

2014-023 _____ BWR Vessel & Internals Project (BWRVIP)

February 21, 2014

Document Control Desk
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Attention: Joseph Holonich

Subject: Project No. 704 – Appendix B to BWRVIP-139-A: BWR Vessel and Internals
Project, Steam Dryer Inspection and Flaw Evaluation Guidelines

Enclosed are five (5) paper copies of Appendix B to “BWRVIP-139-A: BWR Vessel and Internals Project, Steam Dryer Inspection and Flaw Evaluation Guidelines” to the NRC.

Appendix B to BWRVIP-139, “BWR Steam Dryer Demonstration of Compliance with the Technical Information Requirements of the License Renewal Rule [10 CFR 54.21]” was originally transmitted to NRC in 2009, and at the time, the Appendix referenced the unapproved version of the underlying report “BWRVIP-139”. After two NRC Requests for Additional Information (RAI) and several communications with NRC staff, it was decided that the Appendix should be revised to reference the now approved version of the report “BWRVIP-139-A”. Accordingly, the Appendix has been revised and is now being transmitted to the NRC. With this submittal, and as agreed upon with the NRC staff, it is requested that a new RAI, which is more clearly focused on the License Renewal aspects of BWRVIP-139-A, be issued.

Please note that the enclosed report contains proprietary information. A letter requesting that the report be withheld from public disclosure and an affidavit describing the basis for withholding this information are provided as Attachment 1. All proprietary information is highlighted with brackets and yellow shading. The proprietary information is also marked with the letters “TS” in the margin indicating that information is considered trade secrets in accordance with 10CFR2.390.

Two paper copies of the non-proprietary Appendix B to “BWRVIP-139-A: BWR Vessel and Internals Project, Steam Dryer Inspection and Flaw Evaluation Guidelines,” are also enclosed. This non-proprietary report is identical to the enclosed proprietary report except that the proprietary information has been deleted.

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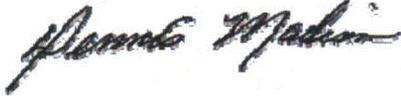
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LRR

Additional were sent to the PM

If you have any questions on this subject, please contact Drew Odell (Exelon, BWRVIP Integration Committee Technical Chairman) by email at andrew.odell@exeloncorp.com or by telephone at 610.765.5483.

Sincerely,

A handwritten signature in black ink, appearing to read "Dennis Madison". The signature is written in a cursive style with a horizontal line at the end.

Dennis Madison
Southern Nuclear
Chairman, BWR Vessel and Internals Project

Kurt Edsinger
Director, PWR &
BWR Materials

February 4, 2014

Document Control Desk
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Request for Withholding of the following Proprietary Information Included in:

Appendix B
BWR Steam Dryer
Demonstration of Compliance with the Technical Information Requirements of the License Renewal Rule
[10 CFR 54.21] from
"BWRVIP-139-A: BWR Vessel and Internals Project, Steam Dryer Inspection and Flaw Evaluation
Guidelines," EPRI Technical Report 1018794, July 2009

To Whom It May Concern:

This is a request under 10 C.F.R. §2.390(a)(4) that the U.S. Nuclear Regulatory Commission ("NRC") withhold from public disclosure the report identified in the enclosed Affidavit consisting of the proprietary information owned by Electric Power Research Institute, Inc. ("EPRI") identified in the attached report. Proprietary and non-proprietary versions of the Report and the Affidavit in support of this request are enclosed.

EPRI desires to disclose the Proprietary Information in confidence to assist the NRC. The Proprietary Information is not to be divulged to anyone outside of the NRC or to any of its contractors, nor shall any copies be made of the Proprietary Information provided herein. EPRI welcomes any discussions and/or questions relating to the information enclosed.

If you have any questions about the legal aspects of this request for withholding, please do not hesitate to contact me at (704) 704-595-2732. Questions on the content of the Report should be directed to Andy McGehee of EPRI at (704) 502-6440.

