



Serial: RNP-RA/02-0126

SEP 09 2002

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
11555 Rockville Pike  
Rockville, Maryland 20852

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

SUBMITTAL OF INFORMATION REQUESTED BY  
NRC BULLETIN 2002-02, "REACTOR PRESSURE VESSEL HEAD  
AND VESSEL HEAD PENETRATION NOZZLE INSPECTION PROGRAMS"

Ladies and Gentlemen:

On August 9, 2002, NRC Bulletin 2002-02, "Reactor Pressure Vessel Head and Vessel Head Penetration Nozzle Inspection Programs," was issued requesting that licensees provide information related to what changes, if any, have been made to inspection programs for the reactor pressure vessel (RPV) head and vessel head penetration (VHP) nozzles, and to provide justification for reliance on visual examinations if that is the primary method to detect degradation. The purpose of this letter is to provide the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, response to NRC Bulletin 2002-02.

Attachment I provides an Affirmation in accordance with the provisions of Section 182a of the Atomic Energy Act of 1954, as amended, and 10 CFR 50.54(f).

As described under Requested Information Item (1)A of the Bulletin, HBRSEP, Unit No. 2, plans to supplement the RPV inspection program with non-visual non-destructive examination (NDE) methods. The HBRSEP, Unit No. 2, RPV inspection plan for the upcoming Refueling Outage (RO) - 21 was provided to the NRC by letter dated August 12, 2002. That inspection plan, combined with the information provided within Attachment II to this letter, constitutes the HBRSEP, Unit No. 2, response to NRC Bulletin 2002-02.

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

Sincerely,

B. L. Fletcher III  
Manager - Regulatory Affairs

A096

United States Nuclear Regulatory Commission  
Serial: RNP-RA/02-0126  
Page 2 of 2

CTB/ctb

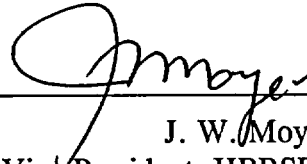
Attachments:

- I. Affirmation
  - II. Submittal of Information Requested by NRC Bulletin 2002-02, "Reactor Pressure Vessel Head and Vessel Head Penetration Nozzle Inspection Programs"
- c: Mr. L. A. Reyes, NRC, Region II  
Mr. R. Subbaratnam  
NRC Resident Inspector

AFFIRMATION

The information contained in letter RNP-RA/02-0126 is true and correct to the best of my information, knowledge and belief; and the sources of my information are officers, employees, contractors, and agents of Carolina Power and Light Company. I declare under penalty of perjury that the foregoing is true and correct.

Executed on: SEP 09 2002

  
\_\_\_\_\_  
J. W. Moyer  
Vice President, HBRSEP, Unit No. 2

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

SUBMITTAL OF INFORMATION REQUESTED BY  
NRC BULLETIN 2002-02, "REACTOR PRESSURE VESSEL HEAD  
AND VESSEL HEAD PENETRATION NOZZLE INSPECTION PROGRAMS"

NRC Information Request

- (1) Within 30 days of the date of the bulletin:
  - A. PWR addressees who plan to supplement their inspection programs with non-visual NDE methods are requested to provide a summary discussion of the supplemental inspections to be implemented. The summary discussion should include EDY, methods, scope, coverage, frequencies, qualification requirements, and acceptance criteria.
  - B. PWR addressees who do not plan to supplement their inspection programs with non-visual NDE methods are requested to provide a justification for continued reliance on visual examinations as the primary method to detect degradation (i.e., cracking, leakage, or wastage). In the justification, include a discussion that addresses the reliability and effectiveness of the inspections to ensure that all regulatory and technical specification requirements are met during the operating cycle, and that addresses the six concerns identified in the Discussion Section of the bulletin. Also, include in the justification a discussion of the basis for concluding that unacceptable vessel head wastage will not occur between inspection cycles that rely on qualified visual inspections. Provide all applicable data to support the understanding of the wastage phenomenon and wastage rates.

Response

Carolina Power and Light (CP&L) Company has evaluated the current status of H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, with regard to the information and criteria provided by NRC Bulletin 2002-02, "Reactor Pressure Vessel Head and Vessel Head Penetration Nozzle Inspection Programs," dated August 9, 2002. In accordance with Requested Information Item (1)A, HBRSEP, Unit No. 2, plans to supplement the reactor pressure vessel (RPV) inspection program with non-visual non-destructive examination (NDE) methods. The HBRSEP, Unit No. 2, RPV inspection plan for the upcoming Refueling Outage (RO) - 21 was provided to the NRC by letter dated August 12, 2002. That inspection plan, combined with the specific information requested by the NRC Bulletin which is provided below, constitutes the HBRSEP, Unit No. 2, response to NRC Bulletin 2002-02.

### Effective Degradation Years

NRC Bulletin 2002-02 provides a table entitled "Example Supplemental Inspections" that identifies three general categories for accrued effective degradation years (EDY). The Bulletin describes the EDY criteria as a means for assessing the potential for vessel head penetration (VHP) nozzle cracking that accounts for the amount of time and the temperature at which a plant has operated.

