10 CFR 50.54(f)

CP&L
A Progress Energy Company

Serial: RNP-RA/02-0041

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United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23

SUBMITTAL OF INFORMATION REQUESTED BY
NRC BULLETIN 2002-01, "REACTOR PRESSURE VESSEL HEAD
DEGRADATION AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY"

Ladies and Gentlemen:

On March 18, 2002, the Nuclear Regulatory Commission (NRC) issued NRC Bulletin 2002-01, "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity," that required pressurized water reactor (PWR) addressees to submit:

(1) Information related to the integrity of the reactor coolant pressure boundary, including the reactor pressure vessel (RPV) head and the extent to which inspections have been undertaken to satisfy applicable regulatory requirements, and

(2) The basis for concluding that plants satisfy applicable regulatory requirements related to the structural integrity of the reactor coolant pressure boundary and future inspections will ensure continued compliance with applicable regulatory requirements, and

(3) A written response to the NRC in accordance with the provisions of Title 10, Section 50.54(f), of the Code of Federal Regulations (10 CFR 50.54(f)) if unable to provide the information or cannot otherwise meet the requested completion dates.

H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, provides as Attachment I to this letter the required affidavit in accordance with 10 CFR 50.54(f).

Attachment II to this letter provides the information that was requested to be provided within 15 days of the date of NRC Bulletin 2002-01.

Robinson Nuclear Plant
3581 West Entrance Road
Hartsville, SC 29550

In accordance with bulletin requirements, HBRSEP, Unit No. 2, will provide the information requested under Item 2 of NRC Bulletin 2002-01 within 30 days after plant restart following the next inspection outage of the RPV head to identify degradation. The information requested under Item 3 of NRC Bulletin 2002-01 will be provided within 60 days of the date of the bulletin.

If you have any questions regarding this matter, please contact Mr. C. T. Baucom.

Sincerely,

B. L. Fletcher III
Manager - Regulatory Affairs

CTB/ctb

Attachments:

I. Affidavit
II. Information Requested by NRC Bulletin 2002-01, "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity"

c: Mr. L. A. Reyes, NRC, Region II
Mr. R. Subbaratnam, NRC, NRR
NRC Resident Inspectors

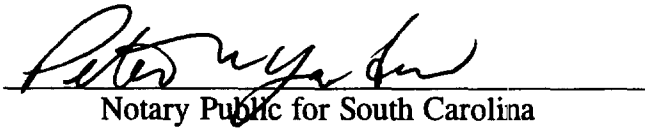
AFFIDAVIT

State of South Carolina
County of Darlington

J. W. Moyer, having been first duly sworn, did depose and say that the information contained in letter RNP-RA/02-0041 is true and correct to the best of his information, knowledge, and belief; and the sources of this information are officers, employees, contractors, and agents of Carolina Power and Light Company.

Sworn to and subscribed before me

this 1st day of April, 20 02



Notary Public for South Carolina

My commission expires: Sept 13, 2009

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

INFORMATION REQUESTED BY NRC BULLETIN 2002-01, "REACTOR PRESSURE VESSEL DEGRADATION AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY"

SUMMARY AND CONCLUSIONS

H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, established the materiel condition of the reactor pressure vessel (RPV) head through performance of a bare-metal visual examination, i.e., qualified visual examination, of the entire RPV head surface during Refueling Outage (RO) - 20 in April 2001. This examination was fully consistent with the requirements for a qualified visual examination as delineated within NRC Bulletin 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles," dated August 3, 2001.

The qualified visual examination of the HBRSEP, Unit No. 2, RPV head during RO-20 was precipitated by the identification of boric acid residue resulting from a control rod drive mechanism (CRDM) canopy seal weld leak. No evidence of vessel head penetration (VHP) nozzle leakage or reactor coolant pressure boundary leakage was identified. The CRDM canopy seal weld leak was repaired and the RPV head was cleaned prior to reinstallation of RPV head insulation. The RPV head was left in good materiel condition following the inspection, repair, and cleaning. Visual examination by VT-2 qualified inspectors identified scattered areas of light to medium rust, with no evidence of metal loss or pitting detected.

