

January 8, 2018

Mr. Norman J. Stringfellow
Chief Operating Officer and Chairman
PWR Owners Group
Program Management Office
1000 Westinghouse Drive
Cranberry Township, PA 16066

SUBJECT: SUMMARY REPORT FOR THE OCTOBER 17, 2017, AUDIT IN SUPPORT OF THE REVIEW OF PWROG-16043-P, REVISION 2, "PWROG PROGRAM TO ADDRESS NRC INFORMATION NOTICE 2012-09: 'IRRADIATION EFFECTS ON FUEL ASSEMBLY SPACER GRID CRUSH STRENGTH' FOR WESTINGHOUSE AND CE PWR FUEL DESIGNS"

Dear Mr. Stringfellow:

By letter dated February 1, 2017, the Pressurized Water Reactor Owner's Group (PWROG) submitted topical report (TR) PWROG-16043-P, Revision 2, for review and approval by the U.S. Nuclear Regulatory Commission (NRC). The topical report describes a proposed approach to address the impact of spacer grid spring relaxation due to irradiation, as discussed in Information Notice 2012-09. In essence, PWROG proposes extending the use of existing methodologies for licensees utilizing Westinghouse Electric Company (Westinghouse) and Combustion Engineering (CE) fuel assembly design types by the use of testing based on fuel assemblies with simulated end-of-life spacer grids. In addition, PWROG proposes a new methodology to credit flowing water dampening to mitigate the effect of the spacer grid spring relaxation on vibrations due to a reduction in fuel assembly stiffness.

An audit of understanding was requested to allow the NRC staff to review relevant documentation and discuss the methodology with cognizant technical experts from PWROG. The audit will support development of appropriately targeted request for additional information (RAI) questions, improving the efficiency of the TR review process.

The audit was held at the Westinghouse facility in Rockville, MD, on October 17, 2017. A copy of this audit plan can be found in the Agencywide Documents Access and Management System (ADAMS) at ML17270A159. A list of audit attendees is provided as Enclosure 1.

The results of the audit will be used by the NRC staff to support the development of draft RAI questions in a timely manner. The Audit Summary Report is provided as Enclosure 2.

N. Stringfellow

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If you have any questions, please contact me at (301) 415-2767 or via electronic mail at Brian.Benney@nrc.gov.

Sincerely,

/RA/

Brian Benney, Senior Project Manager
Licensing Processes Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Enclosures:

1. List of Attendees
2. Summary Report for Audit

SUBJECT: SUMMARY REPORT FOR THE OCTOBER 17, 2017 AUDIT IN SUPPORT OF THE REVIEW OF PWROG-16043-P, REVISION 2, "PWROG PROGRAM TO ADDRESS NRC INFORMATION NOTICE 2012-09: 'IRRADIATION EFFECTS ON FUEL ASSEMBLY SPACER GRID CRUSH STRENGTH' FOR WESTINGHOUSE AND CE PWR FUEL DESIGNS" DATED: JANUARY 8, 2018

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ADAMS Accession Nos.: Pkg.: ML17326A002; Audit Summary: ML17326A003; *via e-mail NRC-001

OFFICE	DLP/PLPB/PM	DLP/PLPB/LA*	DSS/SNPB/BC*	DLP/PLPB/BC	DLP/PLPB/PM
NAME	BBenney	DHarrison	RLukes	DMorey	BBenney
DATE	12/6/17	12/5/17	12/6/17	12/6/17	1/8/18

OFFICIAL RECORD COPY

LIST OF ATTENDEES

OCTOBER 17, 2017, AUDIT OF PRESSURIZED WATER REACTOR OWNER'S GROUP

TO SUPPORT REVIEW OF PWROG-16043-P, REVISION 2

"PWROG PROGRAM TO ADDRESS NRC INFORMATION NOTICE 2012-09:

'IRRADIATION EFFECTS ON FUEL ASSEMBLY SPACER GRID CRUSH STRENGTH'

FOR WESTINGHOUSE AND CE PWR FUEL DESIGNS"

