

2011-168 _____ BWR Vessel & Internals Project (BWRVIP)

September 22, 2011

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U. S. Nuclear Regulatory Commission
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Rockville, MD 20852

Attention: Andrew Hon

Subject: Project No. 704 – BWRVIP Program Implementation Guide (BWRVIP-94NP,
Revision 2)

Enclosed for your information are five (5) copies of the report “BWRVIP-94NP, Revision 2: BWR Vessel and Internals Project, Program Implementation Guide,” EPRI Technical Report 1024452, September 2011. This report is being transmitted to the NRC for information only to keep the NRC informed of industry efforts to manage BWR material degradation issues.

The enclosed report establishes a framework for structuring and strengthening existing vessel and internals programs to ensure consistent application of guidelines by BWRVIP member utilities. This revision incorporates updates to reflect utility experience since the publication of Revision 1 as well as guidance from internal BWRVIP self assessments and from NEI 03-08, “Guideline for the Management of Materials Issues, Revision 2,” January 2010. Please note that the enclosed report is non-proprietary and is available to the public for download from the EPRI website (http://my.epri.com/portal/server.pt?Product_id=000000000001024452).

If you have any questions on this subject please call Chuck Wirtz (FirstEnergy, BWRVIP Integration Committee Technical Chairman) at 440.280.7665.

Sincerely,



Dave Czufin
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Chairman, BWR Vessel and Internals Project

c: Matt Mitchell, NRC

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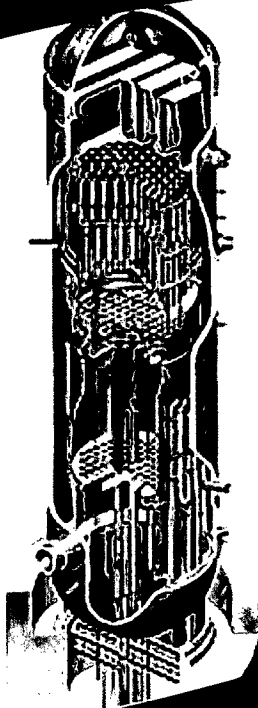
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Program Implementation Guide



BWRVIP-94NP, Revision 2: BWR Vessel and Internals Project

Program Implementation Guide

1024452

Final Report, September 2011

EPRI Project Manager
R. Stark

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This report is based on the following previously published report:

BWRVIP-94, Revision 1: BWR Vessel and Internals Project, BWR Vessel and Internals Project, Program Implementation Guide. EPRI, Palo Alto, CA: 2005. 1011702.

The report is a corporate document that should be cited in the literature in the following manner:

BWRVIP-94NP, Revision 2: BWR Vessel and Internals Project, Program Implementation Guide. EPRI, Palo Alto, CA: 2011. 1024452.

ABSTRACT

This document establishes a framework for structuring and strengthening existing BWR vessel and internals programs to ensure consistent application of guidelines by BWR Vessels and Internals Project (BWRVIP) members.

Program elements outlined in this document include inspection, assessment, repair and mitigation activities, and refers utilities to BWRVIP guidelines (BWRVIP documents) for technical details.

Keywords

Boiling water reactor
Stress corrosion cracking
Vessel and internals
BWRVIP implementation

EXECUTIVE SUMMARY

This document establishes a framework for structuring and strengthening existing BWR vessel and internals programs to ensure consistent application of guidelines by BWR Vessel and Internals Project (BWRVIP) members.

Program elements outlined in this document include inspection, assessment, repair and mitigation activities, and refers utilities to BWRVIP guidelines (BWRVIP documents) for technical details.

EPRI, in conjunction with the BWRVIP, will maintain this guide as an EPRI document and revise it as necessary.

BWRVIP guidelines and this document recognize the need for analysis and flexibility within each plant-specific program.

Utility specific program problems and deviations will be handled in accordance with the plant's corrective action process and the utility's Vessel and Internals Program (VIP) will be fully integrated with existing quality assurance programs in accordance with 10 CFR 50 Appendix B.

BWRVIP members agree to share inspection results with the BWRVIP.

Section 1-“Introduction” provides a background, discusses member utility responsibilities, and the process for revising referenced BWRVIP guidelines.

Section 2-“Vessel and Internals Program” defines the program elements and implementing guidance for strengthening existing vessel and internals programs.

Section 3-“BWR Vessel and Internals Program Support Elements” identifies the program elements necessary to ensure long-term vessel and internals reliability.

Appendix A- “BWRVIP Utility Commitment Letters to NRC” provides BWRVIP utility commitments to the NRC.

Appendix B-“Guidelines for Deviation Disposition” provides guidance for dispositioning deviations from BWRVIP recommendations.

Appendix C “Emergent Issues Protocol” describes the expectations for the communication and evaluation of emergent BWR vessel and internals materials issues.

Appendix D “Record of Revisions – BWRVIP-94NP, Revision 2” provides details of revisions made in BWRVIP-94NP, Revision 2.

PREAMBLE

The BWRVIP Executive Committee (EC) has approved this document for publication and implementation. Furthermore, the BWRVIP EC concurs that:

- utilities shall continue to meet the BWRVIP commitments to the NRC to implement BWRVIP documents (these commitments to the NRC are identified in the BWRVIP letters in Appendix A),
- utilities shall continue to implement BWRVIP documents described herein,
- utilities shall develop an implementation plan at each plant and
- BWRVIP documents shall be implemented in accordance with a controlled program that complies with 10CFR50, Appendix B.

