10 CFR 50.55a

CP&L
A Progress Energy Company

Serial: RNP-RA/02-0093

JUL 0 3 2002

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

Ladies and Gentlemen:

The steam generator inservice inspection results for Refueling Outage 20 (RO-20) at H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, were submitted to the NRC by letter dated August 10, 2001. An electronic mail message received on December 6, 2001, requested additional information pertaining to the RO-20 results and the results from two previous refueling outages (RO-18 and RO-19). The request for additional information was discussed in a conference call on March 26, 2002, between HBRSEP, Unit No. 2, and NRC staff personnel involved in the review of steam generator inspection results.

The request for additional information provided on December 6, 2001, is contained in the attachment to this letter. The response to the request for additional information is also provided in the attachment.

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

Sincerely,

B. L. Fletcher III
Manager - Regulatory Affairs

Robinson Nuclear Plant
3581 West Entrance Road
Hartsville, SC 29550

A047

CAC/cac

Attachment

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

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

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

NRC Request for Additional Information:

By letter dated August 10, 2001, Carolina Power and Light (CP&L) Company, the licensee for H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, submitted their 90-day inservice inspection summary report summarizing inspections performed during refueling outage (RO) 20.

Based on a review of the steam generator portion of this report and previous 90-day reports submitted on January 20, 2000 (RO-19), and July 9, 1998 (RO-18), and monthly operating reports dated May 14, 1998 (RO-18), November 15, 1999 (RO-19), and June 12, 2001 (RO-20), the NRC staff requests the following additional information/clarifications regarding the licensee's steam generator inspections:

For the 2001 (RO-20) inspections:

1. Tube R43C55 in steam generator B was identified as being plugged since a dent prevented an examination by a qualified bobbin probe. Please discuss the nature, history, and location of this dent. If the dent was not present since manufacture, please discuss whether an active denting mechanism is being observed.

   HBRSEP, Unit No. 2, Response:

   The dent in the subject tube has been present since manufacture. Previous examinations of subject dent in 1993 (RO-15) were performed, as required, with bobbin probe sizes which are no longer qualified per the EPRI Guidelines. During the baseline examination, the tube required the use of a 0.650 inch diameter bobbin probe to examine the tube, with a large dent signal present. During RO-15, the tube was examined full length with a 0.680 inch diameter bobbin probe and indicated a dent of 88 volts. During RO-20, the tube was originally examined with a 0.720 inch probe and downsized to a 0.700 inch probe, both of which were restricted at the dent. A 0.680 inch rotating coil was used successfully. Use of the rotating plus point probe at the area of the dent resulted in data of poor quality, and the tube was preventatively plugged.

2. Tube R44C56 in steam generator C had a wear indication at the flow distribution baffle. Similarly, tube R32C26 in steam generator C was plugged due to wear near the tubesheet. Please discuss the nature and size of these indications. If the indications were due to loose parts, discuss whether the part was retrieved or observed by eddy current. If the part was retrieved discussed the source of the part.

HBRSEP, Unit No. 2, Response:

For the tube at R44C56, the wear was at the flow distribution baffle (FDB) + 0.45 inches on the hot leg side. The tube was last examined in 1998 (RO-18) and there was no indication found at this location. A wear rate of 11%/year is estimated. Based on the tube being at the periphery, and the lack of other such indications in other tubing in the FDB area, it is believed that this indication was caused by wear due to transient loose part or, less likely, a drill hole anomaly. Also, the rotating plus point/pancake coil examination used to size the indication showed no discernable distortion from the low frequency channel that would be indicative of a drill hole anomaly. The indication was first identified using a bobbin coil and then examined using a rotating coil (plus point and pancake coil). The indication did not appear crack-like based on the rotating coil information.

The indication was sized using the most conservative available qualified technique resulting in a 43% throughwall indication. The site qualified Eddy Current Technique Specification Sheet (ETSS) was based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span. The tube was preventatively plugged, regardless of indication depth, because the attempt to determine the cause of this wear indication was inconclusive. An Ultrasonic Testing (UT) inspection of an indication at the top-of-tubesheet (TTS) in an in-bundle tube at R32C26 supported the conclusion that the R44C56 indication was not corrosively induced, and that the sizing technique used was conservative. A corrosively induced mechanism would most likely occur first at the TTS rather than at the FDB. No loose part was observed using eddy current and no loose part retrieved. As stated previously, the tube at R44C56 was preventatively plugged.

