

October 15, 2008

Mr. Gary Bryant, Quality Control Manager  
Babcock and Wilcox Nuclear Operations Group  
Mount Vernon Facility  
1400 Old Highway 69-S  
Mount Vernon, IN 47620

SUBJECT: NRC INSPECTION REPORT NO. 99900042/2008-201, NOTICE OF VIOLATION, AND NOTICE OF NONCONFORMANCE

Dear Mr. Bryant:

On August 26–29, 2008, the U.S. Nuclear Regulatory Commission (NRC) conducted an inspection at the Babcock and Wilcox (B&W) Nuclear Operations Group, Inc. facility in Mount Vernon, Indiana. The enclosed report presents the results of this inspection.

This was a limited scope inspection that focused on assessing your compliance with the provisions of Title 10, Part 21, "Reporting of Defects and Noncompliance," of the *Code of Federal Regulations* (10 CFR Part 21), and selected portions of Appendix B, "Quality Assurance Program Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." This NRC inspection report does not constitute NRC endorsement of your overall quality assurance (QA) or 10 CFR Part 21 programs.

Based on the results of this inspection, the NRC has determined that a Severity Level IV violation of NRC requirements occurred. The violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at ([http://www.nrc.gov/about\\_nrc/regulatory/enforcement/enforce\\_pol.html](http://www.nrc.gov/about_nrc/regulatory/enforcement/enforce_pol.html)).

The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because a review of B&W's 10 CFR Part 21 implementation identified that B&W did not adopt appropriate procedures to evaluate deviations and failures to comply associated with substantial safety hazards.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In addition, during this inspection, NRC inspectors found that the implementation of your QA program failed to meet certain NRC requirements imposed on you by your customers. Specifically, the NRC inspectors determined that there were inadequacies in B&W's policies, procedures, and implementing actions for the control of purchased material, equipment, and services; the control of nonconforming parts, material, and equipment; and corrective

actions. The specific findings and references to the pertinent requirements are identified in the Notice of Nonconformance enclosed in this letter.

Please provide a written statement or explanation within 30 days from the date of this letter in accordance with the instructions specified in the enclosed Notice of Nonconformance. We will consider extending the response time if you show good cause for us to do so.

In accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (the Agencywide Documents Access and Management System (ADAMS)), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material be withheld from public disclosure, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Requirements for the Protection of Safeguards Information."

Sincerely,  
*/RA/*

Juan Peralta, Chief  
Quality and Vendor Branch 1  
Division of Construction Inspection and  
Operational Programs  
Office of New Reactors

Docket No.: 99900042

Enclosures:   1. Notice of Violation  
                  2. Notice of Nonconformance  
                  3. Inspection Report No. 99900042/2008-201 and Attachment

actions. The specific findings and references to the pertinent requirements are identified in the Notice of Nonconformance enclosed in this letter.

Please provide a written statement or explanation within 30 days from the date of this letter in accordance with the instructions specified in the enclosed Notice of Nonconformance. We will consider extending the response time if you show good cause for us to do so.

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Office of New Reactors

Docket No.: 99900042

- Enclosures:
1. Notice of Violation
  2. Notice of Nonconformance
  3. Inspection Report No. 99900042/2008-201

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Name	S.Cleavenger		R Patel		K Heck		N Ray	
Date	9/30/2008		9/25/2008		9/30/2008		9/30/2008	
OFFICE	NRO/DCIP/CQVP	E	NRO/DCIP/CQVP	E	NRO/DCIP/CAET	E	NRO/DCIP/CQVP	E
Name	D Votolato		K Kavanagh		R. Pascarelli		J Peralta	
DATE	9/30/2008		9/30/2008		9/30/2008		10/15/2008	

**OFFICIAL RECORD COPY**

## NOTICE OF VIOLATION

Babcock and Wilcox Nuclear Operations Group, Inc.  
Mount Vernon Facility  
1400 Old Highway 69-S  
Mount Vernon, IN 47620

Docket Number 99900042  
Inspection Report Number 2008-201

During an NRC inspection, conducted at Babcock and Wilcox (B&W) Nuclear Operations Group, Inc., Mount Vernon Facility on August 26–29, 2008, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below.

Title 10, Section 21.21, "Notification of Failure to Comply or Existence of a Defect and Its Evaluation," of the *Code of Federal Regulations* (10 CFR 21.21), paragraph 21.21(a), requires, in part, that each individual, corporation, partnership, or other entity subject to 10 CFR Part 21, "Reporting of Defects and Noncompliance," shall adopt appropriate procedures to evaluate deviations and failures to comply associated with substantial safety hazards as soon as practicable.

In part, 10 CFR 21.21(a)(1) requires that deviations and failures to comply be evaluated within 60 days of discovery in order to identify a reportable defect or failure to comply that could create a substantial safety hazard were it to remain uncorrected. Paragraph 21.21(a)(2) requires, in part, that, if an evaluation of an identified deviation or failure to comply cannot be completed within 60 days from discovery, an interim report is prepared and submitted to the Commission through the director or responsible officer in writing within 60 days of discovery of the deviation or failure to comply. Paragraph 21.21(a)(3) requires, in part, that a director or responsible officer be informed as soon as practicable, and, in all cases, within the 5 working days after completion of the evaluation if the manufacture, construction, or operation of a facility or activity, or a basic component supplied for such a facility or activity (i) fails to comply with the Atomic Energy Act of 1954, as amended, or (ii) contains a defect.

Paragraph 21.21(b) requires, in part, that if a deviation or failure to comply is discovered by a supplier of basic components and the supplier determines that it does not have the capability to perform the evaluation to determine if a defect exists, then the supplier must inform the purchasers or affected licensees within 5 working days of this determination.

Paragraph 21.21(d)(3)(i) requires, in part, an initial notification by facsimile to NRC Operations Center or by telephone within 2 days following receipt of information by the director or responsible officer on the identification of a defect or a failure to comply. Paragraph 21.21(d)(3)(ii) requires, in part, a written notification to the NRC within 30 days following receipt of information by the director or responsible corporate officer on the identification of a defect or a failure to comply.

Contrary to the above, as of August 29, 2008, the B&W 10 CFR Part 21 implementing procedure NE/C-1716-04-Q, "Reporting of 'Defects and Noncompliance Concerning Substantial Safety Hazards (10 CFR Part 21) Ohio Administrative Code Department of Health Chapter 3701:1-38-23 General Radiation Protection Standards for Sources of

ENCLOSURE 1

Radiation (ODH 3701),” Revision 7, dated August 31, 2007, did not provide procedural guidance for: (1) evaluating deviations and failures to comply associated with substantial safety hazards within 60 days of discovery, (2) submitting an interim report to the NRC if an evaluation of an identified deviation or failure to comply cannot be completed within 60 days of discovery, (3) notifying the responsible officer within 5 days when it is determined that a defect that could cause a substantial safety hazard exists, (4) notifying the affected purchasers or licensees if the supplier of the basic component does not have the capability to perform the evaluation to determine if a defect exists, (5) notifying the NRC by facsimile or telephone within two days following receipt of information that a defect or failure to comply exists, and (6) providing written notification to the Commission within 30 days of the initial notification.

This issue has been identified as Violation 99900042/2008-201-01.

This is a Severity Level IV violation (Supplement VII).

Pursuant to the provisions of 10 CFR 2.201, “Notice of Violation,” B&W is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Chief, Quality and Vendor Branch 1, Division of Construction Inspection and Operational Programs, Office of New Reactors, within 30 days of the date of the letter transmitting this Notice of Violation. This reply should be clearly marked as a “Reply to a Notice of Violation” and should include (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. Where good cause is shown, the NRC will consider extending the response time.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or through the NRC Agencywide Documents Access and Management System (ADAMS), to the extent possible, the response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, “Requirements for the Protection of Safeguards Information.”

Dated at Rockville, Maryland, this 15th day of October 2008

## NOTICE OF NONCONFORMANCE

Babcock and Wilcox Nuclear Operations Group, Inc.  
Mount Vernon Facility  
1400 Old Highway 69-S  
Mount Vernon, IN 47620

Docket Number 99900042  
Inspection Report Number 2008-201

Based on the results of an NRC inspection conducted at Babcock and Wilcox (B&W) Nuclear Operations Group, Inc., Mount Vernon Facility on August 26–29, 2008, the NRC staff has found that certain activities were not conducted in accordance with NRC requirements.