Sincerely,



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AFFIDAVIT

RE: Request for Withholding of the Following Proprietary Information Included In:

Appendix B
BWR Steam Dryer

Demonstration of Compliance with the Technical Information Requirements of the License Renewal Rule
[10 CFR 54.21] from

“BWRVIP-139-A: BWR Vessel and Internals Project, Steam Dryer Inspection and Flaw Evaluation
Guidelines,” EPRI Technical Report 1018794, July 2009

I, Kurt Edsinger, being duly sworn, depose and state as follows:

I am the Director of PWR and BWR Materials at Electric Power Research Institute, Inc. whose principal office is located at 3420 Hillview Avenue, Palo Alto, CA. (“EPRI”) and I have been specifically delegated responsibility for the above-listed report that contains EPRI Proprietary Information that is sought under this Affidavit to be withheld “Proprietary Information”. I am authorized to apply to the U.S. Nuclear Regulatory Commission (“NRC”) for the withholding of the Proprietary Information on behalf of EPRI.

EPRI Information is identified by double square brackets. [[This sentence is an example.]] the information is also highlighted in yellow. Tables containing EPRI proprietary information are identified with double square brackets before and after the object. In each case, the superscript notation {E} refers to this affidavit as the basis for the proprietary determination.

EPRI requests that the Proprietary Information be withheld from the public on the following bases:

Withholding Based Upon Privileged And Confidential Trade Secrets Or Commercial Or Financial Information (see e.g., 10 C.F.R. § 2.390(a)(4)):

a. The Proprietary Information is owned by EPRI and has been held in confidence by EPRI. All entities accepting copies of the Proprietary Information do so subject to written agreements imposing an obligation upon the recipient to maintain the confidentiality of the Proprietary Information. The Proprietary Information is disclosed only to parties who agree, in writing, to preserve the confidentiality thereof.

b. EPRI considers the Proprietary Information contained therein to constitute trade secrets of EPRI. As such, EPRI holds the Information in confidence and disclosure thereof is strictly limited to individuals and entities who have agreed, in writing, to maintain the confidentiality of the Information.

c. The information sought to be withheld is considered to be proprietary for the following reasons. EPRI made a substantial economic investment to develop the Proprietary Information and, by prohibiting public disclosure, EPRI derives an economic benefit in the form of licensing royalties and other additional fees from the confidential nature of the Proprietary Information. If the Proprietary Information were publicly available to consultants and/or other businesses providing services in the electric and/or nuclear power industry, they would be able to use the Proprietary Information for their own commercial benefit and profit and without expending the substantial economic resources required of EPRI to develop the Proprietary Information.

d. EPRI's classification of the Proprietary Information as trade secrets is justified by the Uniform Trade Secrets Act which California adopted in 1984 and a version of which has been adopted by over forty states. The California Uniform Trade Secrets Act, California Civil Code §§3426 – 3426.11, defines a "trade secret" as follows:

"Trade secret" means information, including a formula, pattern, compilation, program device, method, technique, or process, that:

- (1) Derives independent economic value, actual or potential, from not being generally known to the public or to other persons who can obtain economic value from its disclosure or use; and
- (2) Is the subject of efforts that are reasonable under the circumstances to maintain its secrecy."

e. The Proprietary Information contained therein are not generally known or available to the public. EPRI developed the Information only after making a determination that the Proprietary Information was not available from public sources. EPRI made a substantial investment of both money and employee hours in the development of the Proprietary Information. EPRI was required to devote these resources and effort to derive the Proprietary Information. As a result of such effort and cost, both in terms of dollars spent and dedicated employee time, the Proprietary Information is highly valuable to EPRI.

f. A public disclosure of the Proprietary Information would be highly likely to cause substantial harm to EPRI's competitive position and the ability of EPRI to license the Proprietary Information both domestically and internationally. The Proprietary Information can only be acquired and/or duplicated by others using an equivalent investment of time and effort.