For the tube at R32C26, eddy current revealed an indication during the plus point examination at hot-leg-top-of-tubesheet (HTS) + 0.28 inches appearing to be flawlike but indeterminate as to type (pit, geometry). No eddy current signal from a loose part was evident in the rotating coil data. Review of bobbin data showed a small indication that did not appear flawlike. Comparing bobbin data from a previous inspection in 1995 showed no change. Additional diagnostics using UT, mobilized as a contingency for characterization of TTS geometry indications based on experience at Turkey Point, showed this indication to be caused by wear, likely due to a past loose part. The indication was depth sized at 32% using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span. UT depth sizing results, which is an EPRI qualified technique, showed this indication to be 20% through-wall. Information from this UT inspection confirmed that the site qualified Eddy Current Testing (ECT) technique for depth sizing such indications is conservative. The tube was preventatively plugged.

3. Tube R33C34 in steam generator C was plugged due to an obstruction above the sixth tube support plate. Discuss the nature of this obstruction and previous inspection results for this tube.

HBRSEP, Unit No. 2, Response:

The initial examination in RO-20, utilizing a 0.720 inch diameter probe, detected a restriction above the sixth support plate. The probe was downsized to a 0.700 inch bobbin probe and would not pass. Bobbin probe poly shaft was attempted (3/8" diameter) and would pass. An inspection with a 0.650 inch plus point probe was attempted and the probe would not pass. This tube is in-bundle and based on the location of the obstruction, it is mid-span. The tube was considered incompatible for an examination and therefore pluggable. The surrounding tubes were examined and showed no evidence of degradation or denting near the area of the obstruction in the subject tube. The tube was preventatively plugged due to the inability to pass a qualified probe. The tube was previously examined in RO-15 and RO-16 using a 0.720 inch diameter probe with no obstruction noted. In addition, HBRSEP, Unit No. 2, personnel have performed, as part of the secondary side visual inspection program, a tube support plate inspection on each steam generator. This inspection involves inspection of the tube support plates up through the flow slots to the bottom of the top tube support plate. No upper bundle fouling or corrosion product build-up in the tube support plate areas was identified. Such fouling could lead to tube support plate denting. However, only minor deposition in the land area of the quatrefoil with no bridging was observed. It should be noted that the HBRSEP, Unit No. 2, Model 44F steam generators have quatrefoil broached, stainless steel tube support plates.

4. Please clarify what is meant by "wrapper MOD tubes" (June 12, 2001 letter).

HBRSEP, Unit No. 2, Response:

A wrapper modification was completed in which a small portion of the shroud was cut out at the hand hole to allow access for in-bundle lancing. The vendor inadvertently scratched a number of tubes with their equipment during this process at some hand hole locations. This was identified by the site and each affected tube was examined using a plus point rotating coil in the area of concern.

5. Please discuss the nature of the indications reported in your June 12, 2001, letter (e.g., loose part wear, etc). If the indications are attributed to tube wear from loose parts, discuss the nature of the foreign object and whether it was removed from the steam generator. In particular, address the indications several inches above the tubesheet.

HBRSEP, Unit No. 2, Response:

The indications on those tubes identified in the table below, particularly peripheral tubes with mechanical wear, were attributed to either maintenance equipment contact or transient loose parts. Information, such as the location of the indications, the eddy current response, the limited number of loose parts observed, video tapes with evidence of wear marks on the secondary side of tubes, and the absence of wear growth for previously identified indications, led steam generator personnel to conclude the indications were predominantly the result of maintenance equipment contact.