RECORD OF REVISIONS

BWRVIP-94	Original Report (1006288)
BWRVIP-94, Revision 1	The report as originally published (1006288) was revised to incorporate updates to reflect utility experience since the original publication. The revised report also incorporates guidance from the following NEI documents issued since the original publication of BWRVIP-94: 1. NEI 03-08, "Guideline for the Management of Materials Issues," May 2003. 2. "Materials Guidelines Implementation Protocol," Revision 0, May 2004. BWRVIP commitment letters transmitted to the NRC in 1997 have also been included in a new Appendix A. All changes are marked with margin bars.
BWRVIP-94NP, Revision 2	BWRVIP-94, Revision 1 was revised to incorporate updates to reflect utility experience since the publication of Revision 1. The revised report also incorporates guidance from the following documents issued since the publication of BWRVIP-94, Revision 1: 1. Self Assessment of the Boiling Water Reactor Vessel & Internals Project, September 2006 (BWRVIP Correspondence File Number 2006-033) 2. 2008 Self-Assessment Report – BWRVIP Program (BWRVIP Correspondence File Number 2009-104) 3. NEI 03-08, Revision 2, "Guideline for the Management of Materials Issues," January 2010 4. 2010 Self-Assessment Report – BWRVIP Program (BWRVIP Correspondence File Number 2010-261A) All changes are marked with margin bars. Details of the revisions can be found in Table D-1.

CONTENTS

1 INTRODUCTION	1-1
1.1 Background.....	1-1
1.2 Roles and Responsibilities in Accordance with NEI 03-08	1-2
1.2.1 Roles and Responsibilities of the BWRVIP	1-2
1.2.2 Roles and Responsibilities of Individual BWRVIP Utilities	1-3
1.3 Member Responsibilities.....	1-3
1.4 Utility Requirements.....	1-4
1.5 Emergent Issues.....	1-6
1.6 Implementation Requirements	1-6
2 VESSEL AND INTERNALS PROGRAM.....	2-1
2.1 Vessel and Internals Program Development and Documentation	2-1
2.2 Inspection	2-2
2.3 Repairs	2-2
2.4 Maintenance of Vessel and Internals Integrity	2-2
3 BWRVIP VESSEL AND INTERNALS PROGRAM SUPPORT ELEMENTS	3-1
3.1 Water Chemistry Control.....	3-1
3.2 Quality Assurance.....	3-1
3.3 Corrective Action.....	3-1
3.4 Self-Assessment.....	3-1
3.5 Reporting	3-2
A APPENDIX A: BWRVIP UTILITY COMMITMENT LETTERS TO NRC	A-1
B APPENDIX B: GUIDELINES FOR DEVIATION DISPOSITION	B-1
Introduction	B-1
General Considerations.....	B-1

Deviation Disposition Document Structure.....	B-1
Archiving of Deviation Dispositions	B-2
C APPENDIX C: BWRVIP EMERGENT ISSUES PROTOCOL.....	C-1
D APPENDIX D: RECORD OF REVISIONS, BWRVIP-94NP, REVISION 2	D-1

1

INTRODUCTION

This document is provided to ensure consistent application of BWRVIP guidelines by BWRVIP member utilities. Revision 2 of this document incorporates updates to reflect utility experience since the publication of Revision 1 of this document and guidance from Nuclear Energy Institute (NEI) 03-08, “Guideline for the Management of Materials Issues, Revision 2,” January 2010. NEI 03-08 outlines the policy and practices that the industry commits to follow in managing materials aging issues.

1.1 Background

Intergranular stress corrosion cracking (IGSCC) in austenitic stainless steel piping was identified as a major issue for BWRs in the 1980s. At the same time, EPRI and the BWR owners recognized that reactor internals were potentially susceptible to IGSCC. Shroud cracking in 1993 and 1994 confirmed that IGSCC of BWR vessel internals is a significant issue for boiling water reactors. Subsequent plant inspections have confirmed cracking in other internal components, particularly in the heat affected zone of welds.

As a result, the BWR Vessel and Internals Project (BWRVIP) was formed in June 1994 as an association of member utilities focused on BWR vessel and internals issues. Formation and support of the BWRVIP is a voluntary industry initiative with all U. S. and most international BWR utilities as members.

BWR vessel and internals components were analyzed and prioritized, resulting in BWRVIP guidelines that have been reviewed and approved by the BWRVIP Executive Committee. Meeting the intent of BWRVIP guidelines approved by the BWRVIP Executive Committee, including this program guide, is the responsibility of each utility. These initiatives are a reflection of the commitment of BWRVIP member utilities to safe, reliable and cost-effective reactor operation.

The BWRVIP has expended considerable resources developing technical guidance on inspection, assessment, mitigation and repair strategies to meet challenges posed by IGSCC, irradiation-assisted stress corrosion cracking (IASCC) and other age-related degradation mechanisms. Water chemistry control, including hydrogen water chemistry (HWC) and Noble Metal Chemical Application (NMCA), are examples of industry’s commitment through the BWRVIP to manage aging and inhibit vessel and internals degradation.

Technical guidance has matured to include recommendations regarding non-destructive examination (NDE), inspection scope and frequency, flaw evaluation and crack growth rate assumptions, analysis of inspection data, repair criteria and mitigation strategies to inhibit IGSCC/IASCC and other age-related degradation mechanisms.

1.2 Roles and Responsibilities in Accordance with NEI 03-08

The BWRVIP is an industry materials management Issue Program governed by NEI 03-08. NEI 03-08 identifies the roles and responsibilities of industry groups that address material issues and utility participants in those groups as outlined below.

1.2.1 Roles and Responsibilities of the BWRVIP

The BWRVIP is responsible for:

- meeting the intent of NEI 03-08
- following accepted industry practices for the management of materials issues
- resolving materials issues that fall within the scope of the BWRVIP
- informing the EPRI Materials Degradation/Aging Action Plan Committee of situations that affect the disposition of materials issues
- providing high quality deliverables that meet the intent of NEI 03-08 for all issues addressed
- establishing and maintaining a nuclear safety focused culture
- performing periodic self-assessments and gap analyses
- maintaining a set of performance metrics to monitor operations
- defining the regulatory interface responsibilities at the outset of addressing any major issue
- identifying implementation requirements for deliverables and guidelines
- developing a process to determine which deliverables require industry enforcement and implementation follow-up
- maintaining appropriate lateral communication among groups to effectively coordinate materials issues
- developing and maintaining a Strategic Work Plan that includes evaluating strategic issues through the use of such tools as the Materials Degradation Matrix and the Issue Management Tables
- reporting annually to the EPRI Materials Degradation/Aging Action Plan Committee on the status of materials issues under the BWRVIP cognizance.