As discussed in more detail within the response to Item 1.A below, HBRSEP, Unit No. 2, has and maintains programs and procedures for the identification of boric acid leakage and the prevention of reactor coolant pressure boundary degradation due to boric acid leakage or deposition. The actions taken during RO-20 in response to the CRDM canopy seal weld leak demonstrate the effective implementation of these programs and procedures.

The responses to Items 1.B and 1.C, provided below, demonstrate the leak-tightness and structural integrity of VHP nozzles. The performance of a bare-metal qualified visual examination during RO-20, combined with detailed plant-specific finite element analysis (FEA) modeling and an evaluation of VHP nozzle interference fit data, provide assurance that VHP nozzle through-wall cracking would result in observable leakage at the RPV head surface. The response to Item 1.D below describes the RPV head and VHP nozzle inspection activities planned for RO-21 in October 2002, which include a bare-metal qualified visual examination and ultrasonic testing (UT) of VHP nozzles.

INFORMATION REQUIRED WITHIN 15 DAYS OF NRC BULLETIN 2002-01

1.A. "A summary of the reactor pressure vessel head inspection and maintenance programs that have been implemented."

Response

H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, has and maintains programs and procedures for reactor pressure vessel (RPV) head inspection and maintenance. These programs and procedures, when taken collectively, provide assurance of the long-term materiel condition, structural integrity, and leak-tightness of the reactor coolant system (RCS) pressure boundary. More specific information regarding these programs and procedures is provided in the following paragraphs.

Implementation of NRC Generic Letter 88-05

In response to NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," dated March 17, 1988, HBRSEP, Unit No. 2, implemented a systematic program to monitor locations where boric acid leakage could occur and measures to prevent the degradation of the RCS pressure boundary by boric acid corrosion. This program is documented and maintained within the HBRSEP, Unit No. 2, Plant Operating Manual as Plant Program Procedure (PLP) - 040, "Program for Prevention of Boric Acid Corrosion of RCS Carbon Steel Bolting (Generic Letter 88-05)." The intent of this procedure is to detail the program for identification, evaluation, repair, and prevention of boric acid corrosion of carbon steel components forming the reactor coolant primary pressure boundary.

PLP-040 outlines specific activities and inspection boundaries, and supplements the requirements of other surveillances for the inspection and disposition of borated system leakage and any resultant corrosion of primary pressure boundary "targets," including other safety-related components. These surveillances include:

- Engineering Surveillance Test (EST) - 083, "Inservice Inspection Pressure Testing of Reactor Coolant System (Refueling Shutdown Interval)"
- Operations Surveillance Test (OST) - 053, "Inspection for Reactor Coolant System Leakage (Prior To and Following Cooldown) (Refueling Interval)"
- OST-052, "RCS Leakage Test and Examination Prior to Startup Following an Opening of the Primary System (Refueling and/or Startup Interval)"

Additional pertinent details of PLP-040 are summarized as follows:

- Visual examinations may be conducted without removal of insulation. However, for leakage examinations of components with external insulation surfaces and joints not accessible for direct visual examination, the surrounding area (including the floor, equipment surfaces underneath the inaccessible component, and other areas where leakage may be channeled) shall be examined for evidence of component leakage.

- Discoloration, staining, boric acid residue, and other evidence of leakage on insulation surfaces and the surrounding area shall be given particular consideration as evidence of component leakage. If evidence of leakage is found, removal of insulation to determine the exact source may be required.

- When leakage is discovered, the leak/spray path shall be investigated, removing insulation as necessary, to determine the extent of any component degradation.

- Borated system leakage from the sources of any other borated system in the vicinity of the primary pressure boundary "targets" which could leak/spray on these "targets" is not acceptable. These leaks must be repaired or evaluated (and documented) to assure continued reactor coolant pressure boundary integrity.

- Boric acid corrosion of the "targets" shall be evaluated in accordance with the provisions of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, IWA-5000 and IWB-3000, with regard to structural integrity.

