August 17, 2010

Mr. David Czufin
Exelon
Chairman, BWR Vessel and Internals Project
Electric Power Research Institute
3420 Hillview Avenue
Palo Alto, CA 94304-1395

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION ON BWRVIP-86, REVISION 1, "BWR VESSEL AND INTERNALS PROJECT, UPDATED BWR INTEGRATED SURVEILLANCE PROGRAM (ISP) IMPLEMENTATION PLAN" (TAC NO. ME2190)

Dear Mr. Czufin:

By letter dated January 26, 2009 (Agencywide Documents Access and Management System Accession No. ML090300577), the Boiling Water Reactor Vessel and Internals Project (BWRVIP) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review BWRVIP-86, Revision 1, "BWR Vessel and Internals Project, Updated BWR Integrated Surveillance Program (ISP) Implementation Plan," which combines all separate BWR surveillance programs into a single integrated program. Upon review of the information provided, the NRC staff has determined that additional information is needed to complete the review. Mr. Larry Steinert of your staff and Ralph Architzel of the NRC staff agreed that the response to the enclosed Request for Additional Information (RAI) will be received within four months of the date of this letter. If you have any questions regarding the enclosed RAI questions, please contact me at 301-415-4053.

Sincerely,

/RA/

Jonathan Rowley Project Manager
Licensing Processes Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Project No. 704

Enclosure:
Request for Additional Information

cc w/encl: See next page

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PROJECT NO. 704

REQUEST FOR ADDITIONAL INFORMATION

BWRVIP-86, REVISION 1: "BWR VESSEL AND INTERNALS PROJECT, UPDATED BWR INTEGRATED SURVEILLANCE PROGRAM IMPLEMENTATION PLAN" (TAC NO. ME2190)

1. There are no definite indications of the processes through which any of the neutron fluences in the document were produced. Please confirm that all updated fluence calculations were performed using Nuclear Regulatory Commission (NRC) approved methodology and where appropriate it should be noted if the calculations were consistent with the requirements and guidance provided by Regulatory Guide 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence." It would be beneficial to include language and indications of this consistency within the technical report. This issue has been noted previously.

From the final safety evaluation of Boiling Water Reactor Vessel and Internals Project (BWRVIP)-86, page 15 and BWRVIP-86, Revision 1 page B-18:

> (1) RPV [reactor pressure vessel] and surveillance capsule fluences will be established as based on the use of an NRC-approved fluence methodology that will provide acceptable results based on the available dosimetry data,
>
> (2) if one methodology is used to determine the neutron fluence values for a licensee's RPV and one or more different methodologies are used to establish the neutron fluence values for the ISP [Integrated Surveillance Program] surveillance capsules which "represent" that RPV in the ISP, the results of these differing methodologies are compatible (i.e., within acceptable levels of uncertainty for each calculation).

From the safety analysis cover letter for BWRVIP-116 and BWRVIP-86, Revision 1 page C-2:

> The NRC staff has completed its review of the BWRVIP-116 report and the associated RAI responses. The staff finds that the final proposed BWRVIP ISP(E) (as addressed in the attached safety evaluation) is acceptable for BWR licensees implementation provided that all licensees continue to use one or more compatible neutron fluence methodologies acceptable to the NRC staff, i.e., which comply with the guidance in Regulatory Guide 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," to determine surveillance capsule and RPV neutron fluences. Compatible in this case may be understood to mean neutron fluence methodologies which provide results that are within acceptable levels of uncertainty for each calculation. This condition of ISP(E) implementation is necessary to ensure that data from surveillance capsules included in the ISP(E) may be appropriately shared between BWR facilities and that the basis for the neutron fluence determined from a specific capsule and the RPV which it is intended to represent are comparable. This issue is related to the requirements for an ISP found in items a., b., and c., of Appendix H to 10 CFR Part 50, Paragraph III.C.1.

A statement attesting to adherence to NRC accepted methodology and Regulatory Guide 1.190 is buried within Section 5.3 but no explicit mention of the nature and

pedigree of the neutron fluence values reported is made throughout the rest of the document or prefacing any of the values presented.