1.2.2 Roles and Responsibilities of Individual BWRVIP Utilities

Each utility is committed to NEI 03-08 and shall meet the following expectations:

- implement NEI 03-08
- participate in the BWRVIP
- fund the BWRVIP
- contribute technical resources and executive leadership to the BWRVIP efforts
- share all materials operating experience
- implement appropriate BWRVIP guidelines and recommendations
- evaluate current business and strategic plans for appropriate focus on materials issues.

1.3 Member Responsibilities

Each BWRVIP member agrees to evaluate existing program elements against those described in Sections 2 and 3 and revise and strengthen their programs, where necessary, to meet the intent of this document and the referenced BWRVIP guidelines.

In addition to meeting the intent of all BWRVIP guidelines, each BWRVIP member shall also review and consider relevant operating experience and information contained in applicable NRC notices and other industry documents when evaluating the need to improve existing vessel and internals programs.

The features of a successful vessel and internals program include the following necessary elements:

Vessel and Internals Integrity Elements:

- vessel and internals program development and documentation
- inspection
- repairs
- maintenance of vessel and internals integrity

Program Support Elements:

- water chemistry control
- quality assurance
- corrective action
- self-assessment
- reporting

1.4 Utility Requirements

The BWRVIP utility commitments to the NRC to implement BWRVIP guidance are described in the letters in Appendix A. The applicable BWRVIP guidelines, which have been approved by the BWRVIP Executive Committee, are listed on the EPRI BWRVIP website (<http://www.epri.com/bwrvip>). Any of these guidelines containing “mandatory” or “needed” guidance shall be implemented by member utilities to the fullest extent possible. The current status of the NRC review of each of the BWRVIP documents transmitted to the NRC is listed on the EPRI BWRVIP web site. Requirements for reporting when full compliance with BWRVIP guidance is not met is described in Section 3.5.

BWRVIP member utilities will review past implementation strategies and adjust programs and plans accordingly to ensure utility alignment with the guidelines.

The BWRVIP should be consulted if questions arise on the interpretation or implementation of BWRVIP guidelines. A form for requesting an interpretation or asking an implementation question is posted on the EPRI BWRVIP web site. Responses to utility questions and interpretations of BWRVIP guidelines will be issued periodically by the BWRVIP and will be posted on the EPRI BWRVIP web site.

When this document and other BWRVIP guidelines are approved by the Executive Committee and are initially distributed, or subsequently revised, each utility shall modify their vessel and internals program documentation to reflect the new requirements and shall implement the guidance within two refueling outages, unless a different schedule is identified by the BWRVIP at the time of document distribution. Implementation means not only incorporating the requirements into the utility program, but also performing the initial or baseline inspection and evaluation requirements. Note, however, that if new guidance approved by the Executive Committee includes changes to NRC approved BWRVIP guidance that are less conservative than those approved by the NRC, this less conservative guidance shall be implemented only after NRC approves the changes. “NRC approved” generally means publication of a “-A” document or equivalent.

Allowances for delaying implementation may be made in certain cases. For example, limited equipment availability or delays in developing appropriate inspection techniques could justify not implementing the appropriate guidance within the required two refueling outages. Implementation of new examination methodology that is developed for components, or portions of components, for which no previous examination methodology existed, needs to be tied to the technique demonstrations. Once a technique demonstration has been performed in accordance with BWRVIP-03 and the results have been published (i.e., a BWRVIP demonstration number has been assigned and the results of the demonstration have been documented in a letter to the vendor and all BWRVIP Committee members), the required BWRVIP inspections for which the new examination methodology was developed shall be implemented as soon as practical considering tooling availability and individual plant schedules, configurations and needs and acceptance of the demonstration by the utility. Plant-specific commitments to the regulator may also result in the need to deviate from BWRVIP guidelines.

Deviation dispositions shall be prepared for decisions to deviate from existing and future “mandatory” or “needed” BWRVIP guidelines, including recommended inspection strategies, techniques and evaluation of results. Guidance on dispositioning deviations is provided in Appendix B. If the specified implementation schedule (typically two refueling outages) is extended to account for unusual circumstances, the deviation disposition process shall be used and include a technical basis that addresses any increased risk incurred by extending the implementation schedule.

For BWRVIP guidance classified as “needed,” if a utility pursues an option different than that in the BWRVIP guidance and the option has been specifically submitted to and approved by the NRC (e.g., a license amendment or relief request), a deviation disposition is not required. In such cases, the utility shall inform the BWRVIP of the option utilized and the related NRC approval.

BWRVIP guidelines that are included in the scope of this program, and those that require implementation in accordance with NEI 03-08, are identified on the BWRVIP website under the heading/link “BWRVIP Reports.”

Some of the documents identified on the BWRVIP website, or parts of documents, may not be applicable to some plants for various reasons. For example, not all plants have LPCI lines so guidelines related to that component are not applicable to those plants and, likewise, repair design criteria are not applicable to plants without such repairs.

NEI 03-08 states: “As deliverables or guidelines are developed, expected actions should be classified as to relative level of importance:

- mandatory – to be implemented at all plants where applicable
- needed –to be implemented wherever possible but alternative approaches are acceptable
- good practice – implementation is expected to provide significant operational and reliability benefits, but the extent of use is at the discretion of the individual plant/utility.”

Future BWRVIP documents shall identify level of importance classifications when published. The NEI implementation classification of each applicable BWRVIP document is listed on the BWRVIP website. In this and future BWRVIP documents, the word “shall” is used to denote “mandatory” or “needed” elements and “should” or “may” denotes “good practices.” Deviations from the “mandatory” and “needed” guidance require a deviation disposition in accordance with Appendix B.

An example of an alternative approach to a “needed” element that would require a deviation disposition is a plant that performed an engineering evaluation of core plate bolts and determined that an acceptable alternative to the inspection of the bolts as described in BWRVIP-25 was to verify by UT from the shroud OD that sufficient bolts were in place to provide the necessary support.