PLP-040, Section 7.7, "Corrective Measures," prescribes the actions to be taken in response to the identification of boric acid leakage or residue on carbon steel components associated with the RCS pressure boundary. Paragraph 7.7.3 of this section states, "If carbon and low-alloy steel components are exposed to boric acid, the component shall be cleaned of all boric acid and corrosion product and visually inspected (VT-3). For severe damage, ultrasonic and dye penetrant inspections of the affected components may be necessary."

Inservice Inspection Program

HBRSEP, Unit No. 2, performs inservice pressure testing of the code class pressure retaining components of the RCS in accordance with the ASME B&PV Code, Section XI, Table IWB-2500-1, Examination Category B-P, Item No. B15.10, "Pressure Retaining Boundary," and Article IWA-5000, "System Pressure Tests." This testing is accomplished by EST-083, which includes both a VT-2 visual examination of pressure-retaining bolted connections and a VT-2 visual examination of the head during inservice leakage testing. The acceptance criteria for EST-083 includes the requirement that "no through wall leakage exists on any piping system examined during the performance of this procedure."

A VT-2 visual examination of bolted connections is performed at the start of each refueling outage in accordance with specific criteria provided within EST-083. Under the examination area identified as "Control Rod Drive Housing Area," the following components/areas are specifically identified:

- Canopy seal welds
- Penetration tubes surface
- Penetration tube/head insulation interface - particularly the outer three rows
- Around the inside of the control rod drive mechanism (CRDM) cooling duct shroud
- Conoseal bolting (five places)

A note associated with this component listing states to "view as much of the above items as possible from all accessible areas." In the event that leakage were observed during these visual examinations, plant engineering personnel will review the examination results in accordance with PLP-040.

The VT-2 visual examination during RCS inservice leakage testing is performed at the conclusion of each refueling outage in accordance with specific criteria provided within EST-083, e.g., RCS at nominal operating pressure of 2235 psig. Examination areas specifically identified include the "Control Rod Drive Housing Area" and the "Reactor Vessel Stud Area." Personnel performing VT-2 visual examinations in accordance with EST-083 are certified and qualified to Level II or higher in accordance with non-destructive examination (NDE) procedures.

Implementation of NRC Bulletin 2001-01

By letter dated September 4, 2001, HBRSEP, Unit No. 2, submitted information requested by NRC Bulletin 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles." This submittal was supplemented by letters dated October 2, October 19, November 2, and November 12, 2001. The actions described within those submittals, and the commitments made for future actions to be taken, are collectively intended to assure that vessel head penetration (VHP) nozzle cracking would result in observable leakage to the RPV head surface, and that appropriate inspections and examinations are performed to assure such degradation is detected. The implementation of actions in response to NRC Bulletin 2001-01 provides further assurance of the long-term materiel condition and structural integrity of the RCS pressure boundary.

1.B. "An evaluation of the ability of your inspection and maintenance programs to identify degradation of the reactor pressure vessel head including, thinning, pitting, or other forms of degradation such as the degradation of the reactor pressure vessel head observed at Davis-Besse."

Response

HBRSEP, Unit No. 2, programs and procedures for RPV head inspection and maintenance, as summarized in Item 1.A above, are appropriate and provide assurance that degradation of the RPV head, including thinning, pitting, or other forms of degradation, will be identified and corrected. As further information is made available as a result of Davis-Besse and other industry experiences, HBRSEP, Unit No. 2, will review and modify, as appropriate, these inspection programs and procedures to assure that future inspection activities will be effective in identifying and correcting evidence of reactor coolant pressure boundary leakage. The bases for evaluating the adequacy of RPV head inspection and maintenance procedures are discussed in the following paragraphs.

Plant procedures and surveillances, summarized in Item 1.A above, prescribe the actions necessary for both the inspection for and disposition of borated system leakage and any resultant corrosion of reactor coolant pressure boundary components. These procedures and surveillances, which include the programmatic implementation of NRC Generic Letter 88-05 by plant procedure PLP-040, provide a framework for the systematic monitoring of locations where boric acid leakage could occur, and measures to prevent degradation of the RCS pressure boundary by boric acid corrosion.

