



Serial: RNP-RA/05-0045

MAY 25 2005

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

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

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION
ON THE STEAM GENERATOR INSERVICE INSPECTION RESULTS (TAC NO. MC4588)

Ladies and Gentlemen:

The steam generator inservice inspection results for Refueling Outage 22 (RO-22) at H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, were previously submitted to the NRC by letters dated May 18, 2004, June 15, 2004, and August 26, 2004. An electronic mail message received from the NRC Project Manager for HBRSEP, Unit No. 2, on March 21, 2005, requested additional information pertaining to the RO-22 results.

The response to the request for additional information is provided in the attachment to this letter.

If you have any questions regarding this matter, please contact Mr. C. T. Baucom at (843) 857-1253.

Sincerely,

A handwritten signature in cursive that reads 'C.A. Castle'.

for
C. T. Baucom
Supervisor – Licensing/Regulatory Programs

CTB/cac

Attachment

c: Dr. W. D. Travers, NRC, Region II
Mr. C. P. Patel, NRC, NRR
NRC Resident Inspector

Progress Energy Carolinas, Inc.
Robinson Nuclear Plant
3581 West Entrance Road
Hartsville, SC 29550

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

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

NRC Request:

1. A comparison of tube wall penetration data from the June 15, 2004 monthly report with previous data from the November 14, 2002 monthly report showed that several of the tube penetrations have increased in depth since the last inspection. For example, the indication at the hot leg top-of-tubesheet (TTS) in tube R13-C3 in SG-A increased in depth from 12% to 22% throughwall. The indication in tube R34-C50 in SG-C increased in depth from 14% to 24% throughwall. The staff recognizes that some of this change could be due to eddy current testing variability and/or uncertainty, or due to wear from foreign objects that remained in the steam generators since the previous outage.

With regard to wear indications attributed to loose parts, discuss whether the long-term trending of tube wall penetration depths confirms that degradation is not progressing after the part is removed, or is no longer present, based on eddy current testing (if a visual inspection was not conducted). Discuss the possibility that degradation mechanisms other than wear could be active in the Unit 2 steam generators.

HBRSEP, Unit No. 2, Response:

The long term trending for the small volumetric indications confirms that degradation is not progressing. There is variability in the inspection results that can cause small variations in the recorded depths due to the small size of these indications. For example, the tube at Row 13 Column 3 on the periphery of the tube bundle in the "A" Steam Generator (SG) has a volumetric indication just above the tubesheet. Visual inspections at this location show no loose part present and the indication has not significantly changed since first recorded in 1999. The depth recorded in 1999 was 25%, in 2002 it was 12%, and in 2004 the indication was recorded as 22%. This variation in sizing is within the tolerance of the inspection technique and can occur when sizing small volumetric indications.

Based on the results of SG inspections performed at H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, it is considered unlikely at this time that any active degradation mechanisms, other than intermittent degradation caused by foreign material, exist in the steam generators. The HBRSEP, Unit No. 2, steam generator inspection program exceeds the current Technical Specifications and Electric Power Research Institute (EPRI) SG program requirements for inspection.

The rotating probe has been applied to areas considered more susceptible to potential

degradation, such as the low-row U-bends and the hot leg tubesheet transitions. Additionally, potential indications of degradation from the bobbin probe are re-evaluated with a rotating probe for quantification and resolution. Also, ultrasonic testing equipment is used for the purpose of further investigation when rotating coil results are deemed indeterminate. Once identified, tubes with indications continue to be monitored during each steam generator inspection. These examinations to date have indicated no active degradation mechanisms other than loose parts.

NRC Request:

2. It was mentioned in the Spring 2004 conference call that visual confirmation and removal of the loose part associated with the leaking tube R23-C72 in SG-B was not performed because the affected tube is located in the interior of the tube bundle. It was mentioned in the August 26, 2004 inservice inspection report that tube R24-C33 in SG-B was preventatively plugged and stabilized, and that a loose part was present. Confirm that all loose parts have been removed and/or an engineering evaluation has been performed, confirming that tube integrity will be maintained until the next inspection.