Using the criteria contained within NRC Bulletin 2002-02, HBRSEP, Unit No. 2, is in the category of plants that have greater than 12 EDY. This conclusion is based on information contained within the Electric Power Research Institute (EPRI) Report TP-1006284, "PWR Materials Reliability Program Response to NRC Bulletin 2001-01 (MRP-48)," dated August 2001. That report utilized operating time and head temperature history through February 2001 to identify that HBRSEP, Unit No. 2, had an accrued EDY of 19.0.

### Methods, Scope, Coverage, and Qualification Requirements

By letter dated August 12, 2002, HBRSEP, Unit No. 2, provided a submittal to the NRC entitled, "Reactor Vessel Head Inspection Plan for Refueling Outage 21." A commitment to provide that submittal was made as part of the HBRSEP, Unit No. 2, response to NRC Bulletin 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles." The August 12, 2002, submittal provided a description of the HBRSEP, Unit No. 2, plan for NDE of the 69 VHP nozzles during RO-21, which is scheduled to begin on October 12, 2002. The description of this plan included the methods, scope, coverage, and qualification requirements associated with the upcoming RO-21 examinations. The August 12, 2002, submittal satisfies the associated information requests contained within NRC Bulletin 2002-02.

### Frequencies

The HBRSEP, Unit No. 2, commitment to perform NDE of the 69 VHP nozzles at the next scheduled refueling outage (RO-21) is consistent with the "Frequency/Time" specified within the "Example Supplemental Inspections" table contained within NRC Bulletin 2002-02. The schedule and frequency for NDE examinations during future refueling outages, i.e., refueling outages subsequent to RO-21, will be established following careful review of such factors as the RO-21 inspection results; industry information that becomes available as similar examinations are completed at other facilities; improvements in industry understanding of examination techniques and crack growth rates; and, the possibility of procuring a replacement RPV head for HBRSEP, Unit No. 2.

### Acceptance Criteria

The HBRSEP, Unit No. 2, submittal dated August 12, 2002, provided a general description of actions that will be taken in the event degradation is identified on the inside diameter of a penetration tube during eddy current inspection. Specifically, ultrasonic (UT) examination techniques will be used to characterize indications using undamped, broad band time-of-flight-diffraction (TOFD) probes. By using TOFD probe pairs with different probe spacings, accurate sizing can be accomplished throughout the penetration tube thickness range.

HBRSEP, Unit No. 2, will use UT examinations to characterize indications, and intends to evaluate such indications using flaw acceptance criteria provided within the unit-specific flaw handbook. The flaw acceptance criteria and associated basis information, where applicable, that are currently contained within the unit-specific flaw handbook are summarized as follows:

- The maximum allowable depth for axial flaws on the inside surface of the penetration nozzle at or above the weld is 75% of the penetration wall thickness. There is no concern regarding separation of the penetration nozzle from the reactor vessel head unless the flaw is above the attachment weld and is oriented circumferentially. Calculations have been completed to show that the geometry of penetrations can support a continuous circumferential flaw with a depth of 75% of the wall thickness.
- Axial inside surface flaws identified below the weld are acceptable regardless of depth, as long as their upper extremity does not reach the bottom of the weld during the period of service until the next inspection. Axial flaws that extend above the weld are limited to 75% of the wall thickness.
- Axial outside surface flaws below the attachment weld are acceptable regardless of depth, as long as they do not extend into the attachment weld during the service period. Outside surface flaws above the attachment weld will be evaluated on a case-by-case basis.
- Circumferential flaws located below the weld are acceptable regardless of depth, provided the length is less than 75% of the penetration nozzle circumference for the period of service until the next inspection. Circumferential flaws in this area have no structural significance. Circumferential flaws at and above the weld must be evaluated on a case-by-case basis.
- Surface flaws located in the attachment welds are not acceptable regardless of their depth. If a relevant indication is detected on the J-groove weld during eddy current examination, a dye penetrant examination will be performed. Indications in the J-groove weld that are confirmed with dye penetrant examination will be repaired.

HBRSEP, Unit No. 2, intends to use the flaw acceptance criteria provided within the unit-specific flaw handbook, as summarized above, to evaluate characterized indications. However, as industry knowledge and experience in this area improves, modifications or enhancements may be made to this acceptance criteria to assure that appropriate decisions are made in response to the identification of penetration tube indications.

**NRC Information Request**

- (2) Within 30 days after plant restart following the next inspection of the RPV head and VHP nozzles to identify the presence of any degradation, all PWR addressees are requested to provide:
- A. the inspection scope and results, including the location, size, extent, and nature of any degradation (e.g., cracking, leakage, and wastage) that was detected; details of the NDE used (i.e., method, number, type, and frequency of transducers or transducer packages, essential variables, equipment, procedure and personnel qualification requirements, including personnel pass/fail criteria); and criteria used to determine whether an indication, "shadow," or "backwall anomaly" is acceptable or rejectable.
  - B. the corrective actions taken and the root cause determinations for any degradation found.

**Response**

The next inspection of the HBRSEP, Unit No. 2, RPV head and VHP nozzles will be performed during RO-21, which is scheduled to begin on October 12, 2002. Within 30 days following restart from RO-21, HBRSEP, Unit No. 2, will provide the information requested by NRC Bulletin 2002-02, Requested Information Item (2).