Effective implementation of these inspection and maintenance programs has been demonstrated by RPV head inspections performed during Refueling Outage (RO) - 20 in April 2001. In response to the identification of boric acid residue during an initial inspection of the RPV head and flange area, more in-depth inspections were performed that involved removal of RPV head insulation. Those inspections ultimately culminated in the performance of a bare-metal qualified visual examination, as defined by NRC Bulletin 2001-01, with the source of boric acid residue having been identified as a CRDM canopy seal weld leak. That inspection effort was detailed in the HBRSEP, Unit No. 2, response and supplements to NRC Bulletin 2001-01, dated September 4, October 2, October 19, November 2, and November 12, 2001.

The HBRSEP, Unit No. 2, response and supplements to NRC Bulletin 2001-01 also provide a basis for concluding that degradation of and leakage from VHP nozzles will pass through to the RPV head surface where such leakage would be detected by a visual examination. This conclusion is supported by detailed plant-specific finite element analysis (FEA) modeling of the VHP nozzles and RPV head penetrations. This FEA modeling in conjunction with an evaluation of VHP nozzle interference fit data establishes that a leakage path would exist to the RPV head surface in the event of through-wall cracking of VHP nozzles.

1.C. "A description of any conditions identified (chemical deposits, head degradation) through the inspection and maintenance programs described in 1.A that could have led to degradation and the corrective actions taken to address such conditions."

Response

As noted in Item 1.B above, boric acid residue was identified during an initial inspection of the RPV head and flange area during RO-20 in April 2001. The source of this residue was identified as a CRDM canopy seal weld leak. On April 14, 2001, a VT-2 visual examination was performed in the vicinity of the leaking CRDM canopy seal weld that identified a large volume of boric acid crystals, estimated to be approximately one cubic foot. Smaller deposits were identified in other areas, and evidence of boric acid flow down the RPV head surface to the flange area was noted. A second, expanded inspection was performed on April 15, 2001, following removal of RPV head insulation from a larger area to support an assessment of the extent of condition. This inspection identified further boric acid deposition, with deposits being described as irregular in thickness and up to one-half inch in many areas. No evidence of leakage was identified other than that associated with the affected CRDM canopy seal weld.

The RPV head was cleaned of boric acid deposition and a follow-up inspection was performed on April 16, 2001, to determine the degree of corrosion or wastage that had occurred. Scattered areas of light to medium rust were noted, with no evidence of metal loss or pitting detected. The area of interface between the reactor vessel head and CRDM nozzles was inspected with no distorted metal or discoloration noted. The CRDM canopy seal weld leak was repaired during RO-20.

Additional information and details regarding RPV head inspections performed during RO-20 are provided within the HBRSEP, Unit No. 2, response and supplements to NRC Bulletin 2001-01, which were dated September 4, October 2, October 19, November 2, and November 12, 2001.

The following table provides the results of VT-2 visual examinations performed during certain prior refueling outages in accordance with EST-083 for the examination area identified as the "Control Rod Drive Housing Area:"

Calendar Year	Refueling Outage	Results
1998	RO-18	No indications
1999	RO-19	No indications

The inspection results and corrective actions summarized above provide reasonable assurance that the HBRSEP, Unit No. 2, RPV head is and can be reasonably expected to remain in good materiel condition for the duration of the current operating cycle.

1.D. "The schedule, plans, and basis for future inspections of the reactor pressure vessel head and penetration nozzles. This should include the inspection method(s), scope, frequency, qualification requirements, and acceptance criteria."

Response

HBRSEP, Unit No. 2, will perform a bare-metal qualified visual examination of the VHP nozzles and RPV head during RO-21, which is scheduled to commence in October 2002. Procedures utilized for this VT-2 visual examination will be qualified, as necessary, in accordance with Section XI of the ASME B&PV Code. Observed leakage or evidence of leakage will be evaluated in accordance with the ASME B&PV Code and associated HBRSEP, Unit No. 2, pressure testing and boric acid program procedures. If boric acid deposition is identified, either from reactor coolant pressure boundary leakage between the VHP nozzles and the vessel head or from any other source above the RPV head (e.g., CRDM canopy seal weld leakage), the results will be documented and the deposition removed. Should material degradation result from such deposition, the scope and extent of degradation will be evaluated and appropriate actions for repairs will be implemented.