The BWRVIP will evaluate the need to revise BWRVIP guidelines based on industry operating experience. EPRI will act as the program manager responsible for maintaining technical documents as directed by the BWRVIP.

BWRVIP committee membership is composed of utility personnel. Committee membership may be supplemented by consultants and vendors as appropriate to accomplish assigned tasks. The BWRVIP Executive Committee provides oversight of BWRVIP activities.

1.5 Emergent Issues

Utilities shall communicate new materials issues with generic significance to the BWRVIP in order to allow an evaluation of the generic aspects of the information in a timely manner. The BWRVIP shall then ensure that the BWRVIP members are kept informed of new and emergent issues. This notification and information sharing shall be by e-mail, paper copy or reference to the BWRVIP website or other sources as appropriate for the issue and urgency. Sources of identification of emergent issues shall include day-to-day BWRVIP EPRI personnel contacts with utilities as well as EPRI and BWRVIP utility personnel involvement with industry-wide activities and organizations (e.g., NEI, INPO, NRC, EPRI Nuclear Power Council, etc.). Additional detail on emergent issues is provided in Appendix C, BWRVIP Emergent Issues Protocol.

1.6 Implementation Requirements

In accordance with the implementation requirements of NEI 03-08, the requirement that utilities have a BWR vessel and internals program in accordance with this document (BWRVIP-94, Revision 2) is considered “mandatory” while all other elements of BWRVIP-94 are considered “needed.”

2

VESSEL AND INTERNALS PROGRAM

The purpose of a vessel and internals program is to ensure the integrity of BWR vessel and safety-related internal components, which may be susceptible to IGSCC/IASCC and other age-related degradation. Each utility's program shall address current BWRVIP guidance for mitigation, inspection, assessment, and repair. The program shall receive the appropriate level of senior management oversight and review. BWRVIP members shall implement the requirements of the program through controlled plant procedures. The program can be implemented by integration of its elements into existing utility programs or by a separate, stand-alone program.

2.1 Vessel and Internals Program Development and Documentation

Members shall develop, maintain, and document processes and procedures necessary to implement the provisions of the BWRVIP Inspection and Evaluation Guidelines. At a minimum these processes and/or procedures shall:

1. Identify the component examinations and locations necessary to comply with the BWRVIP guidelines listed on the BWRVIP website.
2. Provide for updating the examination lists to incorporate changes to the BWRVIP guidelines listed on the BWRVIP website.
3. Provide for the performance and documentation for all examinations and evaluations required by the guidelines listed on the BWRVIP website.
4. Provide a means of continued consideration and appropriate inclusion of operating experience from similar BWRs.
5. Ensure scope expansion is performed in accordance with the applicable guidelines.
6. Document any cases where the processes or procedure requirements deviate from those presented in the BWRVIP guidelines due to plant-specific conditions not already accounted for in the guidelines. Appendix B provides additional guidance on preparing deviation dispositions.
7. Ensure that the examination methods used comply with the requirements contained in BWRVIP-03.
8. Provide for methods to document and evaluate unacceptable conditions.
9. Provide for the reporting of inspection results to the BWRVIP.

2.2 Inspection

BWRVIP Inspection and Flaw Evaluation (I&E) guidelines, repair design criteria, and supporting documents listed on the BWRVIP website provide guidance for evaluation of inspection results and shall be used to develop an inspection plan and long-term vessel and internals strategy. Plant-specific vessel and internals inspection plans shall be coordinated with applicable Code and regulatory requirements. When BWRVIP guidance and Code requirements overlap or conflict, approval of the NRC may be required to use the BWRVIP guidance in lieu of Code requirements.

Each utility shall plan and perform inspections and appropriately evaluate results according to the information contained in the latest revision of the BWRVIP guidelines, and associated correspondence, as approved by the BWRVIP Executive Committee, listed on the EPRI website.

2.3 Repairs

The purpose of repairing internal components is to maintain structural integrity of vessel and internal components for continued operation. Utilities shall qualify and implement repair methods in accordance with appropriate design and licensing requirements as well as applicable BWRVIP repair guidelines (including BWRVIP-95). Unless otherwise stated, repairs implemented prior to the issuance of BWRVIP guidelines do not need to be evaluated for compliance with the BWRVIP guidance. Nor do repairs designed in accordance with BWRVIP guidance need to be re-evaluated when subsequent revisions to that guidance are published.

2.4 Maintenance of Vessel and Internals Integrity

BWR vessel and internals shall be monitored to preclude a component from being unable to fulfill its intended design function. The monitoring shall include an ongoing assessment of internals health, identification and tracking of plant-specific considerations, industry experience, and inspection scope, techniques, re-inspection plans and analysis of data as outlined in the applicable guidelines.

A long-term inspection strategy shall be maintained that identifies the elements necessary to continue meeting current BWRVIP guidelines for the vessel and each internal component. Typically, this strategy will identify inspection and re-inspection plans for a minimum of three future outages.

3

BWRVIP VESSEL AND INTERNALS PROGRAM SUPPORT ELEMENTS

The elements listed are important to provide for the long-term reliability of the vessel and internal components. Implementation of these elements is required to comply with this document.

3.1 Water Chemistry Control

Each utility shall have procedures for optimizing primary water chemistry to inhibit IGSCC and IASCC in accordance with the acceptance criteria in the most recent version of EPRI BWR Water Chemistry Guidelines.

3.2 Quality Assurance

Each utility shall ensure that their vessel and internals program conforms to the requirements of 10 CFR 50, Appendix B. In addition, the program shall contain the following necessary elements:

- A description of the elements of the vessel and internals program such as those identified in Section 2.1.
- Vessel and internals program records, including inspection results and data, shall be maintained as part of quality assurance records.
- Planned and periodic audits or self-assessments, as outlined in Section 3.4, shall be carried out to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the vessel and internals program.

3.3 Corrective Action

Each utility shall integrate the corrective action reporting process for the management, identification, trending and resolution of vessel and internals issues.