- A. Criterion VII, “Control of Purchased Material, Equipment, and Services,” of Appendix B to Title 10 Part 50, “Domestic Licensing of Production and Utilization Facilities,” of the *Code of Federal Regulations* (10 CFR Part 50) states, in part, that measures shall be established to ensure that purchased material, equipment, and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents. These measures shall include provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor or subcontractor, inspection at the contractor or subcontractor source, and examination of products upon delivery.

As an American Society of Mechanical Engineers (ASME) N-type Certificate Holder, the 2007 ASME Boiler and Pressure Vessel Code requires B&W to comply with the basic requirements and supplements of ASME NQA-1-1994, “Quality Assurance Requirements for Nuclear Facility Applications.” Supplement 7S-1 to NQA-1-1994, “Supplementary Requirements for Control of Purchased Items and Services,” describes acceptable methods for evaluating the capability of suppliers to provide items or services in accordance with the requirements of the purchase document and requires these methods to be documented.

Contrary to the above, as of August 29, 2008, NRC inspectors found that B&W had procured safety-related weld wire from AREVA NP Inc. in 2007, without sufficient documented evidence of AREVA NP Inc.’s capability to provide items or services in accordance with the technical and quality requirements of the purchase documents. Additionally, the B&W Procedure NE/C-1722-02-Q, “Supplier Evaluations,” Revision 4, dated May 27, 2008, allowed the Supplier Quality Department to procure from a supplier without sufficient evaluation of the implementation of the suppliers QA program. This failure of B&W to provide documented evidence of its supplier’s ability to provide items or services in accordance with the applicable procurement, regulatory, and ASME Code requirements has been identified as Nonconformance 99900042/2008-201-02.

- B. Criterion VII of Appendix B to 10 CFR Part 50 states, in part, that measures shall be established to assure that purchased material, equipment, and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents. These measures shall include provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor or subcontractor, inspection at the contractor or subcontractor source, and examination of products upon delivery.

ENCLOSURE 2

Criterion XI of Appendix B to 10 CFR Part 50 states, in part, that measures shall be established to assure that special processes are controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria, and other special requirements.

Policy Number 12-QA-07 of the B&W Quality Assurance Program Manual (QAPM), "Control of Purchased Items and Services," Revision 10, dated January 28, 2008, and Procedure NE/C-1722-02-Q stated, in part, that B&W will assure that suppliers are capable of supplying quality material, product, and/or services through an ongoing evaluation program. In addition, an Approved Suppliers List identifying acceptable suppliers is prepared and maintained.

Contrary to the above, as of August 29, 2008, B&W had procured thermocouples from a supplier not listed on the B&W Approved Suppliers List, Revision 27, dated August 27, 2008 and did not evaluate the supplier before the procurement. B&W used the thermocouples procured from TE Wire and Cable, LLC during the intermediate postweld heat treatment process of Diablo Canyon Unit 2 Replacement Reactor Vessel Head (RRVH). These thermocouples were installed and monitored to reduce temperature differentials and assure uniform heating of the Unit 2 RRVH. The use of the nonqualified thermocouples during the heat treatment process made the adequacy of the heat treatment process indeterminate. As of August 29, 2008, B&W had not provided justification of the adequacy of the intermediate postweld heat treatment of the Unit 2 RRVH. The failure of B&W to evaluate a supplier and place them on the Approved Suppliers List prior to procurement and the use of the nonqualified thermocouples during the heat treatment process has been identified as Nonconformance 99900042/2008-201-03.

- C. Criterion VII of Appendix B to 10 CFR Part 50 states, in part, that measures shall be established to ensure that purchased material, equipment, and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents. These measures shall include provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor or subcontractor, inspection at the contractor or subcontractor source, and examination of products upon delivery.

Policy Number 12-QA-07 of the B&W QAPM provided the necessary requirements for the use of source verifications to support the acceptance of an item or service. The QAPM stated that the Supplier Quality Department was responsible for ensuring that source inspections were performed at intervals consistent with the importance and complexity of the purchased item, service, or the supplier's past quality performance. Procedure NE/C-1711-02-Q, "Supplier Source Inspection," Revision 1, dated June 20, 2007, provided the requirements for the completion or waiver of a supplier source inspection and stated that a Source Inspection/Waiver Request Form was required to be completed.

Contrary to the above, as of August 29, 2008, Procedure NE/C-1711-02-Q did not include guidance for granting a source inspection waiver on a purchase order in which source inspections were originally required. Furthermore, B&W failed to conduct a source inspection for nine purchase orders from Westmoreland Mechanical Testing in

which source inspections were required to be performed. Further, Source Inspection/Waiver Request forms documenting a waiver of the source inspection were not available or retrievable. B&W's failure to provide adequate procedural guidance in NE/C-1711-02-Q and its failure to generate the Source Inspection/Waiver Request Forms have been identified as Nonconformance 99900042/2008-201-04.

- D. Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50 states, in part, that measures shall be established to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality are properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits.

Policy Number 12-QA-12 of the B&W QAPM, "Control of Measuring and Test Equipment," Revision 10, dated January 28, 2008, stated, in part, that calibrations were performed at specified frequencies on calibrated equipment by the appropriate departments to ensure that calibration was maintained. Additionally, Policy Number 12-QA-12 stated, in part, that procedures establish frequency, calibration methods, records documentation, and surveillance over the personnel performing the calibration.

The B&W Gage Room Operational Manual (GROM), "Gage Control," Revision 20, dated February 12, 2008, stated, in part, that gages that have not been used between calibrations may have their frequency repeated without recalibration. Furthermore, if the frequency is repeated, the gage may have its frequencies extended up to two cycles before recalibration.

Technical Procedure 12-3-GEM-8, "Calibration of Temperature Measuring Equipment," Revision 13, dated August 21, 2006, stated, in part, that analog-type instruments shall be calibrated using a minimum of three calibration points, one each within the first and last 10 percent of the scale range and one at or near the mid-range.

Technical Procedure 12-3-WQI-120, "Storage and Handling of Electrodes, Flux, and Filler Wire for Commercial ASME Contracts," Revision 1, dated August 29, 2005, stated in part, that electrodes in heated storage will be stored in separate ovens maintained between 225 to 300 degrees Fahrenheit.

Contrary to the above, as of August 29, 2008, B&W failed to implement its procedures to control measuring and test equipment as required. Specifically:

1. B&W extended the frequency of the calibration for the 2-inch - 12-inch inside diameter micrometer set for the second cycle without recalibrating the micrometer set, even though the micrometer set had been used during the first extended calibration.
2. B&W calibrated the commercial rod oven dial thermometer using one calibration point instead of a minimum of three calibration points. In addition, the thermometer's calibration failed to meet the temperature requirements specified in Technical Procedure 12-3-WQI-120.



These issues are identified as examples of Nonconformance 99900042/2008-201-05.

- E. Criterion XIII, "Handling, Storage, and Shipping," of Appendix B to 10 CFR Part 50 states, in part, that measures shall be established to control the handling, storage, shipping, cleaning, and preservation of material and equipment in accordance with work and inspection instructions to prevent damage or deterioration.

Policy Number 12-QA-13 of the B&W QAPM, "Handling, Storage, and Shipping," Revision 8, dated January 28, 2008, stated, in part, that controls for handling equipment are established and maintained by the Plant Services Department in accordance with established preventive maintenance program and records shall be maintained by the Plant Services Department to verify compliance with the requirements of the program.

B&W Technical Procedure 12-3-GEM-3, "Procedure for Material Handling, Equipment Design, Inspection, Maintenance and Use," Revision 8, dated September 12, 2005, stated, in part, that magnetic particle examination shall be conducted annually by a qualified personnel and upon completion of each inspection, a magnetic particle sticker indicating the due date will be applied adjacent to the identification tag.

B&W Technical Procedure NDE(G)-1710-38, "Magnetic Particle Inspection of Crane Hooks and Tooling," Revision 5, dated February 27, 2007, provided guidelines to be followed when magnetic particle examination was performed on crane hooks, welds, and/or base material on lifting and handling fixtures (i.e., tooling).

