

Project Number 694 WCAP-16793-NP, Revision 2

September 20, 2012

OG-12-395

Advisory Committee on Reactor Safeguards MS #T2E26 11545 Rockville Pike Bethesda, MD 20852

## Subject:PWR Owners GroupGSI-191 In-Vessel Debris Program (PA-SEE-0312 Rev. 4 and PA-SEE-0872 Rev. 0)

References:

- 1. WCAP-16793-NP, Revision 2, "Evaluation of Long-Term Cooling Considering Particulate, Fibrous and Chemical Debris in the Recirculating Fluid," October 2011.
- OG-12-287, "PWR Owners Group, Submittal of Supplement to WCAP-16793-NP, Revision 2 (PA-SEE-0312, Revision 4)," Letter from Jack Stringfellow, PWROG, to Stewart Bailey, NRC, dated July 20, 2012.

Dear Members of the ACRS:

On May 8 and 9, 2012, the Pressurized Water Reactor Owners Group (PWROG), along with the Nuclear Regulatory Commission (NRC) staff, made a presentation to the Advisory Committee on Reactor Safeguards (ACRS) Subcommittee on Thermal Hydraulic (T/H) Phenomena on the topic of WCAP-16793-NP, Revision 2 (Reference 1), and a proposed Safety Evaluation (SE) justifying methods for demonstrating acceptable in-vessel behavior in the presence of post-LOCA debris (i.e. Generic Safety Issue 191, GSI-191). At this meeting, the ACRS T/H subcommittee members raised various concerns about the program and its results, and whether the test data for in-vessel debris was sufficient to defend the conclusions of the WCAP and SE.

Based upon the extent of data available at even higher debris loads that achieved acceptable results, the large amount and extent of conservatisms built into this test program (as enumerated in Reference 2), and the conservative conditions under which the 15 g/fuel assembly testing was performed (e.g. limiting particulate-to-fiber ratio, conservatively low temperatures, conservatively high flow rates), the PWROG continues to stand behind the conservatism of this WCAP and its 15 g/fuel assembly result. The PWROG considers this value to be a "floor" for fiber limits, as relaxation of the available conservatisms in favor of more prototypical conditions will yield higher fiber limits. However, it is acknowledged that the PWROG cannot directly address all of the ACRS questions on WCAP-16793-NP, Revision 2, with the current test data

In light of these questions, the PWROG created an industry Tiger Team to formulate a future-looking program to bring closure to the in-vessel portion of GSI-191 that would be defensible, prototypical, and usable by all U.S. operating pressurized-water reactors (PWRs). The industry Tiger Team has established a set of conceptual testing objectives and the framework necessary to build a comprehensive test program to address in-vessel debris. The development of this program considers input from the previous testing efforts, interaction with the ACRS T/H subcommittee, and appropriately selected technical resources. Accordingly, the program includes an independent third-party review of all previous PWROG testing to inform and provide insights to the evolving test program plan. The plan also incorporates development of a Phenomenon Identification and Ranking Table (PIRT) to direct test matrix development. A challenge board review will be completed prior to program testing.

The comprehensive program will follow an appropriate scientific approach, including Design of Experiment concepts, to generate test matrices, address important phenomena, and yield sets of defensible debris limits that can be utilized by all U.S. PWR utilities. This program was initiated in September 2012 and will continue through the fall of 2014. The program results will be documented in new WCAPs addressing in-vessel debris effects and related boric acid precipitation, and will be submitted to the NRC staff. Upon completion of the in-vessel debris program, the PWROG will be prepared to present the program conclusions to the ACRS.

The PWROG appreciates the interaction with the ACRS T/H subcommittee and has recognized the value of the comments received as reflected in the development of this in-vessel debris test program. The PWROG anticipates satisfactory resolution of the ACRS principal concerns while establishing an appropriate set of in-vessel debris criteria. Discussions with the ACRS will be requested following appropriate milestones in order to apprise the ACRS of the interim program results.

Correspondence related to this transmittal, including requests for additional information, should be addressed to:

Mr. W. Anthony Nowinowski, Program Manager PWR Owners Group, Program Management Office Westinghouse Electric Company LLC Suite 380, 1000 Westinghouse Drive Cranberry Township, Pennsylvania 16066

If you have any questions, please do not hesitate to contact me at (205) 992-7037 or Mr. W. Anthony Nowinowski at (412) 374-6855.

Sincerely,

Norman & Stringfellow

Jack Stringfellow, Chairman PWR Owners Group

JTM:kjn:rfn

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