Inspection of the RPV head during RO-21 will include ultrasonic testing (UT) of VHP nozzles. The UT techniques that will be employed will be demonstrated in accordance with the Electric Power Research Institute (EPRI) Materials Reliability Program (MRP) protocol. The acceptance criteria for evaluation of recorded UT indications will be established by fracture mechanics analysis. If leakage is identified around the RPV head nozzle penetration and the nozzle is found to be acceptable based upon UT results, then additional examinations will be performed to the extent necessary to determine the source of leakage.

The above-described examination activity may be modified, as appropriate, to reflect industry experience and lessons-learned that may become available during planning for RO-21. This includes the results of reviews and analyses associated with RPV head degradation identified at Davis-Besse.

HBRSEP, Unit No. 2, intends to perform appropriate inspections of the RPV head and VHP nozzles during refueling outages subsequent to RO-21. The nature, scope, and techniques associated with these future inspections will be based on RO-21 inspection results, and industry experience and lessons learned between RO-21 and future refueling outages. The RO-21 inspection results may also be used to assess the potential benefits that could be attained by replacement of the HBRSEP, Unit No. 2, reactor vessel head.

1.E. **"A conclusion regarding whether there is reasonable assurance that regulatory requirements are currently being met (see Applicable Regulatory Requirements, above). This discussion should also explain the basis for concluding that the inspections discussed in response to Item 1.D will provide reasonable assurance that these regulatory requirements will continue to be met. Include the following specific information in this discussion:**

(1) If the evaluation does not support the conclusion that there is reasonable assurance that regulatory requirements are being met, discuss plans for plant shutdown and inspection.

(2) If the evaluation supports the conclusion that there is reasonable assurance that regulatory requirements are being met, provide your basis for concluding that all regulatory requirements discussed in the Applicable Regulatory Requirements section will continue to be met until the inspections are performed."

Response

HBRSEP, Unit No. 2, has performed a review of the following Applicable Regulatory Requirements as described within NRC Bulletin 2002-01:

- 10 CFR 50, Appendix A, "General Design Criteria for Nuclear Power Plants," including the following:

  Criteria 14, "Reactor Coolant Pressure Boundary"
  Criteria 31, "Fracture Prevention of Reactor Coolant Boundary"
  Criteria 32, "Inspection of Reactor Pressure Coolant Pressure Boundary"

- 10 CFR 50.55a, "Codes and Standards"

- 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," Criteria V, IX, and XVI

- Technical Specifications

- NRC Generic Letter 88-05

This review has concluded that reasonable assurance exists that these regulatory requirements are currently being met and will continue to be met until the inspection activities described under Item 1.D have been completed. The following provides a description of how HBRSEP, Unit No. 2, satisfies these regulations and requirements, and how continued compliance will be maintained until future inspection plans have been implemented.

General Design Criteria

The General Design Criteria (GDC) in existence at the time HBRSEP, Unit No. 2, was licensed for operation (July 1970) were contained in the proposed Appendix A to 10 CFR 50, "General Design Criteria for Nuclear Power Plants," published in the Federal Register on July 11, 1967. HBRSEP, Unit No. 2, conformance with these Proposed GDC is described within Updated Final Safety Analysis Report (UFSAR) Section 3.1, "Conformance With General Design Criteria." Applicability of these Proposed GDCs to NRC Bulletin 2002-01 is discussed in the following paragraphs.

Proposed GDC 9 provides the HBRSEP, Unit No. 2, design criteria that is comparable to the current GDC 14. This Proposed GDC states the following:

> "The reactor coolant pressure boundary (RCPB) shall be designed, fabricated, and constructed so as to have an exceedingly low probability of gross rupture or significant uncontrolled leakage throughout its design lifetime."

A discussion of HBRSEP, Unit No. 2, compliance with Proposed GDC 9 is provided within UFSAR Section 3.1.2.9. Previous visual examinations of the HBRSEP, Unit No. 2, reactor vessel head, summarized in Item 1.C above, have not identified reactor coolant pressure boundary or VHP nozzle leakage. Based on the above and industry experience to-date regarding the low levels of primary system leakage resulting from reactor coolant pressure boundary leakage, HBRSEP, Unit No. 2, remains in compliance with the reactor coolant pressure boundary design criteria as set forth within Proposed GDC 9.