Contrary to the above, as of August 29, 2008, B&W failed to provide documented evidence that its preventive maintenance program had been effectively implemented and failed to adopt and implement adequate procedures to control handling equipment as required. Specifically:

1. B&W lacked documented evidence of annual maintenance and magnetic particle examination performed on two crane hooks and two beams.
2. B&W Technical Procedures 12-3-GEM-3 and NDE(G)-1710-38 failed to address the requirement for documenting and maintaining records.

These issues are identified as examples of Nonconformance 99900042/2008-201-06.

- F. Criterion XV, "Nonconforming Materials, Parts, or Components," of Appendix B to 10 CFR Part 50 states, in part, that "measures shall be established to control materials, parts, or components which do not conform to requirements. These measures shall include, as appropriate, procedures for identification, documentation, segregation, disposition, and notification to affected organizations."

Policy Number 12-QA-15 of the B&W QAPM, "Control of Nonconforming Items," Revision 9, dated January 28, 2008, stated that, in addition to establishing written procedures for the identification, documentation, evaluation, segregation, and disposition of nonconforming items, controls shall also provide for the notification of affected departments or suppliers.

Contrary to the above, as of August 29, 2008, the NRC inspectors found that B&W failed to establish and implement procedures to notify affected organizations, including suppliers and customers, of nonconforming conditions. Specifically:

1. B&W had not established any written procedures for the notification of suppliers when a nonconforming condition was discovered at the B&W facility during receipt inspection.
2. B&W policies and procedures lacked controls for notifying its customers of nonconforming conditions on procured items.

These issues are identified as examples of Nonconformance 99900042/2008201-07.

- G. Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50 states, in part, that "measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition."

B&W QAPM Policy Number 12-QA-16, "Corrective Action," Revision 10, dated January 28, 2008, provided a high-level description of the B&W process for initiating corrective actions for internally and customer-identified nonconforming conditions and activities. B&W Policy Number 12-QA-15 provided a link from nonconformances to corrective action by requiring that all nonconformances related to activities such as internal audits, customer audits, or surveys be documented in a corrective action request (CAR).

Contrary to the above, as of August 29, 2008, the NRC inspectors found that B&W did not document all nonconformances related to activities such as internal audits, customer audits, or surveys in CARs. The NRC inspectors found that none of the eight findings identified by a customer's audit were entered into B&W's corrective action program. Additionally, since September 2007, the same customer issued five condition reports to B&W. The NRC inspectors found that only one of these condition reports was captured in a CAR. B&W's failure to capture nonconformances related to internal audits, customer audits, and surveys in CARs has been identified as Nonconformance 99900042/2008-201-08.

- H. Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50 states, in part, that "measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition."

Policy Number 12-Q-16 described B&W's corrective action program and required the B&W Quality Control Manager to perform annual reviews of CARs and nonconformances to determine if repeated problems were adequately addressed and corrected.

B&W Procedure NE/C-1717-03-Q, "Corrective Action," Revision 3, dated July 8, 2008, stated that the corrective action program shall maintain and use performance trend data, including internal and external (customer) audit results and deficiency reports and assigned responsibility for monitoring quality data and trends to the B&W Quality Control Manager and the General Manager.

Contrary to the above, as of August 29, 2008, the NRC inspectors found that B&W had not performed any trending on: (1) the results of internal and external audits, or (2) CARs related to B&W's ASME QA program or the Diablo Canyon Replacement Vessel Head being manufactured at B&W. The failure of B&W to maintain and use performance trend data in its corrective action program has been identified as Nonconformance 99900042/2008-201-09.

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Chief, Quality and Vendor Branch 1, Division of Construction Inspection and Operational Programs, Office of New Reactors, within 30 days of the date of the letter transmitting this Notice of Nonconformance. This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include: (1) the reason for the noncompliance, or if contested, the basis for disputing the noncompliance; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid noncompliances; and (4) the date when your corrective action will be completed. Where good cause is shown, the NRC will consider extending the response time.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or the NRC Agencywide Documents Access and Management System (ADAMS), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Requirements for the Protection of Safeguards Information."

Dated at Rockville, Maryland, this 15th day of October 2008

U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NEW REACTORS  
DIVISION OF CONSTRUCTION INSPECTION AND OPERATIONAL PROGRAMS  
VENDOR INSPECTION REPORT

Docket No.: 99900042

Report No.: 99900042/2008-201

Vendor: Babcock and Wilcox Nuclear Operations Group  
Mount Vernon Facility  
1400 Old Highway 69-S  
Mount Vernon, IN 47620

Vendor Contact: Mr. Gary Bryant  
Quality Control Manager  
812-838-8750

Nuclear Industry: B&W is a domestic supplier of large, heavy-pressure vessels that holds an American Society of Mechanical Engineers (ASME) N-Stamp accreditation. B&W provides some of these components to the current U.S. fleet of nuclear reactors as replacement components. B&W currently is working on both replacement heads for the Diablo Canyon Nuclear Power Plant.

Inspection Dates: August 26–29, 2008

Inspectors: Kerri A. Kavanagh NRO/DCIP/CQVP, Team Leader  
Kenneth Heck NRO/DCIP/CQVP  
Sabrina D. Cleavenger NRO/DCIP/CQVB  
Raju Patel NRO/DCIP/CQVP  
Dori Votolato NRO/DCIP/CQVP  
Nihar Ray NRO/DE/CIB2

Approved by: Juan Peralta, Branch Chief  
Quality and Vendor Branch 1  
Division of Construction Inspection  
& Operational Programs  
Office of New Reactors

## EXECUTIVE SUMMARY

Babcock and Wilcox Nuclear Operations Group, Inc.  
99900042/2008-201

The purpose of this inspection was to verify that Babcock and Wilcox (B&W) Nuclear Operations Group, Inc. implemented an adequate quality assurance (QA) program that complied with the requirements of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," of the *Code of Federal Regulations* (10 CFR Part 50). The inspection also verified that B&W implemented a program under 10 CFR Part 21, "Reporting of Defects and Noncompliance," that met the regulatory requirements of the U.S. Nuclear Regulatory Commission (NRC). The inspection was conducted at B&W's facility in Mount Vernon, Indiana.

The NRC inspection bases were the following:

- 10 CFR Part 21
- Appendix B to 10 CFR Part 50

The NRC inspectors implemented Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors" and Inspection Procedure 36100, "Inspection of 10 CFR Part 21 and 50.55(e) Programs for Reporting Defects and Nonconformance," during the conduct of this inspection.

The NRC had not performed any inspections at B&W's facility in Mount Vernon, Indiana, prior to this inspection.

The NRC inspectors concluded that B&W's QA policies and procedures were in non-compliance with the applicable requirements of 10 CFR Part 21 and Appendix B to 10 CFR Part 50 in the areas described below.

### 10 CFR Part 21 Program

The NRC inspectors cited Violation 99900042/2008-201-01 based on inadequate procedural guidance to implement the requirements of 10 CFR Part 21. Specifically, B&W's 10 CFR Part 21 implementing procedure did not include guidance for: (1) evaluating deviations and failures to comply to identify defects and failures to comply associated with substantial safety hazards within 60 days of discovery, (2) providing an interim report to the Commission if the evaluation cannot be completed within 60 days of discovery, (3) notifying the responsible officer within five days when it is determined that a defect that could cause a substantial safety hazard exists, (4) notifying customers in 5 days if the supplier determines that it cannot perform the evaluation of a deviation, (5) notifying the Commission by fax or telephone within 2 days of the director being notified of a defect, and (6) providing written notification to the Commission within 30 days of the initial notification.

### Control of Purchased Material, Equipment, and Services

The NRC inspectors issued three nonconformances for the failures on the part of B&W to meet the requirements of Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50. The NRC inspectors issued Nonconformance 99900042/2008-201-02 in response to B&W's failure to provide documented evidence of its supplier's ability to provide items or services in accordance with the applicable procurement, regulatory, and American Society of Mechanical Engineers (ASME) Code requirements. The NRC inspectors issued Nonconformance 99900042/2008-201-03 in response to B&W's failure to evaluate a supplier and place them on the Approved Suppliers List prior to procurement. The NRC inspectors issued Nonconformance 99900042/2008-201-04 in response to B&W's failure to perform required source inspections and retrieve Source Inspection/Waiver Request forms to document a waiver of the source inspection from B&W to the supplier.