SG	Tube	Indication Type	% Depth	Location/ Inches	Disposition	Discussion of Indication
B	R43C55	Dent	N/A	01A/26.35	Plug	The dent was restricted to qualified bobbin probes. The dent was examined with qualified rotating coil, however, data was of poor quality due to the large dent size. The tube was preventatively plugged as a result.
B	R1C1	Wear	18 17 18 18	CTS/9.62 CTS/13.07 CTS/13.10 CTS/16.20	Leave in service	Wear indications attributed to the wrapper modification process were confirmed visually by the System Engineer. The indications were depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span. These known wear indications appear identical to TTS peripheral wear indications and the FDB indication in steam generator C.
B	R7C1	Wear	19	CTS/1.15	Leave in service	Peripheral tube with mechanical wear. The indication was depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span.
B	R40C25	Wear	21	CTS/0.59	Leave in service	Peripheral tube with mechanical wear. The indication was depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span.
B	R5C48	Wear	28 29	CTS/1.46 CTS/1.71	Leave in service	Tube near periphery with mechanical wear. The indications were depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span.

SG	Tube	Indication Type	% Depth	Location/ Inches	Disposition	Discussion of Indication
B	R5C49	Wear	27	CTS/1.78	Leave in service	Tube near periphery with mechanical wear. The indication was depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span.
B	R33C78	Wear	20	CTS/0.62	Leave in service	Peripheral tube with mechanical wear. The indication was depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span.
B	R26C84	Wear	20	CTS/0.69	Leave in service	The indication was depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span.
B	R1C92	Wear	14 19 15 12 13 12 12	HTS/1.94 HTS/2.82 HTS/14.12 CTS/8.55 CTS/9.62 CTS/10.92 CTS/11.86	Leave in service	The indications at HTS/1.94 and HTS/2.82 were depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span. The remaining indications are wear indications attributed to the wrapper modification process and were confirmed visually by the System Engineer. These indications were also depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span.
B	R2C92	Wear	10	CTS/10.66	Leave in service	Wear indication attributed to the wrapper modification process. The indication was depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span.

SG	Tube	Indication Type	% Depth	Location/ Inches	Disposition	Discussion of Indication
C	R44C56	Wear	43	FBH/0.45	Plug	The wear on this tube is at the flow distribution baffle on hot leg side. The tube was last examined in 1998 (RO-18) and there was no indication found at this location. A wear rate of 11%/year is estimated. Based on the tube being at the periphery, and the lack of other such indications in other tubing in the FDB area, it is believed that this indication was caused by wear due to a transient loose part or, less likely, a drill hole anomaly. The drill hole anomaly is considered less likely because if this were the cause, it is believed that it would have appeared in previous examinations, and rotating coil data does not support a drill hole anomaly. The indication was sized using the most conservative available qualified technique. The indication was first identified using bobbin coil and then examined using rotating coil (plus point). The indication did not appear crack-like using rotating coil information. The indication was informationally sized prior to plugging using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span. The tube was preventatively plugged, regardless of indication depth, because of the inconclusive cause determination for this type of wear indication. UT inspection of an indication at the TTS in the tube at R32C26 supports the conclusion that this indication is not corrosively induced. A corrosive mechanism would most likely occur first at TTS rather than at the flow distribution baffle.

SG	Tube	Indication Type	% Depth	Location/ Inches	Disposition	Discussion of Indication
C	R33C34	Obstructed	N/A	06H/7.78	Plug	Obstruction in tube above the 6th tube support plate on hot leg side. A 0.700 inch bobbin probe would not pass the obstruction. A 0.650 inch plus point probe also would not pass. A 3/8 inch diameter bobbin probe poly shaft was inserted and passed the obstruction. The tube was preventatively plugged due to inability to pass a qualified probe.
C	R32C26	Wear	32	HTS/0.28	Plug	The indication using a plus point probe appeared to be flawlike, but was indeterminate as to type (pit, geometry). A review of bobbin data showed a small indication which did not appear flawlike. These results were compared to bobbin data from a previous inspection in 1993 and showed no change. Additional diagnositics using UT showed this indication to be caused by wear, likely due to a past loose part. The indication was depth sized at 32% using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span. UT depth sizing results, which is an EPRI qualified technique, showed this indication to be 20% throughwall. Information from this UT confirmed the site qualified ECT technique for depth sizing such indications is conservative.
C	R44C38	Wear	18	HTS/0.48	Leave in service	Peripheral tube with mechanical wear. The indication was depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span.