Proposed GDC 34 provides the HBRSEP, Unit No. 2, design criteria that is comparable to the current GDC 31. This Proposed GDC states the following:

> "The RCPB shall be designed and operated to reduce to an acceptable level the probability of rapidly propagating type failure. Consideration is given:
>
> a) To the provisions for control over service temperature and irradiation effects which may require operational restrictions.
>
> b) To the design and construction of the reactor pressure vessel (RPV) in accordance with applicable codes, including those which establish requirements for absorption of energy within the elastic strain energy range, and for absorption of energy by plastic deformation.
>
> c) To the design and construction of RCPB piping and equipment in accordance with applicable codes."

A discussion of HBRSEP, Unit No. 2, compliance with Proposed GDC 34 is provided within UFSAR Section 3.1.2.34. As noted above, previous visual examinations of the HBRSEP, Unit No. 2, reactor vessel head have not identified reactor coolant pressure boundary or VHP nozzle leakage. Based on the above information and industry experience to-date regarding flaw development and propagation, HBRSEP, Unit No. 2, remains in compliance with Proposed GDC 34 regarding rapidly propagating type failures of the reactor coolant pressure boundary.

Proposed GDC 36 provides the HBRSEP, Unit No. 2, design criteria that is comparable to the current GDC 32. This Proposed GDC states the following:

> "RCPB components shall have provisions for inspection, testing, and surveillance of criteria areas by appropriate means to assess the structural and leak-tight integrity of the boundary components during their service lifetime. For the reactor vessel, a material surveillance program conforming with the current applicable codes shall be provided."

A discussion of HBRSEP, Unit No. 2, compliance with Proposed GDC 36 is provided within UFSAR Section 3.1.2.36. This UFSAR section states that the design of the reactor vessel and its arrangement in the system permits access to the entire internal surfaces of the vessel and to the external surfaces of the vessel including "the closure head except around the drive mechanism adapters." As such, limitations regarding accessibility for inspections were known during licensing of HBRSEP, Unit No. 2. However, this license condition does not supersede Technical Specifications and ASME Code requirements that prohibit RCS pressure boundary leakage. The summary of inspection and maintenance programs provided under Item 1.A above, and the future inspection plans described under Item 1.D above, are considered sufficient and appropriate for the detection and correction of reactor coolant pressure boundary leakage and any associated boric acid deposition. Therefore, HBRSEP, Unit No. 2, remains in compliance with Proposed GDC 36 regarding the capability for RCPB inspection and surveillance.

10 CFR 50.55a, Codes and Standards

10 CFR 50.55a, "Codes and Standards," requires that inservice inspection and testing be performed in accordance with the requirements of the ASME B&PV Code, Section XI, "Inservice Inspection of Nuclear Plant Components." Section XI contains applicable rules for examination, evaluation, and repair of code class components, including the reactor coolant pressure boundary.

The HBRSEP, Unit No. 2, Third Ten-Year Inservice Inspection (ISI) Interval, which commenced on February 19, 1992, was implemented in accordance with the ASME B&PV Code, 1986 Edition with no Addenda. Applicable examination requirements are contained within Table IWB-2500-1, Examination Category B-E, "Pressure Retaining Partial Penetration Welds in Vessels." The required extent and frequency of examination is a VT-2 visual examination of 25% of the vessel nozzles from the external surface. Since the reactor vessel head is insulated and the VHP nozzles do not represent a bolted connection, Article IWA-5000, "System Pressure Tests," subsection IWA-5242, "Insulated Components," permitted these inspections to be performed without removal of insulation.