### Control of Measuring and Test Equipment

The NRC inspectors issued Nonconformance 99900042/2008-201-05 for B&W's failure to implement its procedures to control measuring and test equipment as required. The NRC inspectors identified two examples of this nonconformance.

### Handling, Storage, and Shipping

The NRC inspectors issued Nonconformance 99900042/2008-201-06 for B&W's failure to provide documented evidence of its preventive maintenance program and failure to adopt and implement adequate procedures to control handling equipment as required.

### Nonconforming Materials, Parts, or Components

The NRC inspectors issued Nonconformance 99900042/2008-201-07 for B&W's failure to establish and implement procedures to notify affected organizations, including suppliers and customers, of nonconforming conditions.

### Corrective Action

The NRC inspectors issued two nonconformances for failures on the part of B&W to meet the requirements of Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. The NRC inspectors issued Nonconformance 99900042/2008-201-08 for B&W's failure to document all nonconformances related to activities such as internal audits, customer audits, or surveys on a Corrective Action Request as required. The NRC inspectors issued Nonconformance 99900042/2008-201-09 for B&W's failure to maintain and use performance trend data in its corrective action program.

## REPORT DETAILS

### 1. 10 CFR Part 21 Program

#### a. Inspection Scope

The NRC inspectors reviewed the B&W Quality Assurance Program Manual (QAPM) and implementing policies and procedures that govern the 10 CFR Part 21 process, including Procedure NE/C-1716-04-Q, "Reporting of Defects and Noncompliance Concerning Substantial Safety Hazards (10 CFR Part 21) Ohio Administrative Code Department of Health Chapter 3701:1-38-23 General Radiation Protection Standards for Sources of Radiation (ODH 3701)," Revision 7, dated August 31, 2007. The NRC inspectors also discussed the 10 CFR Part 21 process with members of B&W's management and technical staff and sampled B&W's 10 CFR Part 21 program implementation activities.

#### b. Observations and Findings

##### b.1 10 CFR Part 21 Procedure and Implementation

Procedure NE/C-1716-04-Q outlined the process used at B&W for the reporting of defects and nonconformance discovered by B&W or reported to B&W by its suppliers or customers. The procedure provided for the review of such deviations by the Works Quality Control Manager, who decides whether any identified deviation is a defect or a failure to comply. Upon evaluation of B&W's 10 CFR Part 21 implementation activities, the NRC inspectors learned that B&W had not performed any 10 CFR Part 21 evaluations.

The NRC inspectors determined that Procedure NE/C-1716-04-Q did not address all the requirements of 10 CFR Part 21.21, "Noticed of Failure to Comply or Existence of a Defect and Its Evaluation." Specifically, Procedure NE/C-1716-04-Q did not specify the requirement of: 1) paragraph 21.21(a)(1) for evaluating deviations and failures to comply to identify defects and failures to comply associated with substantial safety hazards as soon as practicable, and, in all cases within 60 days of discovery, in order to identify a reportable defect or failure to comply that could create a substantial safety hazard, were it to remain uncorrected; 2) paragraph 21.21(a)(2) for preparing an interim report and submitting it to the Commission in writing through the director or responsible officer within 60 days of discovery of the deviation or failure to comply, if the evaluation cannot be complete within 60 days of discovery; 3) paragraph 21.21(a)(3) for ensuring that a director or responsible officer is informed as soon as practicable, and, in all cases, within 5 working days after completion of the evaluation of a deviation or failure to comply where it was determined that the deviation or failure to comply is a defect that could cause a substantial safety hazard; 4) paragraph 21.21(b) for informing the purchasers or affected licensees within 5 working days when the supplier determines that it does not have the capability to perform the evaluation to determine if a defect exists; 5) paragraph 21.21(d)(3)(i) for initially notifying by facsimile the NRC Operations Center or by telephone within 2 days following receipt of information by the director or responsible officer on the identification of a defect or a failure to comply; and 6) paragraph 21.21(d)(3)(ii) for providing a written notification to the NRC within 30 days following receipt of information by the director or responsible corporate officer on the identification

of a defect or failure to comply. The NRC inspectors identified this issue as Violation 99900042/2008-201-01.

c. Conclusions

Except for the examples identified in Violation 99900042/2008-201-01, the NRC inspectors concluded that the B&W 10 CFR Part 21 program is consistent with regulatory requirements.

2. Control of Purchased Material, Equipment, and Services

a. Inspection Scope

The NRC inspectors reviewed the B&W QAPM, policies, and implementing procedures that govern the control of purchased material, equipment, and services to verify compliance with the quality assurance requirements of Criterion VII of Appendix B to 10 CFR 50. Specifically, the NRC inspectors reviewed the following policies and procedures established by B&W to select, qualify, and oversee vendors supplying basic components, as described in the following procedures:

- B&W QAPM Policy Number 12-QA-07, "Control of Purchased Items and Services" Revision 10, dated January 28, 2008
- Procedure NE/C-1722-02-Q, "Supplier Evaluations," Revision 4, dated May 27, 2008
- Procedure NE/C-1711-02-Q, "Supplier Source Inspection," Revision 1, dated June 20, 2007.

The NRC inspectors also reviewed a sample of source reviews, receipt inspection reviews, material procurement documents, and external audits to evaluate the adequacy of B&W's measures for verifying the attributes and quality of purchased material.

b. Observations and Findings

b.1 Policies and Procedures for Vendor Qualification

Policy Number 12-QA-07 of B&W's QAPM stated, in part, that the Material Manager was responsible for supplier evaluation and selection, source inspection, receiving inspection, and acceptance of material, equipment, and services to be used in the fabrication of items on contracts invoking the ASME Boiler and Pressure Vessel Code. Procedure NE/C-1722-02-Q identified the requirements for evaluations of suppliers prior to addition to the Approved Supplier List.

B&W is an ASME N-type Certificate Holder. Due to this certificate, the 2007 ASME Code requires B&W to comply with the basic requirements and supplements of ASME NQA-1-1994, "Quality Assurance Requirements for Nuclear Facility Applications." Supplement 7S-1 to NQA-1-1994, "Supplementary Requirements for Control of Purchased Items and Services," described the three acceptable methods for evaluating the capability of suppliers to provide items or services in accordance with the requirements of the purchase document. Supplement 7S-1 to NQA-1-1994 also required these methods to be documented. Documentation of this evaluation represents



the basis for the Certificate Holder's approval of the supplier's QA program and implementation.

The NRC accepts ASME accreditation as evidence that the holder of the accreditation has a documented QA program that meets the requirements of Appendix B to 10 CFR 50. However, this recognition applies only to programmatic aspects of the QA programs, and holders of operating licenses and construction permits, as well as their contractors (e.g., B&W), are still responsible for ensuring that the suppliers are effectively implementing their approved QA programs. This implementation evaluation should be accomplished and documented through one or more of the three methods identified in NQA-1-1994. The provisions in Procedure NE/C-1722-02-Q, which allowed for suppliers to be added to the Approved Supplier List based on a customer waiver, a catalog or off the shelf item, or because the supplier has an ASME Code certification, are not allowances permitted by NQA-1 Supplement 7S-1.

The NRC inspectors found that Policy Number 12-QA-07 of the B&W QAPM allowed B&W to place ASME Quality Systems Certificate holders on the Approved Supplier List and procure from the supplier without sufficient evaluation of the implementation of the supplier's QA program. Additionally, the B&W Procedure NE/C-1722-02-Q allowed the Supplier Quality department to place a supplier on the Approved Supplier List when the supplier met additional allowances outside the quality manual. The NRC inspectors found that B&W added AREVA NP Inc. to the Approved Suppliers List and contracted AREVA NP Inc. to supply safety-related weld wire without sufficient documented evidence of its capability to provide items or services in accordance with the technical and quality requirements of the purchase documents. This failure of B&W to provide documented evidence of its supplier's ability to provide items or services in accordance with the applicable procurement, regulatory, and ASME Code requirements has been identified as an example of Nonconformance 99900042/2008-201-02.