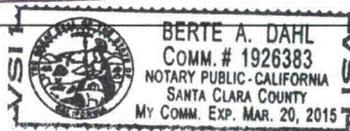
I have read the foregoing and the matters stated herein are true and correct to the best of my knowledge, information and belief. I make this affidavit under penalty of perjury under the laws of the United States of America and under the laws of the State of California.

Executed at 3420 Hillview Avenue, Palo Alto, CA being the premises and place of business of Electric Power Research Institute, Inc.

Date: FEB 4, 2014

Kurt Edsinger
Kurt Edsinger

(State of California)



Subscribed and sworn to (or affirmed) before me on this 4th day of February, 2014 by Kurt Edsinger, proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

Signature Berthe A. Dahl (Seal)

My Commission Expires 20th day of March, 2015

Non-Proprietary Version of Appendix B
to "BWRVIP-139-A: BWR Vessel and Internals Project, Steam
Dryer Inspection and Flaw Evaluation Guidelines"

Appendix B BWR Steam Dryer

Demonstration of Compliance with the Technical Information Requirements of the License Renewal Rule [10 CFR 54.21]

The purpose of Appendix B is to demonstrate that this report (along with associated BWRVIP correspondence amending the report) provides the necessary information to comply with the technical information requirements pursuant to §54.21(a) and (c), §54.22, and the NRC's findings under §54.29(a) of the license renewal rule [Reference B.8 (1)]. It is intended that the NRC's review and approval of Appendix B will allow utilities the option to incorporate the report and Appendix by reference in a plant-specific integrated plant assessment (IPA) and time-limited aging analysis (TLAA) evaluation. If a license renewal applicant confirms that this report applies to their plant's current licensing basis (CLB) and that the results of the Appendix B IPA and TLAA evaluation are in effect at their plant, then no further review by the NRC of the matters described herein is needed. This appendix is only directly applicable to the steam dryer designs addressed within this report.

B.1 Description of the BWR Steam Dryer and Intended Functions

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Steam dryer configurations for BWR/2 through BWR/6 designs are described in Section 2.3 and shown in Figures 2-1 through 2-50. Steam dryer materials of construction are outlined in Section 2.1.

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The intended function is preserved under normal, upset, emergency, and faulted conditions. Section 4.0 describes the details of the loading evaluations that were performed to support the adequacy of the aging management requirements described in Section 5.0.

B.2 Steam Dryer Components Subject to Aging Management Review

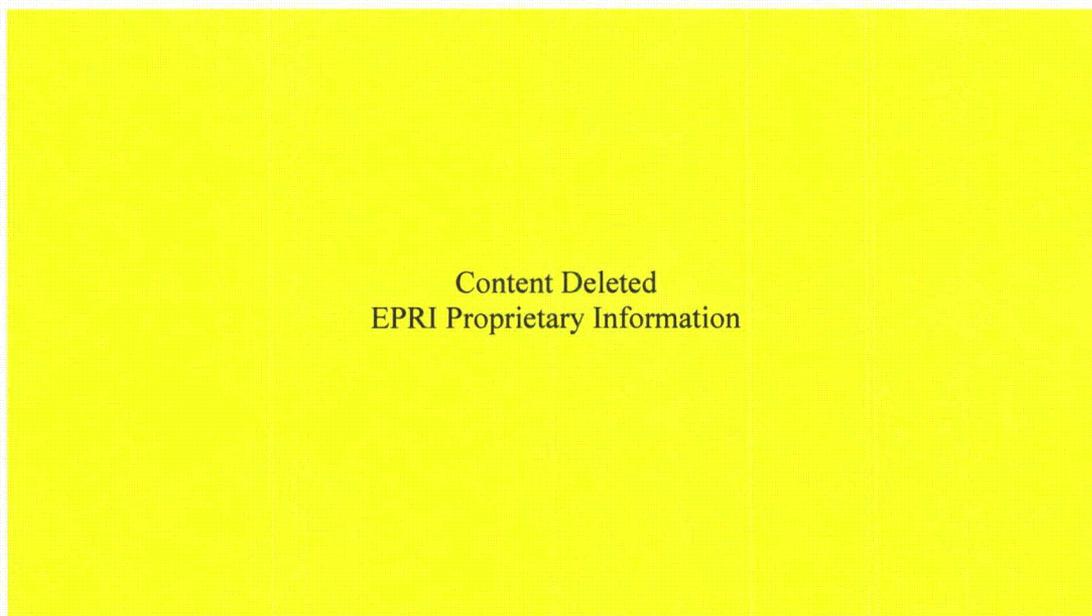
§54.21(a)(1) of the license renewal rule provides the requirements for identifying components that are subject to aging management review. The steam dryer license renewal evaluation boundary includes those steam dryer components that are required to accomplish the intended function described above in Section B.1 (i.e., to maintain structural integrity). The approach used in BWRVIP-139-A does not rely on evaluation to exclude any steam dryer sub-component from aging management review. FMEA, finite element structural analyses, and operating experience are used as inputs to guide development of an integrated inspection program that manages aging of the entire steam dryer.