The HBRSEP, Unit No. 2, Fourth Ten-Year ISI Interval commenced on February 19, 2002, and has been developed in accordance with the ASME B&PV Code, 1995 Edition with 1996 Addenda. This edition of the ASME B&PV Code has removed Examination Category B-E, since VHP nozzles are examined as part of RCS leakage testing performed under Examination Category B-P, "All Pressure Retaining Components." Examination Category B-P requires a VT-2 visual examination of the reactor vessel pressure-retaining boundary each refueling outage. Similar to the 1986 Edition of the ASME B&PV Code, Article IWA-5000, "System Pressure Tests," subsection IWA-5242, "Insulated Components," permits these inspections to be performed without removal of insulation.

The Acceptance Standards provided within both the 1986 and 1995 Editions of the ASME B&PV Code for the referenced VT-2 visual examinations is identified as IWB-3522, which requires correction of pressure boundary leakage prior to continued service. Additionally, both the 1986 and 1995 Editions of the ASME B&PV Code contain within IWB-3140 Acceptance Standards for visual examinations required by IWB-2500. Specifically, IWB-3142 prescribes Acceptance Standards regarding the acceptability for continued service of components whose visual examination detects relevant conditions.

As described above, HBRSEP, Unit No. 2, has and maintains procedures and programs to implement ASME B&PV Code requirements relative to the reactor coolant pressure boundary and VHP nozzles. The acceptance criterion for these procedures is that no through-wall leakage exists. During RO-20, HBRSEP, Unit No. 2, identified and corrected a CRDM canopy seal weld leak that did not constitute reactor coolant pressure boundary leakage. Activities during RO-20 also included completion of a bare-metal qualified visual examination of the RPV head surface which confirmed that no reactor coolant pressure boundary or VHP nozzle leakage existed. VT-2 visual examinations were performed in accordance with ASME B&PV Code requirements during RO-18 and RO-19, which identified no indications in the RPV head area. In the event that reactor coolant pressure boundary or VHP nozzle leakage is identified during future examinations, corrective actions will be taken in accordance with plant procedures and the ASME B&PV Code prior to continued plant operation. Therefore, HBRSEP, Unit No. 2, remains in compliance with 10 CFR 50.55a regarding ASME B&PV Code requirements.

10 CFR 50, Appendix B

NRC Bulletin 2002-01 identified the following Criteria of 10 CFR 50, Appendix B, as being applicable to reactor coolant pressure boundary degradation and leakage:

- Criterion V, "Instructions, Procedures, and Drawings"
- Criterion IX, "Control of Special Processes"
- Criterion XVI, "Corrective Action"

HBRSEP, Unit No. 2, has and maintains the required instructions, procedures, and drawings for special processes and activities affecting quality to satisfy the requirements of 10 CFR 50, Appendix B, Criterion V and IX. The response to Item 1.A above provides information regarding the requirements of NRC Generic Letter 88-05 and the Inservice Inspection requirements of the ASME B&PV Code which are prescribed within HBRSEP, Unit No. 2, instructions and procedures. A bare-metal qualified visual examination of the HBRSEP, Unit No. 2, RPV head surface was completed and documented during RO-20 using instructions and procedures in accordance with Criterion V. Plans for future inspections, as described in the response to Item 1.D above, will be conducted using appropriate instructions, procedures, or drawings in accordance with Criterion V and IX. Where appropriate, the necessary plant-specific analyses will be conducted to demonstrate that proposed examination techniques will result in the reliable detection of degradation prior to a loss of any margins of safety associated with the reactor coolant pressure boundary. For the performance of bare-metal qualified visual examinations during RO-20 and in future refueling outages, the necessary FEA modeling has been completed and reviewed in conjunction with an evaluation of VHP nozzle interference fit data to demonstrate that a leakage path would exist to the RPV head surface to enable detection of through-wall cracking of VHP nozzles.

10 CFR 50, Appendix B, Criterion XVI, requires that measures be established to assure that conditions adverse to quality are promptly identified and corrected. Additionally, significant conditions adverse to quality will have the cause determined and corrective actions taken to preclude repetition. HBRSEP, Unit No. 2, has and maintains programs and procedures to satisfy the requirements of Criterion XVI. As described above, evidence of boric acid deposition identified during RO-20 was addressed by identifying and correcting a CRDM canopy seal weld leak. Additionally, a proactive effort was undertaken during RO-20 to perform a bare-metal qualified visual examination of the RPV head surface. No evidence of reactor coolant pressure boundary or VHP nozzle leakage was identified during the RO-20 inspection and repair efforts. HBRSEP, Unit No. 2, has described in the response to Item 1.D above the examination and inspection activities planned for RO-21. These future inspection activities will be developed and

implemented to provide reasonable assurance that any conditions adverse to quality, e.g., reactor coolant pressure boundary leakage, boric acid deposition, etc., will be identified and corrected.