## b.2 Maintenance of the Approved Supplier List

According to Policy Number 12-QA-07 of the B&W QAPM and Procedure NE/C-1722-02-Q, the Approved Supplier List was maintained and distributed by Supplier Quality and periodically updated. Supplier Quality also had the responsibility for reviewing the results of the audits and approving the addition and deletion of suppliers to/from the list.

In addition, the NRC inspectors observed that thermocouples used during the intermediate postweld heat treatment process for the Diablo Canyon Replacement Reactor Vessel Head (RRVH) project were procured from TE Wire and Cable, LLC. TE Wire and Cable, LLC was not listed on the B&W Approved Supplier List. B&W failed to follow the QAPM and Procedure NE/C-1722-02-Q which required B&W to evaluate the supplier's ability to meet the ASME code quality requirements before procurement. The use of the nonqualified thermocouples during the heat treatment process made the adequacy of the heat treatment process indeterminate as discussed in Section 3 of this report. This failure to comply with procedures affecting the quality of B&W's control of purchased materials, items, and services has been identified as Non-Conformance 99900042/2008-201-03.

### b.3 Review of Purchase Orders

The NRC inspectors reviewed a sample of purchase orders for items, services, and calibrations for the Diablo Canyon RRVH project. Purchase orders for mechanical services and testing services appropriately included clauses invoking the provisions of 10 CFR Part 21 and requiring the supplier to conduct the work under its 10 CFR Part 50, Appendix B QA program. The NRC inspectors noted that change orders requiring the vendor to comply with the requirements of 10 CFR Part 21 and the vendors Appendix B QA Program were dated months after the original purchase order date had been issued. The original purchase orders were found to be inadequate by a customer and B&W had opened a Corrective Action Report (CAR) noting that these purchase orders for safety-related services were not adequate since they did not invoke the relevant regulatory requirements. Part of the corrective action completed by B&W was to issue corrections to the affected purchase orders to add the needed clauses. Also, since the work had already been completed before the purchase orders were changed to invoke these requirements, B&W was in the process of completing corrective actions to verify that the services had been conducted in accordance with the requirements of Appendix B to 10 CFR Part 50 and 10 CFR Part 21.

### b.4 Source and Receipt Inspections

Policy Number 12-QA-07 of the B&W QAPM provided the necessary requirements for the use of source verifications (inspections) and review of Certificates of Conformance to support the acceptance of an item or service. Procedure NE/C-1711-02-Q provided the requirements for the completion of a supplier source inspection and allowed for the ability to waive the source inspection. However, Procedure NE/C-1711-02-Q did not provide guidance for the allowances in which a waiver was able to be granted for source inspections which were a requirement of a purchase order. Since the QAPM allowed for a combination of supplier certification and source verification or receipt inspections to accept an item, B&W was able to accept an item or service without a source inspection, however, both certification and receipt inspections must be completed instead. This requirement was not delineated in Procedure NE/C-1711-02-Q. If a source inspection was required, NE/C-1711-02-Q stated that a Source Inspection/Waiver Request form must be completed whether an inspection was completed or a waiver was granted.

Contrary to above, Procedure NE/C-1711-02-Q did not include guidance for a source inspection waiver granted when source inspections were a requirement of a purchase order. Furthermore, the NRC inspectors found that source inspections had not been conducted for nine purchase orders for Westmoreland Mechanical Testing even though the purchase order required that source inspections be conducted by B&W nor were Source Inspection/Waiver Request forms available during the inspection to document a waiver of the source inspection. Inadequate procedure guidance and the failure to generate and maintain the Source Inspection/Waiver Request forms have been identified as Nonconformance 99900042/2008-201-04.

### b.5 Review of Vendor Audit Reports

For a sample of reports from audits that B&W conducted of its suppliers, the NRC inspectors verified that during such audits, B&W adequately evaluated the vendor's compliance with the applicable requirements of ISO/IEC 17025 or Appendix B to 10 CFR Part 50, 10 CFR Part 21, and ASME Code Section III, "Rules for Construction of Nuclear Facility Components." The NRC inspectors also verified that audit methods of evaluation or checklists were prepared and completed for the audit and contained sufficient objective evidence to support the conclusions made by B&W. The NRC inspectors also verified that the scope of supply identified in the B&W Approved Supplier List database was consistent with the materials supplied to B&W by each vendor in the sample population.

### c. Conclusions

Except for the issues identified in Nonconformances 99900042/2008-201-02, 99900042/2008-201-03, and 99900042/2008-201-04, the NRC inspectors concluded that B&W's policies and procedures for procurement control comply with the QA requirements of Criterion VII of Appendix B to 10 CFR Part 50 and that B&W personnel were effectively implementing these policies and procedures.

## 3. Control of Special Processes

### a. Inspection Scope

The NRC inspectors reviewed the B&W QAPM policies and implementing procedures that govern the control of special processes to verify compliance with the QA requirements of Criterion IX, "Control of Special Processes," of Appendix B to 10 CFR Part 50. The NRC inspectors reviewed the following sections of the B&W QAPM, implementing procedures and supporting documentation:

- Policy Number 12-QA-09, "Control of Processes," Revision 10, dated January 28, 2008
- Policy Number 12-QA-10, "Inspection," Revision 10, dated January 28, 2008
- Policy Number 12-QA-11, "Test Control," Revision 8, dated January 28, 2008
- Areva Technical Document 08-9025240-003, "Certified Design Specification, Replacement Reactor Vessel Closure Head, Pacific Gas & Electric, Diablo Canyon, Units 1 & 2," Revision 3, dated March 13, 2008
- Technical Procedure 12-3-HT-11, "Stress Relief of Carbon and Low Alloy Steels for Commercial Applications," Revision 7, dated August 19, 2003
- Technical Procedure 12-3-HGL-4, "Hydrostatic Testing ASME Vessels," Revision 4, dated February 3, 2006.

The NRC inspectors also reviewed procedures and technical documents that implement these QA requirements, discussed related items with B&W project personnel, and observed ongoing work activities. At the time of the inspection, work was proceeding on fabrication of two RRVHs for Diablo Canyon, under commercial contract to AREVA NP, Inc.

b. Observations and Findings

The B&W QAPM established the administrative policies to assure compliance with Section III, Division 1 of the ASME Code, Appendix B to 10 CFR Part 50, and NQA-1 requirements when constructing items for contracts invoking the ASME Code and supplying materials in accordance with the ASME Code. QAPM Policy Number 12-QA-09 described the control of special processes, which include welding, nondestructive examination (NDE), and heat treatment. B&W's QAPM Policy Number 12-QA-10 described requirements for inspection, including development of technical documents and drawings referenced in the Manufacturing Process Plan. Inspection plans and technical procedures controlled all dimensional verifications and NDE testing associated with the fabrication of components. QAPM Policy Number 12-QA-11 described the control of tests for verifying conformance of an item to ASME Code or contract requirements, such as hydrotests, to ensure that items conformed to specified requirements and to demonstrate that the items would perform satisfactorily in service.

Welding

The NRC inspectors discussed welding personnel training, procedures, and processes with the senior welding engineer and determined that all welding on ASME Code materials and fabrication of ASME Code items was performed by qualified welders and welding operators in accordance with approved welding procedure specifications, which were qualified in accordance with ASME Code, Section III. The NRC inspectors reviewed eight weld data packages for the weld filler material used in fabrication of the RRVH project. The weld packages included documentation for Inconel Type 52 and 152 for welding electrodes, E309L-16 for welding electrodes, strip/flux combination for SS 309L weld metal overlay, and material/chemistry certification by the customer and subsequent documentation by B&W.

Nondestructive Examination

The NRC inspectors discussed NDE welding personnel training, procedures, and processes with the Level III inspector, who was responsible for examination of NDE personnel and development of NDE inspection procedures. NDE inspection procedures applicable to the RRVHs included penetrant testing (PT), magnetic particle testing (MT), and ultrasonic testing (UT). No inspection activities or process hold points were observed for the RRVH project, but relevant work documentation, evidencing completed visual and PT examination, were available, examined, and found satisfactory and in conformance with applicable procedures. Inspection and test certification files for project NDE personnel were satisfactory and covered the inspection activities required by contract.