B.3 Management of Aging Effects [§54.21(a)(3)]

§54.21(a)(3) of the license renewal rule requires a demonstration that the effects of aging will be adequately managed so that the intended function will be maintained consistent with the CLB for the period of extended operation.

(a) Description of Aging Effects:

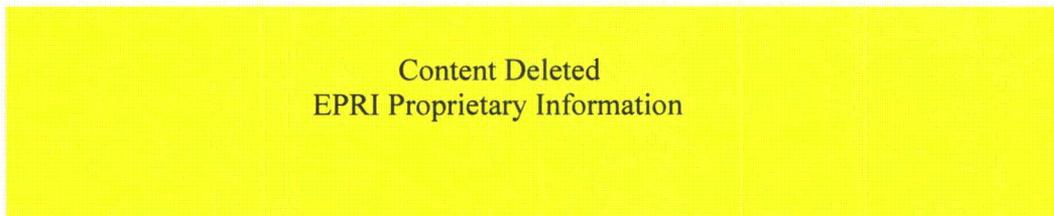
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Sections 2.1 and 2.2 of BWRVIP-139-A contain additional discussion of the materials, construction and operating environment. Additionally, Sections 1.1, 2.4 and 2.5 contain supplemental information related to BWR steam dryer environmental conditions, degradation modes, and operating experience.

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(b) Assessment of Aging Effects and Programs

Management of crack initiation and growth is accomplished by assessment, inspection, and monitoring.

Sections 3.0 and 4.0 describe assessment of the steam dryers using FMEA and finite element analysis modeling. These assessments are used to form a basis for steam dryer inspection plans.

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Section 4.0 describes 3-D finite element modeling evaluations used to identify locations with higher relative susceptibility to FIV induced fatigue cracking. The results of these finite element analyses are presented in Sections 4.5.1, 4.5.2, and 4.5.3 for square hood dryers, slanted hood dryers, and curved hood dryers, respectively.

Additional guidance for demonstrating steam dryer structural integrity under power uprate conditions is contained in BWRVIP-182-A. [Reference B.8 (5)] BWRVIP-182-A defines documentation and benchmarking requirements for steam dryer integrity demonstration in conjunction with power uprate license application.

The inspection program for the steam dryer is described in Section 5.0.

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Steam dryer inspection recommendations are defined in Section 5.3. Figures 5-1 through 5-11 illustrate the recommended inspection locations. Integrity based inspection locations are outlined in red. Field experience based inspection locations are outlined in green. Square hood steam dryer inspection locations are described in Section 5.3.1, summarized in Table 5-1, and illustrated in Figures 5-1 through 5-8. Slanted hood steam dryer inspection locations are described in Section 5.3.2, summarized in Table 5-2, and illustrated in Figures 5-9 and 5-10. Curved hood steam dryer inspection locations are described in Section 5.3.3, summarized in Table 5-3, and illustrated in Figure 5-11. Section 5.3.4 describes the strategy for re-inspection of steam dryers. A graded approach is provided, with re-inspection recommendations dependent on power level changes and the stability of cracks left in the as found condition. Inspections of repaired regions of the steam dryer are performed in accordance with BWRVIP-181-A, "Steam Dryer Repair Criteria" [Reference B.8 (6)].