3.4 Self-Assessment

BWRVIP members shall perform periodic self-assessments of their vessel and internals management programs. This review shall be performed by knowledgeable utility personnel or a contractor with independent experts selected by the utility on a periodic basis to review the

program's rigor and adherence to industry guidance. An INPO "review visit" can serve as a self-assessment. The self-assessment shall identify areas for program improvement, along with program strengths. The assessment shall include a review of all applicable BWRVIP guidelines, identify the program's compliance with the guidance, and identify plans in place to ensure complete compliance with these guidelines. A review of any deviation disposition shall be performed as part of the self-assessment.

Periodic self-assessments of the BWRVIP Issue Program (IP) itself are to be performed in accordance with the IP self-assessment requirements of NEI 03-08.

3.5 Reporting

If at any time a utility does not implement any portion of an applicable "mandatory" or "needed" BWRVIP guideline that has been approved by the Executive Committee, the utility shall notify the NRC and the BWRVIP within 45 days of the utility executive concurrence with the deviation disposition. This notification shall consist of the licensee transmitting a letter to the NRC Document Control Desk with copies to the NRC Plant Project Manager, the NRC BWRVIP Project Manager, the NRC Site Resident Office and the NRC Regional Office. The licensee shall clearly state what they are deviating from, i.e., inspection requirements, inspection schedule, etc. of the BWRVIP guidelines, the justification for the deviation and what is being done in lieu of the requirements, as necessary. In addition, the letter should be very clear to indicate that the letter is being transmitted for information only and that the licensee is not requesting any action from the NRC staff. In cases where inspection recommendations cannot be implemented and that situation is stated in the BWRVIP document transmitted to the NRC (e.g., the AD-1 welds at Fermi 2 and LaSalle 1 prior to tooling development), the BWRVIP transmittal of the document to the NRC is considered the notification to the NRC that a BWRVIP recommendation is not implemented. In such cases, utility notification to the NRC is not required. The NRC shall also be notified if changes are made to the utility's Vessel and Internals Program that affect implementation of "mandatory" and "needed" BWRVIP guidelines. Deviations from BWRVIP guidelines do not need to be submitted to the NRC for approval unless specifically required by the BWRVIP guideline document or other utility commitments.

When "-A" documents are transmitted to the NRC, utilities shall review previously identified deviations applicable to any earlier version of that document and determine applicability of the deviation to the "-A" version and notify the NRC as appropriate.

Licensees shall forward a summary of all inspections, associated results and new repairs to the BWRVIP Program Manager within 120 days following completion of an outage. The BWRVIP will compile these inspection summaries and provide them to the NRC on a regular basis. Utilities do not need to provide these summaries to the NRC. However, these BWRVIP reporting requirements do not replace any existing requirements for reporting directly to the NRC.

Flaw evaluations performed in accordance with the guidance in BWRVIP reports for the acceptance of inspection results do not require transmittal to, or approval by, the NRC. However, nothing in the BWRVIP documents supersedes ASME Section XI requirements for reporting flaws and flaw evaluations.

Flaw evaluations that deviate from the guidance in BWRVIP reports (e.g., assumptions, methods, acceptance criteria, etc.) shall be submitted to the NRC. If the flaw evaluation is later revised, the results shall be communicated to the NRC. The submittal schedule for the analyses shall be determined by the licensee and the NRC. Flaw evaluations submitted to the NRC shall also be submitted to the BWRVIP.

If a utility determines that implementation as described in an applicable BWRVIP document cannot be achieved, or that meaningful inspection results cannot be obtained in spite of best efforts, the user shall notify the BWRVIP as soon as practical with sufficient details to support development of alternative actions. These notifications, as well as planned actions by the BWRVIP, will be summarized and reported to the NRC by the BWRVIP.

Section XI of the ASME Boiler and Pressure Vessel Code contains rules for inspection, flaw evaluation and repair/replacement of certain components that are also addressed as part of the BWRVIP program. The Code requirements are detailed in Table IWB-2500, Category B-N-2, Welded Core Support Structures and Interior Attachments to Reactor Vessel. In order for BWRVIP I&E Guidelines to be used in lieu of the ASME Code requirements, each licensee must obtain relief from the Code via the process described in 10CFR50.55a. This would best be accomplished by using the technical alternative provision contained in 10CFR50.55a(a)(3)(i).

The form and format of the reporting of inspection results shall be in accordance with licensee's established procedures. This may include, but is not limited to, submittal by letter or as an attachment to ASME Code required documentation (NIS-1, OAR-1, etc.).

Industry reports are necessary to share information on failure mechanisms, NDE technique applications, repair effectiveness, operating experience, and other items. This experience is shared through the BWRVIP and member utilities. Member utilities agree to share results of assessments outlined in Section 3.4 with the BWRVIP.

A

APPENDIX A: BWRVIP UTILITY COMMITMENT LETTERS TO NRC

BWRVIP

BWR Vessel &
Internals Project

Issue Management and Resolution

May 30, 1997

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: Brian Sheron

Subject: BWR Utility Commitments to the BWRVIP

The purpose of this letter is to reaffirm the BWR utility commitments to the goals, objectives and products of the BWR Vessel and Internals Project (BWRVIP).

All 21 U. S. BWR/2-6 utilities identified in Attachment 1 have been active members of the BWRVIP since its inception in 1994. The BWRVIP utility members are proud of the record and successes achieved by the BWRVIP and we will continue to complete the activities of the BWRVIP with dispatch. Based on a poll of the BWRVIP Executive Committee members, the U. S. BWRVIP utility members unanimously concur with the following renewed commitments:

1. we will continue to provide financial and technical resources needed to complete the BWRVIP Program Plan,
2. we will actively participate in completing the BWRVIP Program Plan,
3. we will implement the BWRVIP products at each of our plants as appropriate considering individual plant schedules, configurations and needs,
4. if a plant does not implement the applicable BWRVIP products, the plant will provide timely notification to the NRC staff, and
5. we will continue to work closely with the NRC staff to the successful and timely conclusion of the BWRVIP Program Plan.

The BWRVIP remains on schedule to provide the BWRVIP products to the NRC staff and we look forward to prompt NRC review and acceptance of these products.

Please feel free to contact me if you have any questions on this subject.