Heat Treatment

The NRC inspectors discussed the intermediate postweld heat treatment process with B&W personnel and noted that the thermocouples were attached to the Unit 2 RRVH in accordance with Procedure 12-3-HT-1 to assure uniform temperature distribution for the furnace zone and/or furnace load. Redundant thermocouples were installed and monitored to reduce temperature differentials and assure uniform heating of the Unit 2 RRVH. Temperatures were recorded on an automatic strip chart recorder and automatically printed out as a permanent record of the heat treatment process. As

described in Section 2 of this report, the NRC inspectors identified that the thermocouples used in the intermediate postweld heat treatment process were purchased from an unqualified supplier. The use of the nonqualified thermocouples during the heat treatment process made the adequacy of the heat treatment process indeterminate. When the NRC inspectors notified B&W of this issue, B&W immediately proceeded to generate a CAR and began evaluating the adequacy of the intermediate postweld heat treatment process of the Unit 2 RRVH. B&W had not completed the CAR or the evaluation of the adequacy of the heat treatment process at the conclusion of the inspection. Therefore, the NRC inspectors were not able to review any documentation associated with the use of nonqualified thermocouples and their impact on the adequacy of the heat treatment process.

#### Hydrostatic Testing

The NRC inspectors discussed project controls and fabrication activities with the project manager for the RRVHs. Following final machining, and welding of the RRVH lifting lugs, B&W planned to hydrostatic test the RRVHs in accordance with ASME Code requirements. At the time of the inspection, B&W had not yet developed a contract specific hydrostatic test procedure, but the general hydrostatic test requirements of the ASME Code, as described in Procedure 12-3-HGL-4 and the Areva contract design specification 08-9025240-003, were reviewed and found to provide a satisfactory technical basis for conformance with applicable regulatory requirements.

#### Unit 1 RRVH

At the time of the inspection, manufacturing operations associated with the Unit 1 RRVH, including automatic and manual welding of strip cladding and associated inspections were being performed at one work station with the dome mounted vertically in a large positioning turn table. Cladding of the dome had been completed and the NRC inspectors observed the weld overlays. The NRC inspectors also observed preparation of RRVH lifting lugs and support lugs for installation. Visual and dimensional verifications associated with these operations had been completed and routine grinding operations were in progress. Procedures, drawings, and work documents were available at the work station and found to be satisfactory.

#### c. Conclusions

The inspectors found the welding, inspection, and testing personnel to be knowledgeable, qualified, and certified to ASME Code requirements and fabrication activities were conducted in accordance with the contract specifications and with B&W QAPM and implementing procedures. However, the NRC inspectors identified that the thermocouples used in the intermediate postweld heat treatment process were purchased from an unqualified supplier. This issue is described in Nonconformance 99900042/2008-201-02 in Section 2 of this report.

#### 4. Control of Measuring and Test Equipment

##### a. Inspection Scope

The NRC inspectors reviewed the B&W QAPM and implementing policies and procedures that govern the control of measuring and test equipment (M&TE) to assure

that the guidelines provided an adequate description of the process and implementation consistent with the requirements of Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. Within the scope of this area of the inspection, the NRC inspectors reviewed the following procedures and records:

- B&W QAPM Policy Number 12-QA-12, "Control of Measuring and Test Equipment," Revision 11, dated January 28, 2008
- B&W Gage Room Operational Manual (GROM), "Gage Control," Revision 20, dated February 12, 2008
- Technical Procedure 12-3-GEM-8, "Calibration of Temperature Measuring Equipment," Revision 13, dated August 21, 2006
- Technical Procedure 12-3-WQI-120, "Storage and Handling of Electrodes, Flux, and Filler Wire for Commercial ASME Contracts B&W," Revision 1, dated August 29, 2005.

b. Observations and Findings

Policy Number 12-QA-12 described the requirements and responsibilities for the control of M&TE. The policy also stated that B&W would identify and segregate the out-of-tolerance M&TE in a controlled area until the equipment was re-calibrated in accordance with the GROM.

Section 3(a) of the B&W GROM, stated, in part, that gages that had not been used between calibration cycles, may have its calibration cycle repeated without recalibration. If the calibration cycle is repeated, this calibration may be extended up to two cycles as long as the gage had not been used.

Technical Procedure 12-3-GEM-8, stated, in part, that analog type instruments shall be calibrated using a minimum of three calibration points, each point within the first and last 10 percent of the scale range and one point at or near the mid-range.

Technical Procedure 12-3-WQI-120, stated, in part, that electrodes in heated storage will be stored in separate ovens maintained between 225 to 300 degrees Fahrenheit.

The NRC inspectors noted that Policy Number 12-QA-12 adequately defined the responsibilities for the maintenance, control, calibration, record documentation, and identification of M&TE used in activities affecting quality. The NRC inspectors reviewed a representative sample of calibration records identified on inspection reports and manufacturing plans for Diablo Canyon RRVH project and verified that the calibration records were in accordance with procedures related to M&TE control.

Based on its review, the NRC inspectors identified two examples in which B&W failed to implement its procedures to control measuring and test equipment as required. Specifically:

- (1) The NRC inspectors noted that the calibration for the 2-inch – 12-inch inside diameter micrometer set, serial number U2-7558, had been extended for two consecutive calibration cycles. The calibration record for the micrometer set indicated that the micrometer set was "not used" during the two extended calibration cycles. However, the NRC inspectors identified that the micrometer set had been

used during the first extended calibration cycle, as documented on Inspection Plan Number 1100 of Diablo Canyon RRVH project, and that B&W failed to recalibrate the micrometer set consistent with the GROM. This issue is indentified as an example of failure to comply with MT&E procedures and is part of Nonconformance 99900042/2008-201-05.

- (2) The NRC inspectors noted that the calibration record for the commercial rod oven dial thermometer, gage number 310-1, stated that the thermometer was calibrated. However, the NRC inspectors identified that the thermometer was calibrated only at one calibration point instead of the minimum of three calibration points as required by Technical Procedure 12-3-GEM-8. In addition, the thermometer's calibration failed to meet the temperature requirements specified in Technical Procedure 12-3-WQI-120 as evidenced in the calibration record. This issue is identified as another example of failure to comply with MT&E procedures and is part of Nonconformance 99900042/2008-201-05.

c. Conclusions

Except for the issues identified in Nonconformance 99900042/2008-201-05, the NRC inspectors concluded that B&W's policies and procedures for control of M&TE comply with the QA requirements of Criterion XII of Appendix B to 10 CFR Part 50 and that B&W personnel were effectively implementing these policies and procedures.

5. Handling, Storage, and Shipping

a. Inspection Scope

The NRC inspectors reviewed the B&W QAPM and the applicable implementing policies and procedures that govern the control of handling, storage, and shipping, to verify compliance with the Criterion XIII, "Handling, Storage and Shipping," of Appendix B to 10 CFR Part 50. Within the scope of this area, the NRC inspectors reviewed the following procedures and records:

- B&W QAPM Policy Number 12-QA-13, Handling, Storage, and Shipping," Revision 8, dated January 28, 2008
- Technical Procedure 12-3-GEM-3, "Procedure for Material Handling, Equipment Design, Inspection, Maintenance and Use," Revision 8, dated September 12, 2005
- Technical Procedure NDE(G)-1710-38, "Magnetic Particle Inspection of Crane Hooks and Tooling," Revision 5, dated February 27, 2007.

b. Observations and Findings

Policy Number 12-QA-13 described the responsibilities and requirements for the control of handling, storage, and shipping of items and components either procured or fabricated by B&W. Section 4.0 of Policy Number 12-QA-13 stated that controls for handling equipment are established and maintained by Plant Services in accordance with an established preventive maintenance program and records shall be maintained by Plant Services to verify compliance with the requirements of the program.

Technical Procedure 12-3-GEM-3 required that an MT examination or an engineering evaluation, where applicable, be conducted annually by qualified personnel and upon

completion of each inspection, an MT sticker indicating the due date be applied adjacent to the identification tag. Technical Procedure NDE(G)-1710-38 provided guidelines to be followed when performing an MT examination on crane hooks, welds and/or base material on lifting and handling fixtures (i.e., tooling).

