

**BWRVIP** BWR Vessel & Internals Project \_\_\_\_\_ 2004-030

January 19, 2004

Document Control Desk  
U. S. Nuclear Regulatory Commission  
11555 Rockville Pike  
Rockville, MD 20852-2738

Attention: Meena Khanna

Subject: PROJECT NO. 704 -- BWRVIP Response to NRC Staff Safety Evaluation of the  
BWR Vessel and Internals Project BWRVIP-53 Report

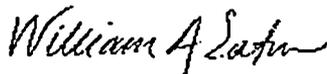
- References:
1. Letter from Jack R. Strosnider (NRC) to Carl Terry (BWRVIP Chairman), "Safety Evaluation of the BWRVIP Vessel and Internals Project, Standby Liquid Control Line Repair Design Criteria (BWRVIP-53), EPRI Report TR-108716, July 1998 (TAC NO. MA2328)," dated October 26, 2000.
  2. Letter from Carl Terry (BWRVIP Chairman) to NRC Document Control Desk, "BWR Vessel and Internals Project, Standby Liquid Control Line Repair Design Criteria (BWRVIP-53), EPRI Report TR-108716, July, 1998," dated July 2, 1998.

Enclosed is the BWRVIP response to issues identified in the NRC staff Safety Evaluation (SE) of the BWRVIP-53 report. The NRC staff issues were transmitted to the BWRVIP by the Reference 1 letter identified above.

Please note that the enclosed BWRVIP response contains proprietary information. Therefore, the request for withholding the BWRVIP-53 report from public disclosure transmitted to the NRC by the Reference 2 letter identified above also applies to the enclosed information.

If you have any questions on the enclosed information or the subject it addresses, please call Ken Wolfe at EPRI at 650.855.2578.

Sincerely,



William A. Eaton  
Chairman, BWR Vessel and Internals Project  
Entergy Operations, Inc.

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## **BWRVIP Response to NRC Safety Evaluation of BWRVIP-53**

Open issues from the NRC Safety Evaluation of BWRVIP-53 are repeated below verbatim followed by the BWRVIP response to the Staff's evaluation. Items from the SE for which the Staff has indicated their concurrence with the BWRVIP position are not repeated here.

RAI Item 1: In Section 3.2.1.2, "Alternative SLC and CDP Nozzles Safety Basis," the BWRVIP-53 report discusses roll expansion repairs of the SLC and CDP nozzles. As this repair was previously denied in the staff's review of the BWRVIP-17 report, the staff will not accept roll expansion as a permanent repair method.

BWRVIP Response to Item 1: It is recognized that the Staff will not accept roll expansion as a permanent repair. However, in some instances, roll expansion may be appropriate for a temporary repair. Section 3.2.1.2 will be modified to clarify that roll expansion can be considered only for a temporary repair.

Staff's Evaluation of BWRVIP Response to Item 1: As was previously stated in the staff's SE of EPRI's November 1996 proprietary report TR-106712, "Review of "BWR Vessel and Internals Project, Roll/Expansion Repair of Control Rod Drive and In-core Instrument Penetrations in BWR Vessels (BWRVIP-17)," dated March 13, 1998, the staff determined that roll expansion is not a structural repair but is only leak limiting. Further, the staff found that the corrective action intended by the ASME Code requirements, upon discovery of a flaw in a Class 1 pressure retaining boundary component, is to either repair the flaw or replace the flawed component in order to return it to a condition of Code compliance. An ASME Code-acceptable repair of a crack in a control rod drive (CRD) stub tube or in-core penetration would require a weld repair. Although the roll/expansion method may for some time period control the symptom of the flaw (leakage), it does not reestablish structural integrity by repairing or replacing the degraded item consistent with 10 CFR 50.55a. Therefore, the NRC staff determined that the BWRVIP-17 report did not provide a sufficient generic technical basis and criteria for performing a non-Code repair to an ASME Code component to warrant a generic alternative to the ASME Code. The same reasoning holds for roll expansion of the SLC and CDP nozzles.

However, as described above, roll expansion can control leakage for some short time. A licensee may utilize the BWRVIP-53 report as part of the technical basis for a plant-specific request for an alternative repair per 10 CFR 50.55a(a)(3) to utilize roll expansion to temporarily repair the SLC and CDP nozzles for no more than one (1) operating cycle. The request will be reviewed by the staff on a plant-specific basis prior to its implementation.

BWRVIP Response to Staff Evaluation of Item 1: The report will be revised to clarify that the NRC has not accepted roll-expansion as an acceptable method for permanent repair and that use of roll-expansion by a licensee requires prior review and approval by the NRC.

RAI Item 6: Appendix C, "Repair Concepts For SLC and CDP Nozzles"

RAI Item 6.1: Section C.2.1.2, "Japanese Owners Group In-core Repair," describes the major steps for this repair. The staff requests either a separate topical report or an additional appendix to this report to support approval of the Japanese welding repair methods.

RAI Item 6.2: Section C.2.3, "Non-Structural Thermal Spray Leakage Barriers," discusses a repair technique that ASME does not currently recognize or approve. As such, the staff requests that the use of this method as a repair technique be considered only on a case-by-case basis.

RAI Item 6.3: Section C.2.5, "Mechanical Seals." Pursuant to 10 CFR 50.55a(a)(3)(i), the staff has approved Combustion Engineering (CE) designed mechanical nozzle seal assemblies as an alternative repair technique for leaks in ASME Code Class 1 nozzles in the hot legs, pressurizers, and steam generators of domestic PWRs. However, if this repair technique is to be proposed for repairs of SLC and CDP line nozzles, additional detailed analyses would need to be submitted by BWRVIP.