Sincerely,



Carl Terry
Niagara Mohawk Power Company
Chairman, BWR Vessel and Internals Project

Reply To: Carl Terry, BWRVIP Chairman, Niagara Mohawk Power Company, P. O. Box 63,
Lycoming, NY 13093 • Phone: (315) 349-7263 • Fax: (315) 349-4753

U. S. BWRVIP Utility Members

Boston Edison
Carolina Power & Light
Centerior
ComEd
Detroit Edison
Entergy
GPU Nuclear
IES Utilities
Illinois Power
Nebraska Public Power District
New York Power Authority
Niagara Mohawk Power Company
Northeast Utilities
Northern States Power
PECO Energy
Pennsylvania Power & Light
Public Service Electric & Gas
Southern Nuclear
TVA
Vermont Yankee
Washington Public Power Supply System

BWRVIP

BWR Vessel &
Internals Project

Issue Management and Resolution

October 30, 1997

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: Brian Sheron

- References:
1. Letter from Carl Terry (BWRVIP Chairman) to Brian Sheron (NRC), "BWRVIP Utility Commitments to the BWRVIP," dated May 30, 1997.
 2. Letter from Brian W. Sheron (NRC) to Carl Terry (BWRVIP Chairman), "BWR Utility Commitments to the BWRVIP," dated July 29, 1997.

Subject: BWRVIP Utility Commitments to the BWRVIP

The purpose of this letter is to clarify the BWRVIP utilities understanding of the expectations of the NRC staff regarding implementation of BWRVIP products.

On May 30, 1997 the BWRVIP transmitted the Reference 1 letter to the NRC staff that provided several BWRVIP utility commitments. These included implementing the BWRVIP products at each BWR as appropriate, considering individual plant schedules, configurations, and needs; and to provide timely notification to the NRC staff if a plant does not implement the applicable BWRVIP products. The BWRVIP utilities understood that the extent and type of NRC comments on the submitted products could affect the content of the original submittal, and may lead to additional BWRVIP review and possibly a resubmittal.

Reference 2 requested notification by a BWR licensee of a decision not to fully implement a BWRVIP report as approved by the NRC staff within 45 days of the report approval. The BWRVIP agrees to this 45 day response period. However, as we discussed at our meeting on October 9, 1997, a generic implementation commitment can only apply if the NRC staff approves the document as submitted by the BWRVIP. If the NRC staff conditionally approves a BWRVIP document, resolution of comments may be required including resubmittal of a BWRVIP document. It is the intention of the BWRVIP to inform the NRC staff within 45 days of your approval if such a situation exists.

Reply To: Carl Terry, BWRVIP Chairman, Niagara Mohawk Power Company, P. O. Box 63,
Lycoming, NY 13093 • Phone: (315) 349-7263 • Fax: (315) 349-4753

If you have any questions on this subject please contact Vaughn Wagoner of CP&L,
BWRVIP Integration Committee Technical Chairman, at (919) 546-7959.

Sincerely,

A handwritten signature in black ink, appearing to read 'C. Terry'.

Carl Terry
Niagara Mohawk Power Company
Chairman, BWR Vessel and Internals Project

c: C. E. Carpenter, NRC
BWRVIP Executive Committee

B

APPENDIX B: GUIDELINES FOR DEVIATION DISPOSITION

Introduction

The purpose of this appendix is to identify the considerations and documentation that must be developed and reside in a utility's Vessel and Internals Program if deviations are taken from any of the "mandatory" or "needed" elements presented in the aforementioned BWRVIP guidelines. Deviation from these recommendations requires a deviation disposition in accordance with this appendix. Deviation dispositions do not need to be submitted to the NRC. However, the NRC shall be notified of any deviation from BWRVIP guidelines transmitted to the NRC as described in Section 3.5.

General Considerations

1. When it is determined that actions will be taken or implemented in a plant's vessel and internals program which may not be consistent with the elements documented in the applicable BWRVIP guideline, a deviation disposition shall be written and made part of the utility's vessel and internals program. A utility's vessel and internals program includes supporting programs such as chemistry programs. Deviation dispositions shall be required when utility procedures, inspections, methodology, or guidelines are inconsistent with the intent of the supporting BWRVIP guidelines, regardless of NRC review and approval status.
2. The deviation disposition shall provide the basis for determining that the proposed deviation meets the same objective and intent, or level of conservatism exhibited by the BWRVIP guidelines.
3. In no case shall any deviation to the vessel and internals program allow a change to a plant's licensing basis without the approvals required by regulation.
4. A thorough, formal engineering review of a proposed deviation should include and consider input from a wide variety of sources. The engineering review shall be supported by calculations when warranted.

Deviation Disposition Document Structure

1. The deviation disposition shall reference the applicable BWRVIP guideline.
2. The deviation disposition shall be explicit in detailing the deviation that is being taken and why it is acceptable. It should clearly identify all available information and resources, which allow the deviation to be acceptable.

3. The deviation disposition shall clearly state how long the deviation will be in effect with a specific end date identified in the deviation disposition or in the corrective action program.
4. The deviation disposition shall clearly identify the impact that the deviation will have on meeting the intent of the guideline.
5. The deviation disposition shall clearly identify the appropriate approval signatures, dates, and shall be controlled as part of the utility's document control procedure.
6. The deviation disposition shall receive final concurrence from the responsible utility or plant executive.
7. All approved deviation dispositions shall be sent to the BWRVIP for documentation. The BWRVIP will post all approved deviation dispositions on the BWRVIP website for access and awareness for all BWRVIP member utilities.
8. The deviation and the supporting disposition shall be entered into the corrective action program at the plant.
9. The disposition of a deviation from a "mandatory" document or element shall receive concurrence by a knowledgeable materials expert independent of the utility justifying the deviation.
10. Flaw evaluations that deviate from the guidance in BWRVIP documents (e.g., assumptions, methods, acceptance criteria, etc.) shall be submitted to the NRC and a deviation disposition shall be completed.