The NRC inspectors verified that the B&W preventive maintenance program for handling and special lifting equipment was performed in accordance with the requirements stated in the QAPM. The NRC inspectors observed that preventive maintenance of handling and lifting equipments was performed in a timely manner and was color coded to show which quarter maintenance was performed. However, during the review of maintenance records of handling and lifting equipments, the NRC inspectors identified a lack of documented evidence of annual maintenance for two crane hooks (serial numbers TL24004 and T8173) and two beams (serial numbers TL33130A and TL33130B). In addition, the NRC inspectors observed that B&W Technical Procedures 12-3-GEM-3 and NDE(G)-1710-38 did not contain the requirement for documenting and maintaining maintenance records as required by Policy Number 12-QA-13. These issues are examples of B&W's failure to keep documented evidence of its preventive maintenance program and to adopt and implement adequate procedures to control handling equipment as required and have been identified as Nonconformance 99900042/2008-201-06.

c. Conclusions

Except for the issues identified in Nonconformance 99900042/2008-201-06, the NRC inspectors concluded that B&W's policies and procedures for control of handling, storage and shipping comply with the QA requirements of Criterion XIII of Appendix B to 10 CFR Part 50 and that B&W personnel were effectively implementing these policies and procedures.

6. Nonconforming Materials, Parts, or Components

a. Inspection Scope

The NRC inspectors reviewed the B&W QAPM and implementing policies and procedures that govern the control of nonconforming materials, parts, and components to verify compliance with the requirements of Criterion XV, "Nonconforming Materials, Parts, or Components," of Appendix B to 10 CFR Part 50. Specifically, the NRC inspectors reviewed the following documents:

- B&W QAPM Policy Number 12-QA-15, "Control of Nonconforming Items," Revision 9, dated January 28, 2008
- B&W QAPM Procedure Number NE/C-1716-02-Q, "Non-Conforming Material Control," Revision 4, dated August 31, 2005
- B&W Procedure NE/C-1711-01-Q, "Rapid Response Plan (RRP) and Unusual Incidents," Revision 3, dated July 10, 2008
- B&W Procedure NE/C-1008-05-Q, "Manufacturing Plan, Deviation, Variation Notice Preparation and Control," Revision 5, dated June 23, 2008
- B&W Work Instruction QAS-1711-07, "Supplier Source Inspections," Revision 7, dated July 26, 2005.



The NRC inspectors reviewed the departmental logs of RRP for all issues associated with the manufacture of RRVHs for the Diablo Canyon project and sampled several RRP concerning unacceptable indications and incorrect manufacturing conditions related to the RRVHs.

b. Observations and Findings

b.1 Policies and Procedures for the Control of Nonconformances

B&W Policy Number 12-QA-15 provided B&W's controls for the identification, documentation, evaluation, segregation, and disposition of items that do not conform to ASME Code, design, or contract requirements. In accordance with this policy, B&W documented all nonconforming conditions on an RRP. Policy Number 12-QA-15 also stated that, in addition to establishing written procedures for the identification, documentation, evaluation, segregation, and disposition of nonconforming items, controls shall also provide for the notification of affected departments or suppliers.

B&W Procedure NE/C-1716-02-Q described the methods B&W used to identify, segregate, and prevent the inadvertent use, assembly, and/or shipment of non-conforming material, parts, and components. The procedure provided references for B&W Procedures NE/C-1711-01-Q and NE/C-1008-05-Q for further guidance on handling nonconformances.

B&W Procedure NE/C-1711-01-Q identified the conditions for which an RRP must be completed. The procedure further directed the RRP originator to forward the RRP to the responsible Manufacturing Engineer for disposition in accordance with Procedure NE/C-1008-05-Q.

B&W Procedure NE/C-1008-05-Q described the preparation, release, maintenance, and control of manufacturing plans and modifications to manufacturing plans, which include deviations, RRP, and variation notices. Procedure NE/C-1008-05-Q provided detailed instructions for initiating and completing an RRP when a nonconforming condition occurred and directed Quality Control to sign the RRP to indicate that disposition of the condition was complete. Procedure NE/C-1008-05-Q also provided guidance to the Manufacturing Engineer for notifying any affected departments within the B&W organization and obtaining signatures to certify the affected department's approval of the disposition.

B&W Work Instruction QAS-1711-02 directed Quality Management personnel to request that the supplier complete a Supplier Referral Variation form stating the cause and corrective action and send it to B&W Purchasing in the event that a material or part is rejected during source inspections at the supplier facility.

The NRC inspectors determined that B&W had established adequate measures in the above documents to identify, document, evaluate, segregate, and disposition nonconforming conditions. The NRC inspectors verified that B&W Procedure NE/C-1716-02-Q identified the B&W organizational responsibilities and authorities for the review and disposition of nonconforming items. However, the NRC inspectors determined, after a review of B&W procedures and discussion with B&W QA personnel, that no written controls had been established to identify nonconforming conditions that require the notification of B&W suppliers or to provide instruction on how to make such

notifications (information to include, format to use, timeliness, etc.) when a nonconforming condition was discovered at the B&W facility during receipt inspection. The failure of B&W to establish and implement procedures for notifying suppliers of nonconforming conditions has been identified as an example of Nonconformance 99900042/2008201-07.

The NRC inspectors also found that B&W policies and procedures lacked controls for notifying their customers of nonconforming conditions on procured items, as required by Criterion XV of Appendix B to 10 CFR Part 50. Section 9, "Control of Supplier Nonconformances," of Supplement 7S-1 to NQA-1-1994, further describes this requirement as it states that both the purchaser and supplier shall establish and document methods for the disposition of items and services that do not meet procurement documentation requirements. The failure of B&W to establish and implement procedures for notifying customers of nonconforming conditions has been identified as another example of Nonconformance 99900042/2008201-07.

#### b.2 Review of Rapid Response Plans

Based on an evaluation of 21 of the 44 RRP's initiated for all issues associated with the RRVHs for the Diablo Canyon project, the NRC inspectors noted that each nonconformance report (NCR) contained a detailed description of the condition and sufficient technical justification to verify the acceptability of the disposition. The NRC inspectors verified that the RRP's included the appropriate reviews of the planned disposition and that the evaluation for 10 CFR Part 21 applicability was completed. The NRC inspectors also verified that all work associated with the RRP, including any actions recorded on variation notices and deviation plans, was completed prior to the final QA signoff on the RRP and that any necessary testing or inspection to verify the adequacy of the rework had been completed.

#### c. Conclusions

Except for the examples identified in Nonconformance 99900042/2008-201-07, the NRC inspectors concluded that the B&W program requirements for the control of nonconformances are consistent with the regulatory requirements of Criterion XV of Appendix B to 10 CFR Part 50. Based on the RRP's reviewed, the NRC inspectors determined that the B&W QAPM and associated nonconformance procedures and work instructions were being effectively implemented.

### 7. Corrective Action Program

#### a. Inspection Scope

The NRC inspectors reviewed the B&W QAPM and implementing policies and procedures that govern the control of corrective action to verify compliance with the requirements of Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. Specifically, the NRC inspectors reviewed the following documents:

- B&W Policy Number 12-QA-15, "Control of Nonconforming Items," Revision 9, dated January 28, 2008
- B&W Policy Number 12-QA-16, "Corrective Action," Revision 10, dated January 28, 2008

- B&W Procedure NE/C-1717-03-Q, "Corrective Action," Revision 3, dated July 8, 2008.

The NRC inspectors also reviewed a sample of CARs associated with ASME Code activities and the Diablo Canyon RRVH project to verify compliance with program requirements and adequate implementation of those requirements.

b. Observations and Findings

b.1 Policies and Procedures for the Corrective Action Program

B&W Policy Number 12-QA-16 provided a high-level description of the B&W process for initiating corrective actions for internally and customer-identified nonconforming conditions and activities. The procedure also described the process for initiation of corrective actions to B&W suppliers and subcontractors for conditions adverse to quality.

B&W Procedure NE/C-1717-03-Q outlined the process for identifying and analyzing conditions that required corrective action, determining the root cause, evaluating the condition for the applicability of 10 CFR Part 21, implementing corrective action, and making any necessary notifications. The procedure required that the department responsible for the CAR identified the cause of the deficiency, proposed the corrective action, and a target date for implementation of the corrective action on the CAR within 20 working days of CAR issuance.