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Proactive monitoring methods are described in Section 7.0. These methods are classified as "Good Practice" in accordance with NEI 03-08, Revision 2 [Reference B.8 (3)].

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B.4 Time Limited Aging Analyses [§54.21(c)(1)]

The six criteria for time limited aging analyses (TLAA) contained in §54.3 were applied to identify TLAA's for the steam dryer. For the purposes of this demonstration, TLAA's are those calculations and analyses that:

1. Involve the steam dryer,
2. Consider the effects of aging,
3. Involve time-limited assumptions defined by the current operating term,
4. Were determined to be relevant in making a safety determination,
5. Involve conclusions or provide the basis for conclusions related to the capability of the steam dryer to perform its intended function, and,
6. Are incorporated or contained by reference in the CLB.

No generic TLAAs applicable to the steam dryer were identified. If a plant-specific analysis identified by an applicant meets all six criteria above, the analysis would be identified by the applicant as a TLAA for license renewal and dispositioned by the applicant in its license renewal application.

B.5 Exemptions [§54.21(c)(2)]

Exemptions associated with the steam dryer that contain TLAA analysis issues will be identified and evaluated for license renewal by individual applicants.

B.6 Technical Specification Changes or Additions [§54.22]

There are no generic changes or additions to the technical specifications associated with the steam dryer as a result of this aging management review to ensure that the effects of aging are adequately managed. Justification for plant-specific changes or additions will be provided by the applicant.

B.7 Demonstration that Activities will Continue to be Conducted in Accordance with the CLB [54.29(a)]

Sections B.1, B.2, and B.3 address the requirements of §54.21(a) of the rule. The steam dryer components that are subject to aging management review are identified, and it is demonstrated that the effects of aging are adequately managed. Sections B.4 and B.5 address the requirements of §54.21(c) of the rule. Plant-specific TLAAs and exemptions that require evaluation will be evaluated by the applicant. Section B.6 addresses the requirements of §54.22. There are no generic technical specification changes or additions necessary to manage the effects of aging for the steam dryer during the period of extended operation. Plant-specific changes or additions will be justified by the applicant.

Therefore, actions have been identified and will be taken by utilities with BWR plants, such that there is reasonable assurance that aging will be managed such that the intended function of the steam dryer will be maintained during the period of extended operation.

B.8 References

- (1) Title 10 of the Code of Federal Regulations, Part 54, *Requirements for License Renewal of Operating Licenses for Nuclear Power Plants*, (77 Federal Register 39907), July 6, 2012.
- (2) Nuclear Energy Institute Report NEI 95-10, Revision 6, *Industry Guideline for Implementing the Requirements of 10 CFR Part 54 the License Renewal Rule*, June 2005.

- (3) Nuclear Energy Institute Report NEI 03-08, Revision 2, *Guideline for the Management of Materials Issues*, January 2010.
- (4) *BWRVIP-06, Revision 1-A: BWR Vessel and Internals Project, Safety Assessment of BWR Reactor Internals*, EPRI, Palo Alto, CA: 2009. 1019058.
- (5) *BWRVIP-182-A: BWR Vessel and Internals Project, Guidance for Demonstration of Steam Dryer Integrity for Power Uprate*, EPRI, Palo Alto, CA: 2010. 1020802.
- (6) *BWRVIP-181-A: BWR Vessel and Internals Project, Steam Dryer Repair Criteria*, EPRI, Palo Alto, CA: 2010. 1020997.