Archiving of Deviation Dispositions

Utilities shall inform the BWRVIP of deviation dispositions that have been closed or are no longer in effect. The BWRVIP will maintain a list of closed or archived deviation dispositions that are no longer in effect on the BWRVIP website. The BWRVIP will also advise the NRC of archived or closed deviation dispositions on a periodic basis.

C

APPENDIX C: BWRVIP EMERGENT ISSUES PROTOCOL

Protocol

NEI 03-08 identifies utility and issue program (IP) actions to be taken when an emergent materials issue with generic significance to the industry is identified at a nuclear power plant. The BWRVIP emergent issues protocol below provides specific actions tailored to BWR vessel and internals materials degradation issues.

The first step is for a utility to recognize a new BWR vessel and internals materials related finding with potential generic significance that needs to be communicated to the BWRVIP. Examples of such findings include but are not limited to the following:

1. Any through wall leakage is identified in a BWR vessel (includes the nozzle assemblies out to the process piping to safe-end or safe-end-extension weld)
2. An unplanned plant shutdown is elected due to BWR vessel or internals materials issue
3. Inspection results are unexpected and have the potential for generic implications
4. Mitigation results are unexpected and have the potential for generic implications
5. Operating experience that is beyond that previously reported in INPO's OE database.

Once a utility recognizes a finding with potential generic significance, they shall communicate this information to the EPRI BWRVIP Program Manager or the BWRVIP Integration Committee (IC) Chair as soon as possible after the finding is characterized. This communication must include the timeframe within which any BWRVIP response on the issue is needed. The expectation is for the utility to provide the information within 24 hours of characterization if possible. If the EPRI BWRVIP Program Manager or the BWRVIP IC Chair is not available, then the utility shall contact the chair of the applicable BWRVIP committee and/or focus group. BWRVIP contact information is available on the BWRVIP website <http://www.epri.com/bwrvip> (must have an EPRI website log-on ID and password to access).

The EPRI BWRVIP Program Manager and BWRVIP IC Chair shall discuss the information and determine the need for a BWRVIP Integration Committee and/or Executive Oversight Committee (EOC) conference call to evaluate the significance (technical and regulatory) of the finding and its potential effect on the BWR fleet. If necessary, the IC and/or EOC shall discuss the issue relative to: a) assisting the affected utility, b) informing the entire industry, c) initiating an action plan to investigate and address the issue. The INPO BWRVIP Program Manager and/or the EPRI Materials Degradation/Aging Action Plan Committee (MAPC) INPO representative shall be invited to participate in the IC and/or EOC conference calls.

The IC and/or EOC will also consider:

- Safety Significance
- Demonstration of a new degradation type
- Effect on the basis of industry guidance
- Effect on the existing knowledge base
- Expected regulatory significance
- Need for additional expertise or knowledge
- Promoting, if practical, obtaining root cause analysis of the flaws via destructive testing (e.g., boat sample)

The BWRVIP IC Chair shall communicate the issue, related information and unresolved issues to the EPRI MAPC Chair for a potential MAPC Emergent Issue conference call on the topic. If the MAPC determines that another IP should have the lead on this issue, the BWRVIP will take direction from that IP. Otherwise, the BWRVIP shall take the actions required in NEI 03-08 to resolve the issue and develop any implementation actions. Attachment 1 provides a flowchart of the BWRVIP Emergent Issue process.

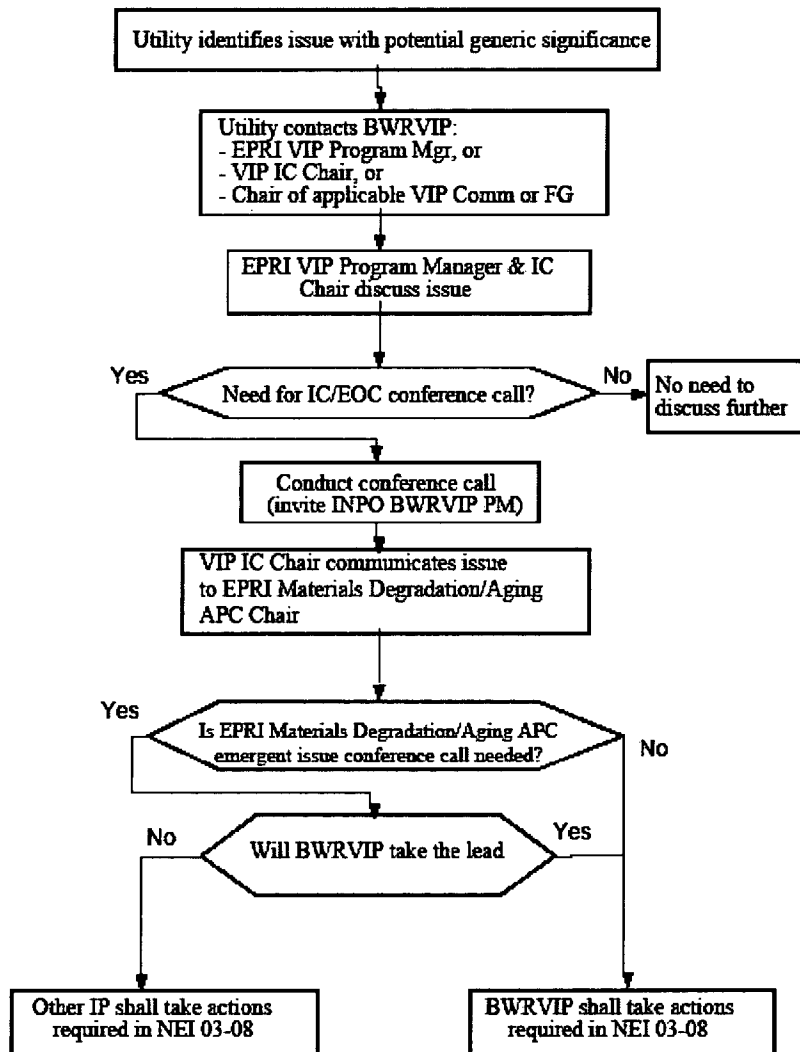
Regulatory Interface

Communication with the Nuclear Regulatory Commission (NRC) is an integral part of the BWRVIP's commitment to gaining and maintaining the NRC's confidence in the ability of the BWRVIP to manage BWR vessel and internals materials degradation issues safely and effectively, without excessive regulatory actions, or oversight. Therefore, when emergent BWR vessel and internals materials issues arise, open and timely communication between the BWRVIP and the NRC is imperative. The following guidance is provided:

- In no case shall the BWRVIP contact the NRC on an emergent issue without permission (at least verbally, but email is preferred) from the subject plant's Point-of-Contact (POC) for the emergent issue or from their Management. Generally, the NRC shall not be contacted by the BWRVIP until the emergent issue has been communicated by the licensee to the Office of Nuclear Reactor Regulation (NRR) through the NRR Project Manager for the subject plant.
- BWRVIP Communications with NRR shall be made to the NRC staff levels commensurate with the severity of the emergent issue as determined by the BWRVIP EOC Chair, EPRI BWRVIP Program Manager, and/or BWRVIP IC Chair.

The focus of the BWRVIP communications with the NRC shall be the generic implications of the emergent materials issue and what actions (if any) the BWRVIP is taking or considering.

BWRVIP Emergent Issue Flowchart



D

APPENDIX D: RECORD OF REVISIONS, BWRVIP-94NP, REVISION 2

BWRVIP-94NP, Revision 2	BWRVIP-94, Revision 1 was revised to incorporate updates to reflect utility experience since the publication of Revision 1. The revised report also incorporates guidance from the following documents issued since the publication of BWRVIP-94, Revision 1: 1. Self Assessment of the Boiling Water Reactor Vessel & Internals Project, September 2006 (BWRVIP Correspondence File Number 2006-033) 2. 2008 Self-Assessment Report – BWRVIP Program (BWRVIP Correspondence File Number 2009-104) 3. NEI 03-08, Revision 2, “Guideline for the Management of Materials Issues,” January 2010 4. 2010 Self-Assessment Report – BWRVIP Program (BWRVIP Correspondence File Number 2010-261A) All changes are marked with margin bars. Details of the revisions can be found in Table D-1.
END	

**Table D-1
Revision Details**

Required Revision	Source of Requirement for Revision	Description of Revision Implementation
	Editorial	Updated reference to NEI 03-08, Revision 2, in Section 1
Update Section 1.2.1 and 1.5 to reflect updates in NEI 03-08, Revision 2	2010 BWRVIP Self Assessment	Sections 1.2.1 and 1.5 updated to incorporate minor revisions in NEI 03-08, e.g., replace reporting to NEI with reporting to EPRI Materials Degradation/Aging Action Plan Committee, etc.
Clarify language to indicate if the two cycle implementation requirement is extended, a deviation disposition shall be used and include a technical basis that addresses any increased risk by extending the 2-cycle window	2006 BWRVIP Self Assessment	Added clarification to Section 1.4
Delete list of applicable BWRVIP documents in Section 1.5 and replace with reference to the BWRVIP website for up-to-date listing	2006 and 2010 BWRVIP Self Assessments	Revised Sections 1.4 and 1.5 to refer to the BWRVIP website for current list of applicable reports
Clarify schedule for implementation of new inspection techniques	BWRVIP Inquiry 2007-005	Added clarification in Inquiry 2007-005 to Section 1.4
Clarify that NRC approved means a “-A” document or equivalent	EPRI	Added clarification to Section 1.4
Clarify that for “needed” documents, a different utility option that requires NRC review and approval does not require a deviation disposition	Utility	Added clarification to Section 1.4
Add Emergent Issues Protocol from BWRVIP Operating Principles and Procedures	2010 BWRVIP Self Assessment	Added new Section 1.5 and Appendix C

Table D-1
Revision Details (continued)

Required Revision	Source of Requirement for Revision	Description of Revision Implementation
Add NEI 03-08 implementation requirements statement in accordance with BWRVIP Operating Principles and Procedures	EPRI	Added new Section 1.6
Clarify that deviations from some BWRVIP documents require submittal to the NRC (e.g., BWRVIP-95-A)	Utility	Added clarification to Section 3.5 that deviations from BWRVIP guidelines do not need to be submitted to the NRC unless approval is specifically required by the BWRVIP document
Revise BWRVIP-94 to include requirement for utility to notify BWRVIP as soon as practical of obstacles to implementing "mandatory" or "needed" guidance	2008 BWRVIP Self Assessment	Added clarification to Section 3.5
Clarify "cannot be implemented" and "meaningful results" when describing utility notification to BWRVIP of inability to implement guidance	2006 BWRVIP Self Assessment	Clarified wording in Section 3.5
In accordance with NEI 03-08, clarify Section 3.5 to explain that NRC and the BWRVIP shall be notified of deviations from all BWRVIP guidance documents, not just NRC-approved documents	2006 BWRVIP Self Assessment	Added clarification to Section 3.5 and Appendix B
Clarify guidance on reporting of flaw evaluations that deviate from the guidance in BWRVIP documents	2006 BWRVIP Self Assessment	Added new item to Appendix B regarding reporting of flaw evaluations that differ from BWRVIP guidance
Clarify that flaw evaluations submitted to NRC but not deviating from BWRVIP guidance (e.g., flaw evaluations for fluences $>3 \times 10^{21}$ n/cm ²) should also be submitted to the BWRVIP	BWRVIP-76-A Review Group	Added clarification to Section 3.5.

Table D-1
Revision Details (concluded)

Required Revision	Source of Requirement for Revision	Description of Revision Implementation
Clarify that the BWRVIP shall submit BWRVIP inspection summaries to the NRC and that there is no BWRVIP requirement for utilities to report these to the NRC	EPRI	Added clarification to Section 3.5
Consider adding protocol for informing NRC and BWRVIP of archived/closed deviation dispositions	Utility	Added statements in Appendix B that BWRVIP shall maintain a list of archived/closed deviation dispositions on the BWRVIP website and shall advise the NRC of archived or closed deviation dispositions on a periodic basis.
Consider changing "will" to "shall" throughout, as appropriate	Utility	Selectively changed "will" to "shall" in a number of locations

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