HBRSEP, Unit No. 2, Response:

An engineering evaluation of loose parts was previously completed. That evaluation bounds the loose parts that were not removed during Refueling Outage 22 (RO-22). Therefore, based on currently known conditions, it is concluded that tube integrity will be maintained until the next inspection.

NRC Request:

3. It was noted in the May 6, 2004 conference call that the eddy current results were screened for potential offsets, or shifts, in the eddy current signal traces, as discussed in Information Notice (IN) 2002-21 and IN 2002-21 Supplement 1. The licensee identified five tubes in SG-A, ten tubes in SG-B, and 27 tubes in SG-C with an offset in the eddy current signal. The licensee stated that none of the tubes with an eddy current shift were lower row tubes, and no evidence of cracking was found.

Discuss whether the tubes in SG-B with an identified eddy current shift were examined with a rotating probe at the expansion transition.

HBRSEP, Unit No. 2, Response:

In order to clarify the statement in the question regarding "tubes with an offset," it should be noted that there are two type of offset measurements performed to indicate a precursor to potential high stress tubes. One criteria looks for an offset of the eddy current data for tubes in rows 1 through 8 where U-bend heat treatment is performed.

HBRSEP, Unit No. 2, had no tubes that showed an offset in this category. The other criteria is based on the measurement of the offset in the tubes in Rows 9 through 45 and determines the tubes that fall within a statistical sample as tubes with the highest potential for residual stress. This is not intended to be an indication that these tubes are defective, only that the measured offset falls within the statistical threshold. The tubes that fell within the statistical threshold were inspected with the bobbin probe and evaluated for the precursor condition. None of these tubes indicated a precursor condition. Four of the 10 tubes that fell below the 2-Sigma Criterion in the "B" SG were examined at the hot leg expansion transition with rotating probe during the RO-22 examination. No indications of degradation were reported in these tubes.

NRC Request:

4. Discuss what corrective actions were taken in response to finding leaking tube R23-C72 in SG-B. The staff notes that, although the tube had adequate integrity (in this case), the degradation progressed from non-detected to 100% through-wall in one inspection interval.

HBRSEP, Unit No. 2, Response:

The leaking tube was bounded by examining the surrounding tubes with eddy current inspections. In situ pressure testing was performed on the leaking tube R23-C72 in the "B" SG. Steam generator tubes exceeding or approaching the Technical Specifications tube plugging limit were repaired by plugging and staking as applicable. The Operational Assessment for Operating Cycles 23 and 24 considered the flaw and determined that no predicted flaw of any type would equal or exceed its respective structural or leakage limit. An additional corrective action for this condition was the proposal to include information gained during RO-22, as documented in the Nuclear Condition Report investigation, pertaining to the impact of foreign material on steam generator internals in the "Maintenance Services Orientation" package for RO-23, to increase awareness of personnel performing maintenance on secondary side components.

NRC Request:

5. Tube R38-C69 in SG-B was plugged, based on visual identification of a wear scar just above the hot leg TTS. Discuss the severity of the scar (i.e., was tube integrity maintained), and discuss why the indication was not detected with a bobbin and/or rotating coil.

HBRSEP, Unit No. 2, Response:

During the in-bundle examination of the "B" SG, a small scar was discovered on the outer diameter of the R38-C69 tube. The rotating probe examination of this tube,

which included a pancake and plus-point coil, revealed no detectable indication. The remote visual examination indicated a small shallow scar in the tube. There is no evidence of a loose part or other interference that would preclude a detectable eddy current signal, therefore the indication is believed to be less volume/depth than is detectable by the eddy current technique, and less than the smallest indication of the calibration standard (20% throughwall), which indicates that tube integrity was maintained. The tube was preventatively plugged as a conservative measure.