B&W Policy 12-QA-16 and B&W Procedure NE/C-1717-03-Q described B&W's policies for identifying, analyzing, and completing corrective actions. Both documents identified the need for corrective action as "conditions adverse to quality," consistent with Criterion XVI of Appendix B to 10 CFR Part 50, but provided no further guidance on how to determine if a condition was adverse to quality and rose to the significance of initiating a CAR.

In its discussion of corrective actions initiated in response to nonconforming conditions identified by a customer or described in an RRP, Policy 12-QA-16 stated, in part, that Works Quality Control Manager was responsible for determining if cause and corrective action request is required. The NRC inspectors noted that neither Policy 12-QA-16 nor the associated implementing procedures provide further guidance to describe the criteria the Works Quality Control Manager should use to determine if a CAR is necessary.

The NRC inspectors observed that B&W personnel had a good understanding of how to identify manufacturing-related nonconformances that warrant the generation of a CAR but were confused regarding how to identify sources of quality and program-related deficiencies that should be captured in the corrective action program. The NRC inspectors noted that B&W had only issued four CARs for the Diablo Canyon RRVH project, which had been ongoing for more than two years. The lack of documented guidance for implementing the B&W corrective action program has been identified as part of Nonconformance 99900042/2008-201-08.

## b.2 Implementation of the Corrective Action Program

B&W Policy Number 12-QA-15 provided a link from nonconformances to corrective action by requiring that all nonconformances related to activities such as internal audits, customer audits, or surveys be documented on a CAR.

The NRC inspectors found that, contrary to the requirements of B&W Policy Number 12-QA-15, B&W did not document all nonconformances related to activities such as internal audits, customer audits, or surveys on a CAR. The NRC inspectors found that none of the eight findings identified by a customer audit conducted November 26-28, 2007, were entered into B&W's corrective action program. Additionally, since September 2007, the same customer had issued five condition reports for inadequate purchase orders, procedural weaknesses, and invalid bases for supplier approvals, supplier audit inadequacies, and detrimental material control. Of these five condition reports, only one had been captured in a CAR. This example of failure to effectively implement B&W's corrective action program has been identified as part of Nonconformance 99900042/2008-201-08.

The NRC inspectors reviewed all of the CARs issued for the RRVHs for the Diablo Canyon project and also reviewed a sample of CARs related to B&W's ASME QA program that were issued as a result of internal audits. The NRC inspectors noted that each CAR contained a detailed description of the deficiency, included the appropriate review and signoff, and had been evaluated for applicability of 10 CFR Part 21 requirements. The NRC inspectors evaluated the timeliness of corrective actions and found that, generally, the CARs were processed in a timely fashion.

B&W Procedure NE/C-1717-03-Q assigned responsibility for monitoring quality data and trends to the B&W Quality Control Manager and the General Manager and stated that the corrective action program shall maintain and use performance trend data, including internal and external (customer) audit results and deficiency reports. The NRC inspectors found that, contrary to this requirement, B&W had not performed any trending on: (1) the results of internal and external audits, or (2) CARs related to B&W's ASME QA program or the Diablo Canyon RRVHs. After discussions with B&W QA personnel, B&W completed a trend analysis for all CARs related to B&W's ASME QA program and the Diablo Canyon RRVHs and found that of the 17 total CARs, 15 were caused by documentation and two were caused by personnel. B&W's failure to maintain and use performance trend data in its corrective action program has been identified as Nonconformance 99900042/2008-201-09.

## c. Conclusions

Except for the examples identified in Nonconformance 99900042/2008-201-08 and Nonconformance 99900042/2008-201-09, the NRC inspectors concluded that the B&W corrective action program requirements are consistent with the regulatory requirements of Criterion XVI of Appendix B to 10 CFR Part 50 and that the B&W QA policies and procedures for corrective action were being effectively implemented.

## 8. Audits

### a. Inspection Scope

The NRC inspectors reviewed the B&W QAPM and implementing policies and procedures that govern the audit process to verify compliance with the requirements of Criterion XVIII, "Audits," of Appendix B to 10 CFR Part 50. The NRC inspectors also evaluated a sample of internal audit reports to verify compliance with the program requirements and adequate implementation of those requirements. Specifically, the NRC inspectors reviewed the following documents:

- B&W Policy Number 12-QA-18, "Quality Audits," Revision 9, dated January 28, 2008
- B&W Procedure NE/C-1719-01-Q, "Quality Systems Internal Auditing Program," Revision 5, dated June 10, 2007
- B&W Procedure NE/C-1719-02-Q, "Lead Auditor Certification," Revision 1, dated February 2, 2006.

### b. Observations and Findings

B&W Policy Number 12-QA-18 described the process and requirements for performing internal audits. This procedure further discussed schedules for audit activities, selection of the audit team, reports, and control of the audit process. The policy stated that each on-going ASME Code activity shall be audited at least once annually.

Procedure NE/C-1719-01-Q described the responsibilities of the personnel involved in the internal audit program. The requirements also described the frequency of internal audits, the scope of the internal audits, preparation and content of the audit report, identification and resolution of corrective actions, and closeout of audit findings. Within audit reports, a CAR captured internal findings, described the deficiencies, and assigned responsibility for and due dates for resolving the findings. The NRC inspectors noted that the B&W policy and procedures established adequate requirements for implementing the audit program.

The NRC inspectors verified that the sample of internal audit reports reviewed was performed in accordance with program requirements. The NRC inspectors confirmed that the audit reports reviewed described the recommendations and findings identified during the internal audits. Each finding was assigned a CAR and the CAR documentation was attached to the audit report. For the audit reports reviewed, the NRC inspectors noted that corrective actions were taken in a timely manner to respond to any identified findings. The inspectors identified no issues in this area.

In addition, the NRC inspectors reviewed the qualification records for a sample of lead auditors and auditors. The inspection team verified that all auditors and audit team leads met the relevant requirements as described in Policy Number 12-QA-18 and Procedure NE/C-1719-02-Q.

c. Conclusions

The NRC inspectors concluded that the B&W internal audit program requirements were consistent with the regulatory requirements of Criterion XVIII of Appendix B to 10 CFR Part 50. Based on the sample reviewed, the NRC inspectors also determined that the B&W QAPM and associated audit procedures were being effectively implemented. The NRC inspectors did not identify any issues in this area.

9. Exit Meetings

On August 29, 2008, the NRC inspectors presented the results of the inspections during an exit meeting with Michael Keene, B&W Mount Vernon General Manager, Gary Bryant, Manager of Quality Assurance, and other B&W personnel.

## ATTACHMENT

### 1. PERSONS CONTACTED

Sara Allen	Quality Assurance
Gary Bryant	Manager, Quality Assurance
Ron Fox	Principal Quality Engineer, Areva
Jake Gill	Quality Assurance Engineer
William Hall	Quality Assurance Engineer
Matt Hines	Manufacturing Engineer
Gene L. Homer	Metallurgical Engineer
Michael Keene	General Manager
Daniel E. Mace	NDT Level III
Denny Renninger	Manager, Supplier Quality
Jeffrey S. Snow	Project Manager
Charles D. Somers	Principal Engineer, Welding Department
Les Taggart	Consulting Quality Engineer, Pacific Gas and Electric Company

### 2. INSPECTION PROCEDURES USED

Inspection Procedure 43002, "Routine Inspections of Nuclear Vendors."

Inspection Procedure 36100, "Inspection of 10 CFR Part 21 and 50.55(e) Programs for Reporting Defects and Nonconformance."

### 3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

There were no previous NRC inspections performed at B&W's facility in Mount Vernon, Indiana, prior to this inspection.

<u>Item Number</u>	<u>Status</u>	<u>Type</u>	<u>Description</u>
99900042/2008-201-01	Opened	Violation	10 CFR Part 21
99900042/2008-201-02	Opened	Nonconformance	Criterion VII
99900042/2008-201-03	Opened	Nonconformance	Criterion VII
99900042/2008-201-04	Opened	Nonconformance	Criterion VII
99900042/2008-201-05	Opened	Nonconformance	Criterion XII
99900042/2008-201-06	Opened	Nonconformance	Criterion XIII
99900042/2008-201-07	Opened	Nonconformance	Criterion XV
99900042/2008-201-08	Opened	Nonconformance	Criterion XVI
99900042/2008-201-09	Opened	Nonconformance	Criterion XVI