SG	Tube	Indication Type	% Depth	Location/ Inches	Disposition	Discussion of Indication
C	R37C45	AVB wear	6 and 3	03A and 04A	Leave in service	Two intersections were identified for this tube. The indication at 03A was identified in a previous examination. There was negligible change noted when compared to previous inspection results. The previous inspection in 1998 showed the indication at 03A as 3%. There was no previously identified indication at 04A reported, but the 3% result is within the error range. The current program guidance requires recording indications at or above 10%. Both indications were depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing anti-vibration bar (AVB) wear-type indications.
C	R44C57	Wear	17 and 17	HTS/0.58 and HTS/1.18	Leave in service	This is a peripheral tube with two locations that show mechanical wear indications. The indications were depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span.
C	R35C61	AVB wear	5 and 5	02A and 03A	Leave in service	Two intersections were identified for this tube. The indication at 02A was identified in previous examinations. There was negligible change noted when compared to previous inspection results. The previous inspection in 1998 showed the indication at 02A as 5%. There was no previous indication at 03A recorded. The current program guidance requires recording indications at or above 10%. Both indications were depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing AVB wear-type indications.

SG	Tube	Indication Type	% Depth	Location/ Inches	Disposition	Discussion of Indication
C	R38C62	AVB wear	4 and 13	02A and 03A	Leave in service	There were two intersections for this tube. The indication at 03A was identified in a previous examination. There was negligible change noted when compared to the previous inspection results. The previous inspection in 1998 showed the indication at 03A as 9%. There was no previous indication at 02A reported. Both indications were depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing AVB wear-type indications.
C	R33C78	Wear	15	HTS/0.71	Leave in service	This is a peripheral tube with mechanical wear. The indication was depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span.
C	R3C91	Wear	28	HTS/0.28	Leave in service	A loose part was removed in 1994, resulting in plugging of tubes at R1C90, R2C90, R3C90. This was the first time this tube was examined with the plus point TTS exam. The indication was not seen using the bobbin probe due to proximity with the TTS. The indication was depth sized using site qualified ETSS based on the EPRI/industry qualified technique for sizing volumetric, pit-type indications in the free span.

For the 2000 (RO-19) inspections:

6. Please clarify the number and extent of tubes inspected with the bobbin coil (i.e., clarify the statement that Steam Generator "A" had a total of 50% tubes tested from the cold leg and 60% tested from the hot leg). What was the number or overall percentage of tubes inspected? What was the extent of the inspection (tube-end to tube-end, tube-end to uppermost tube support plate on the cold-leg side, etc)?

HBRSEP, Unit No. 2, Response:

The percentages stated were provided to indicate that some tubes were examined partially from the hot leg manipulator and partially from the cold leg manipulator. Thus, a single tube may have been included in both percentages. The tubes

included in the bobbin coil portion of the test plan were inspected full length Hot Tube End (HTE) to Cold Tube End (CTE). For those tubes in rows 1 and 2, the U-bend examination was completed with the plus-point rotating probe coil (RPC) through the upper-most hot leg and cold leg support. In some cases, such as lower row tubes, some acquisition for a particular tube was performed from the cold leg and some from the hot leg. Examinations were also allocated in this manner to balance the time between manipulators, thus minimizing the amount of time necessary for the inspection window.

For the actual percentages, for tubes other than rows 1 and 2, 1428 tubes received a full length bobbin exam. For the tubes in rows 1 and 2, 182 tubes received a bobbin coil examination on the straight sections on both the hot and cold leg sides, and an RPC examination on the U-bend region. Thus, for the large scope portion of the test plan, a total of 1428 plus 182 tubes were tested full length. This is approximately 50.1% of the total number of tubes. HBRSEP, Unit No. 2, also performed a 100% plus-point RPC U-bend examination. Also, a 60% hot leg TTS exam with a plus-point RPC coil at +4/-2 inches was performed as part of the test plan. Approximately 20% (50 exams, 42 tubes) of the inlet/hot leg manufacturing buff marks (MBM) were also inspected using the plus-point RPC.

Selected special interest examinations were also performed as follows:

- 16 previous indications from the cold leg using RPC.
- 30 diagnostic exams on 28 tubes from the cold leg using RPC.
- Nine from the hot leg at TTS using RPC to bound a possible loose part (PLP).
- Eight previous indications from the hot leg using RPC.
- Nine previous dent indications from the hot leg using RPC.
- 18 new dents identified by bobbin probe from the hot leg using RPC.
- 50 previous benign indications from the hot leg using RPC.
- Two additional diagnostic exams from the hot leg using RPC.

