreement between the benchmarks and the depletion code is poor, what options does the analyst have to take? A discussion followed that the benchmarks were intended to validate depletion codes not address deficiencies within the code. The NRC staff concluded that a discussion on the range of applicability with respect to other depletion codes would help address the appropriate use of the benchmarks. The NRC staff also asked if the data used to create the benchmarks would be publically available. EPRI responded that the data is from Duke Energy and not publically available. However, EPRI added that the Massachusetts Institute of Technology sponsored Benchmark for Evaluation and Validation of Reactor Simulations is publically available, and that this data set would be suitable for analysts to confirm EPRI's findings regarding reactivity decrement errors using independent calculational tools and methods. More information can be found at <http://crpg.mit.edu/pub/beavrs>.

The NRC staff and EPRI agreed about transmitting RAIs to capture the NRC staff concerns on the docket to help ensure that the responses to the RAIs satisfy the NRC staff concerns.

At the conclusion of the meeting, the NRC staff facilitated a discussion overview, action item identification, and meeting closeout.

One member of the public attended the meeting and provided comments at the end of the meeting. The member of the public stated concerns about how reactivity decrement is accounted for in fuel that has had physical changes such as fuel damage, axial growth, and other fuel thermal-mechanical phenomena. The NRC staff referred to the NEI 12-16 RAIs which ask similar questions to the one stated by the member of the public. The NRC staff committed to providing the ADAMS Accession numbers of the NEI 12-16 document and RAI request to the member of the public.

Project No. 669

Enclosure:  
List of Attendees

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<b>DATE</b>	12/17/2015	12/29/2015	01/05/2016
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<b>NAME</b>	CJackson	KHsueh	(WMacFee for) JHolonich
<b>DATE</b>	01/06/2016	01/13/2016	02/01/2016

### List of Attendees

U.S. Nuclear Regulatory Commission (NRC) Staff Meeting with Electric Power Research Institute (EPRI) on EPRI Report 1025203, "Utilization of the EPRI Depletion Benchmarks for Burnup Credit Validation," and EPRI Report 1022909, "Benchmarks for Quantifying Fuel Reactivity Depletion Uncertainty"

<b>Name</b>	<b>Organization</b>
William MacFee	NRR/DSS/SRXB
Kent Wood	NRR/DSS/SRXB
Amrit Patel	NRR/DSS/SRXB
Jim Livingston	Pacific Northwest National Laboratory
Kris Cummings	Nuclear Energy Institute
Kord Smith	EPRI Contractor
Hatice Akkurt	EPRI
Marvin Lewis	Member of the Public

Enclosure