Section 3, BWR Surveillance Programs Before the ISP

2. In Tables 3-2 and 3-3 there are several updated chemistry values, for instance in Table 3-2 the nickel content for Browns Ferry 1, Fitzpatrick, Hatch 2, River Bend, and Susquehanna were updated. In Table 3-3 the chemistries from Browns Ferry 1, Dresden 3, Duane Arnold, Grand Gulf, Hope Creek, LaSalle 1, Perry, River Bend, and Susquehanna 1 were updated from the values presented in BWRVIP-86-A and/or the NRC staff's Reactor Vessel Integrity Database (RVID). Please clarify whether each affected licensee has reported those changes to, and had them accepted by, the NRC.

3. In Table 3-4 the chemistry values for the Oyster Creek SSP Capsule, B&W/EPRI Linde 80 weld was markedly changed from the BWRVIP-86-A reported value. Please clarify whether this change was reported to, and accepted by, the NRC and if this change warranted re-evaluation.

4. A reference is made on page 3-3 of BWRVIP-86 Rev. 1, to Table 3-7. Please clarify if that reference should refer to Table 3-5 instead.

Section 4, ISP Capsule Irradiation, Withdrawal and Testing

5. Tables 4-1 and 4-2 include numerous updated chemistry and neutron fluence values including some strongly different neutron fluence values such as that of the River Bend surveillance plate and the Clinton weld. Please clarify whether each affected licensee has reported those changes to, and had them accepted by, the NRC.

6. In Section 4.1.2 the argument is made that changes to the target limiting material need not be made whenever the vessel limiting material changes. This argument is supported by citing that changes are neither required by ASTM E185-82, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels," nor likely to occur and therefore the test matrix set of target materials will remain static with regard to future changes in vessel limiting materials. This reasoning holds merit and provides value to the document, but the staff considers that the below conclusions stated on page 4-11 are too strictly negative with regards to accounting for changes in vessel limiting materials;

> BWRVIP evaluation of the effects or consequences of changes in vessel limiting materials has shown that the ISP test matrix does not need to be changed when vessel limiting materials change. Therefore, the test matrix set of target vessel materials will remain "static" with regard to future changes in vessel limiting materials. The reasons are discussed below.

and again on page 4-14,

> The BWRVIP evaluation concluded that the guidance of ASTM E 185-82 does not require the ISP to maintain a "dynamic" test matrix in which the target material changes whenever the vessel limiting material changes; that no

> technical benefit would be derived from doing so; and that maintenance of a "dynamic" test matrix would not cause valuable surveillance data to be considered that is not already being considered. It would, however, detract from the long-term effectiveness of the ISP by reducing its ability to monitor specific high-value surveillance materials over time. For these reasons, the ISP test matrix (either target vessel material or representative surveillance material) will not be changed when a vessel limiting material changes.

It is the understanding of the staff that the arguments put forth in Section 4.1.2 state, in simple terms, that the ISP [and ISP(E)] need not be changed every time a small fluctuation in neutron fluence or chemistry analysis changes the vessel limiting material.

Please clarify if this is the intent, and provide language that is less strict. It would be expected that if major new information came forward concerning the nature or properties of vessel materials (for example, reevaluation of RPV material embrittlement due to the use of new embrittlement models) that would then suggest a change in vessel limiting material, and consequently target limiting materials, such change would be evaluated and considered for possible implementation within the program. The current text of BWRVIP-86, Revision 1 seems to preclude this eventuality.

7. Figures 4-1 and 4-2 are nearly unreadable in printed format. Please reformat these figures for readability and clarity. Enlarging the figures which are already segregated to their own pages as well as using more distinct shapes and colors would be preferable with special attention being paid to the appearance of the figures when printed in black and white. Additionally the two figures should have a consistent selection of shapes with regards to data plotted. Currently there is no stylistic consistency between the two plots which leads to confusion between them.

<u>Appendix A</u>

8. Numerous chemistries were updated with the Individual Vessel Evaluation tables as noted in the revision notes. Please clarify whether each affected licensee has reported those changes to, and had them accepted by, the NRC.