7. Five tubes were reported as having volumetric/geometric conditions at the tubesheet interface. Please describe the nature of these manufacturing irregularities. [November 15, 1999 letter]

HBRSEP, Unit No. 2, Response:

For the five tubes in question, the Level III data analysts involved in the RO-19 resolution process were in agreement on the results of the data review. The results were also discussed with the vendor, corporate Level III examiners, and EPRI personnel. As a result, the indications were resolved as geometry, most likely present during manufacture. Supplementary data from other plants (Turkey Point and Surry) show that similar signals were reported. Surry performed an extensive study utilizing UT examination and tube pull comparisons and validated the signals were geometry related. Turkey Point later recorded indications near the

TTS during their inspection of Unit 3 (post RO-19 at HBRSEP, Unit No. 2) and initially reported the indications as volumetric and as circumferential cracking. Subsequent review resolved the cracking indications to be geometry, which supported the conclusion that the similar indications at HBRSEP, Unit No. 2, were also geometry. During the inspection of Turkey Point Unit 4 (which followed the Turkey Point Unit 3 inspections), similar indications were discovered and were dispositioned by eddy current as geometry. UT examinations were also performed, which confirmed the characterization. Supporting eddy current data from Surry and Turkey Point Unit 3 had been obtained for use in training at HBRSEP, Unit No. 2.

8. 54 indications were reported in 34 tubes. The indications were in the periphery of the tube bundle. Discuss the nature of these indications. Please provide the location and percent wall thickness of these indications. [November 15, 1999 letter]

HBRSEP, Unit No. 2, Response:

These indications are small in volume and were attributed to either maintenance equipment contact or transient loose parts. Information, such as the location/height of the indications, the eddy current response, the limited number of loose parts observed, video tapes with evidence of wear marks on the secondary side of tubes, and the absence of wear growth for a few previously identified indications, led to the conclusion that the indications were a result of maintenance equipment contact. This condition was brought to the attention of the sludge lance vendor in RO-19, thereby stressing the need for eliminating potential tube damage during the sludge lancing evolution.

Tube	Location (inches)	% Through-wall	Comments
R1C1	CTS + 13.30	11	0.04 volts, blowdown lane tube, indication at approximate level of handhole opening where sludge lance equipment is inserted
R1C2	CTS + 14.10	22	0.08 volts, blowdown lane tube, indication at approximate level of handhole opening where sludge lance equipment is inserted
R1C3	CTS + 15.59	19	0.07 volts, blowdown lane tube, indication at approximate level of handhole opening where sludge lance equipment is inserted
R1C4	CTS + 15.36	27	0.10 volts, blowdown lane tube, indication at approximate level of handhole opening where sludge lance equipment is inserted
R1C5	CTS + 15.28	15	0.05 volts, blowdown lane tube, indication at approximate level of handhole opening where sludge lance equipment is inserted