BWRVIP Response to Item 6: The repair concepts discussed in Appendix C are intended to provide the repair designer with a number of potential repair approaches. They were not included in the report for the purpose of obtaining NRC acceptance or approval. The introduction to Appendix C will be clarified to indicate that the potential repair approaches have not necessarily been accepted by the NRC.

Staff's Evaluation of BWRVIP Response to Item 6: Appendix C should state that it is for "Information Only." Use of the repair methods and concepts described therein will need to be submitted for staff approval as an alternative to 10 CFR 50.55a on a case basis.

BWRVIP Response to Staff Evaluation of Item 6: Appendix C will be revised as requested.

RAI Item 7: Section 1.1, Background, states that "there has only been one report of cracking in any BWR SLC and CDP nozzles or internals." This refers to the 1965 failure of a SLC sparger in an overseas BWR/1. Clarification to this statement should be made based on

the findings at Big Rock Point (Report dated April 24, 1998). Big Rock Point found the discharge piping of the SLC line severed during decommissioning.

BWRVIP Response to Item 7: The discussion of previous failures was intended only as an introductory remark and does not have substantial bearing on the remainder of the document. However, if the April 24, 1998 report is provided, the BWRVIP will review this new information and determine if there is sufficient basis to identify this in the document as a second cracking incident.

Staff's Evaluation of BWRVIP Response to Item 7: The information on cracking of the SLC discharge piping at the Big Rock Point site is publicly available. BWRVIP is requested to identify this incident and evaluate its significance in a revision to the BWRVIP-53 report.

BWRVIP Response to Staff Evaluation of Item 7: The failure at Big Rock Point is documented in a 2000 ICONE paper by Polaski, et al. entitled "The Big Rock Point Sampling and Condition Assessment Project." The observed piping failures were confined to the interior of the SLC supply tank. This location is not within the scope of the BWRVIP repair or inspection documents. Therefore, a discussion of the event is not relevant to BWRVIP-53.

RAI Item 10: Appendix A.1, "Abandoning in Place," states that "...liquid control injection into the lower head, without the liquid control piping and sparger, is acceptable; a review of plant-specific analyses would be appropriate to document this." The staff disagrees with this statement. The staff does not believe that this has been shown to be acceptable. The BWRVIP-53 document should provide guidance on the plant-specific analysis that could be done to show acceptable results on a plant-specific basis.

BWRVIP Response to Item 10: The primary basis for "Abandoning in Place" as a repair option is the testing and analysis of boron mixing as referenced in the response to Item 8 above (*Item 8 referenced analysis and testing that demonstrated that the SLC sparger was not required to assure proper boron mixing*, ed.). Plant-specific analysis would be required to address other concerns such as potential vibration and loose parts from SLC and CDP internal components known to be cracked.

Staff's Evaluation of BWRVIP Response to Item 10: The staff finds that the BWRVIP-53 report should be modified to address the staff's RAI comments to Item 10.

BWRVIP Response to Item 10: As described above, the issue of boron mixing was addressed in Item 8 in which analysis and testing was referenced (Reference 1) demonstrating that the

sparger is not required to ensure mixing. The BWRVIP proposes to address the additional issues of loose parts and vibration as follows. The third sentence in Section A.1 currently reads "*Damaged or suspect internal SLC&CDP piping should be evaluated as potential loose parts.*" The sentence will be revised to read "*Damaged or suspect internal SLC&CDP piping can lead to loose parts concerns. Plant-specific analyses should be conducted to evaluate the potential to generate loose parts (e.g. due to vibration) and the potential consequences.*"

**RAI Item 11:** Provide the frequency of periodic flushing of the SLC internal line which could be used to determine if the line is pinched or not.

**BWRVIP Response to Item 11:** For repair concepts which could potentially result in some internal lines in a "pinched off" condition, a flushing test could be developed and applied at each refueling outage. This would verify that no hydraulically significant change has occurred since the outage when the repair was first implemented. It is anticipated that the frequency of flushing could be reduced over time based on experience with that specific repair.

**Staff's Evaluation of BWRVIP Response to Item 11:** The staff finds that the BWRVIP-53 report should be modified to address the staff's RAI comments to Item 11. General guidelines should be developed by the BWRVIP to address line blockage, as described above.

**BWRVIP Response to Item 11:** The BWRVIP proposes to add the following text at the end of the second paragraph in Section A.1:

*In cases where internal lines are known or suspected to be pinched, flushing tests shall be developed using plant-specific design requirements and conducted prior to startup from the outage of discovery and shall be repeated every two subsequent outages. Alternate flushing schedules are acceptable as approved by the NRC.*

**Additional Item:** In Section 3.0 of the Safety Evaluation, the staff states "Inspections of the repaired components should be in accordance with the BWRVIP-27 guidance, as approved by the staff." As previously discussed with the Staff in relation to other Repair Design Criteria, the specific inspection requirements in the Inspection and Evaluation Guidelines (e.g., BWRVIP-27) may not be appropriate for a repaired component. Locations specified for inspection in I&E Guidelines may be, for example, structurally replaced by a repair and will not require further inspection. However, it is appropriate

that the intent of the I&E Guidelines be met in future inspections of the repaired component. Therefore, the following paragraph will be added to section 10.2:

Inservice inspections shall be defined consistent with the intent of the inspections defined in BWRVIP-27 [2].

Reference 1: Eckert, E.C., "Summary of BWR Boron Remixing," GE Report GENE-A00-05652-03, Prepared for the BWR Owners' Group, February 1996 (GE proprietary)



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