PROJECT NO. 694

Name	Organization
Jim Andrachek	PWROG
Brian Benney	NRC
Scott Krepel	NRC

SUMMARY REPORT FOR
OCTOBER 17, 2017, AUDIT OF PRESSURIZED WATER REACTOR OWNER'S GROUP
TO SUPPORT REVIEW OF PWROG-16043-P, REVISION 2
"PWROG PROGRAM TO ADDRESS NRC INFORMATION NOTICE 2012-09:
'IRRADIATION EFFECTS ON FUEL ASSEMBLY SPACER GRID CRUSH STRENGTH'
FOR WESTINGHOUSE AND CE PWR FUEL DESIGNS"
PROJECT NO. 694

By letter dated February 1, 2017, the Pressurized Water Reactor (PWR) Owners Group (PWROG) submitted a licensing topical report (TR) which presents a methodology to develop fuel assembly characteristics and damping coefficients for end-of-life (EOL) conditions that can be used with existing testing and analysis methodologies for seismic and loss-of-coolant accident (LOCA) events. The TR is entitled, "PWROG Program to Address NRC Information Notice (IN) 2012-09: 'Irradiation Effects on Fuel Assembly Spacer Grid Crush Strength' for Westinghouse [Electric Company (Westinghouse)] and CE [Combustion Engineering] PWR Fuel Designs," and can be identified its TR number, PWROG-16043-P.

PWROG-16043-P is the PWROG's proposed approach to generically address the issue identified in IN 2012-09 for all licensees that use Westinghouse or CE fuel. In essence, this TR describes how to extend the previously approved testing and analysis methodologies in WCAP-9401-P-A and CENPD-178-P to determine an appropriate crushing load for spacer grids at EOL. In addition, the TR proposes a methodology that can be used to develop flowing water damping ratios that can then be credited in the LOCA and seismic analyses in a similar manner to the NRC approved still water damping ratios. In summary, the existing NRC approved testing and analysis methodologies will continue to be used, but this TR extends the applicability of the relevant aspects of these methodologies to the extent necessary to address potential fuel assembly structural performance issues as a result of irradiation. In addition, a new approach is proposed to aid licensees in recovery of margin lost due to this issue.

After introductions and opening remarks, the PWROG staff provided a presentation discussing PWROG-16043-P. By design, the presentation touched upon the specific topics that had been highlighted as areas of interest in the audit plan. During the presentation, the NRC staff member asked questions and engaged in discussion with the PWROG technical staff to obtain clarification and/or identify potential gaps in the documentation submitted as part of the TR. During the audit, the licensee presented to the NRC staff member a number of paper copies of documents related to the TR. The documents presented by PWROG for review by the NRC are listed below:

1. GCCD-14-141, 17 RFA-2 EOL grid summary test reports
2. GCCD-14-139, CE16NGF EOL grid summary test reports

3. PWROG-15048-P, 17 RFA-2 EOL fuel assembly mechanical summary test report
4. PWROG-15044-P, CE16NGF EOL fuel assembly mechanical summary test report
5. PWROG-15084-P, Fuel assembly flowing water damping test summary report -17RFA2
6. PWROG-15083-P, Fuel assembly flowing water damping test summary report – CE16NGF
7. PFT-16-36, 17RFA-2 and CE16NGF Fuel assembly flowing water damping data extrapolation

During the audit, the NRC staff member reviewed the information provided in the package and discussed it with the PWROG staff. There was open communication throughout the audit and it was conducted in accordance with the audit plan with no known deviation. As a result of the discussions, a number of open items were identified for which the PWROG staff understood that further clarification or discussion would be necessary. These items will be captured in request for additional information (RAI) questions by the NRC staff, along with any other questions that may emerge during the NRC staff's continuing review of PWROG-16043-P. The NRC staff engaged in a back-and-forth with PWROG to ensure that they understood what they would need to address in response to the RAIs.

The NRC staff member indicated that PWROG should expect to see the RAI questions in spring 2018. The NRC staff explained, when prompted, that the reason for the length of time between the audit for understanding and issuance of the RAI questions was that the NRC staff would complete a draft safety evaluation (SE) with holes prior to issuing the RAI questions. This will help minimize the potential for additional rounds of RAI questions by ensuring that the NRC staff has clearly identified any information gaps necessary to support a safety determination. This will also reduce the amount of time necessary to complete the draft SE upon receipt of the RAI responses.