Based on the above, there is reasonable assurance that HBRSEP, Unit No. 2, has met and will continue to meet the regulatory requirements provided within 10 CFR 50, Appendix B, Criterion V, IX, and XVI.

Technical Specifications

10 CFR 50.36, "Technical Specifications," provides requirements for Technical Specifications (TS) for licenses associated with production and utilization facilities. 10 CFR 50.36(c)(2) provides requirements specific to "Limiting Conditions for Operation," and 10 CFR 50.36(c)(3) provides requirements relative to "Surveillance Requirements." The HBRSEP, Unit No. 2, Operating Licensing and TS were developed and approved in accordance with these requirements and provide Limiting Conditions for Operation (LCO), Action Statements, and Surveillance Requirements (SR) regarding the reactor coolant pressure boundary.

HBRSEP, Unit No. 2, TS 3.4.13, "RCS Operational Leakage," provides criteria and limits regarding primary system leakage, including LCO 3.4.13 which prohibits RCS pressure boundary leakage. Should pressure boundary leakage exist, Condition B would be entered which requires the unit to enter MODE 3 in six hours and MODE 5 in 36 hours. Verification that RCS operational leakage is within limits by performance of an RCS water inventory balance is performed every 72 hours during steady-state operation in accordance with SR 3.4.13.1.

As noted above under the General Design Criteria discussion, and as indicated within the HBRSEP, Unit No. 2, TS Bases for LCO 3.4.13, the RCS leakage detection systems provide the means to detect RCS leakage to the extent practical. Industry experience from reactor coolant pressure boundary and VHP nozzle leakage has shown that the associated primary system leakage can be well below TS limits and the sensitivity of on-line leakage detection systems. An RCS leak of sufficient magnitude to be detected by on-line leak detection systems would be evaluated in accordance with TS requirements and the appropriate actions taken. The current HBRSEP, Unit No. 2, TS requirements, e.g., LCOs and SRs, are consistent with the requirements of 10 CFR 50.36 and specify actions to maintain plant operations within analysis and design limits.

NRC Generic Letter 88-05

As described in more detail within the response to Item 1.A above, HBRSEP, Unit No. 2, has and maintains a program for the implementation of NRC Generic Letter 88-05. This program is described within and implemented by Plant Operating Manual procedure PLP-040, which is further supported by plant surveillances that include EST-083, OST-053, and OST-052. Effective implementation of these program procedures was demonstrated during RO-20 in response to the identification of a CRDM canopy seal weld leak. These program and surveillance procedures are consistent with NRC Generic Letter 88-05 and provide a further measure of assurance regarding HBRSEP, Unit No. 2, compliance with applicable General Design Criteria.

2. **"Within 30 days after plant restart following the next inspection of the reactor pressure vessel head to identify any degradation, all PWR addressees are required to submit to the NRC the following information:**

   A. **The inspection scope (if different than that provided in response to Item 1.D) and results, including the location, size, and nature of any degradation detected.**

   B. **The corrective actions taken and the root cause of the degradation."**

   Response

   HBRSEP, Unit No. 2, will provide the requested information within 30 days following restart from the next scheduled refueling outage, i.e., RO-21, which is currently scheduled to begin in October 2002.

3. **"Within 60 days of the date of the bulletin, all PWR addressees are required to submit to the NRC the following information related to the remainder of the reactor coolant pressure boundary:**

   A. **The basis for concluding that the boric acid inspection program is providing reasonable assurance of compliance with the applicable regulatory requirements discussed in Generic Letter 88-05 and this bulletin. If a documented basis does not exist, provide plans, if any, for a review of these programs."**

   Response

   HBRSEP, Unit No. 2, will provide the requested information within 60 days of the date of the bulletin.