Tube	Location (inches)	% Through-wall	Comments
R1C6	CTS + 15.45	22	0.08 volts, blowdown lane tube, indication at approximate level of handhole opening where sludge lance equipment is inserted
R1C89	HTS + 15.55	16	0.04 volts, blowdown lane tube, indication at approximate level of handhole opening where sludge lance equipment is inserted
R7C1	CTS + 0.55	19	0.06 volts, TTS, peripheral, point tube
	CTS + 0.56	18	0.06 volts, TTS, peripheral, point tube
R7C92	CTS + 0.65	18	0.07 volts, TTS, peripheral, point tube
R11C2	CTS + 0.52	19	0.06 volts, TTS, peripheral, point tube
	CTS + 0.57	15	0.05 volts, TTS, peripheral, point tube
R11C91	CTS + 0.56	14	0.05 volts, TTS, peripheral, point tube
	CTS + 0.60	16	0.06 volts, TTS, peripheral, point tube
	CTS + 0.68	21	0.02 volts, TTS, peripheral, point tube
R13C3	CTS + 0.54	25	0.09 volts, TTS, peripheral, point tube
R16C4	CTS + 0.47	12	0.04 volts, TTS, peripheral, point tube
	CTS + 0.55	20	0.07 volts, TTS, peripheral, point tube
R19C87	CTS + 7.62	20	0.08 volts, peripheral
R23C7	CTS + 0.55	26	0.10 volts, TTS, peripheral, point tube
	CTS + 0.57	14	0.05 volts, TTS, peripheral, point tube
R23C86	CTS + 0.62	21	0.09 volts, TTS, peripheral, point tube
R26C9	CTS + 0.55	27	0.10 volts, TTS, peripheral, point tube
	CTS + 0.63	19	0.07 volts, TTS, peripheral, point tube
R26C84	CTS + 0.65	13	0.05 volts, TTS, peripheral, point tube
R31C80	CTS + 0.51	19	0.07 volts, TTS, peripheral, point tube
R33C15	CTS + 0.67	18	0.06 volts, TTS, peripheral, point tube
	CTS + 0.67	20	0.07 volts, TTS, peripheral, point tube
R36C74	HTS + 0.60	16	0.06 volts, TTS, peripheral, point tube
R37C20	HTS + 0.63	19	0.07 volts, TTS, peripheral, point tube
R40C25	CTS + 0.52	23	0.09 volts, TTS, peripheral, point tube
	CTS + 0.57	27	0.10 volts, TTS, peripheral, point tube
R40C68	HTS + 0.69	19	0.07 volts, TTS, peripheral, point tube
	HTS + 0.75	22	0.09 volts, TTS, peripheral, point tube
R42C30	HTS + 0.63	20	0.05 volts, TTS, peripheral, point tube
	HTS + 0.57	25	0.09 volts, TTS, peripheral, point tube
	HTS + 0.58	22	0.08 volts, TTS, peripheral, point tube
R42C63	HTS + 0.65	8	0.03 volts, TTS, peripheral, point tube
	CTS + 0.60	32	0.13 volts, TTS, peripheral, point tube
R43C33	CTS + 0.55	11	0.04 volts, TTS, peripheral, point tube
	CTS + 0.59	20	0.07 volts, TTS, peripheral, point tube
R43C37	CTS + 0.55	22	0.08 volts, TTS, peripheral, point tube
R43C60	CTS + 0.56	15	0.06 volts, TTS, peripheral, point tube
R44C36	CTS + 0.60	22	0.08 volts, TTS, peripheral, point tube
R44C57	HTS + 0.70	16	0.06 volts, TTS, peripheral, point tube
	CTS + 0.46	26	0.11 volts, TTS, peripheral, point tube
	CTS + 0.61	17	0.07 volts, TTS, peripheral, point tube
	CTS + 0.64	24	0.10 volts, TTS, peripheral, point tube
R45C41	CTS + 0.63	26	0.09 volts, TTS, peripheral, point tube
	CTS + 0.64	26	0.09 volts, TTS, peripheral, point tube

Tube	Location (inches)	% Through-wall	Comments
R45C47	CTS + 2.74	22	0.08 volts, handhole tube, indication directly below handhole opening where sludge lance equipment is inserted
	CTS + 6.50	30	0.12 volts, handhole tube, indication directly below handhole opening where sludge lance equipment is inserted
R45C52	CTS + 0.60	29	0.14 volts, TTS, peripheral, point tube, 5 tubes away from centerline of handhole opening
	CTS + 3.72	17	0.07 volts, handhole tube, indication 5 tubes away from centerline of and below handhole opening where sludge lance equipment is inserted

9. Please discuss how the one tube in the cold leg with no tube expansion in the tube sheet was dispositioned. Was it plugged? If not, describe the basis for leaving it in service. [November 15, 1999 letter]

HBRSEP, Unit No. 2, Response:

The unexpanded tube was addressed as part of the eddy current resolution process as an eddy current anomaly. The tube end weld is the pressure boundary and no credit is taken for the expansion of the tube within the tubesheet, as confirmed by a review of Westinghouse Report, WNEP-8323, "Model 44F Replacement Steam Generator Stress Report for Carolina Power and Light Company, H. B. Robinson, Unit No. 2." The purpose of expanding the tube within the tubesheet is to eliminate a potential concentration site/crevice for secondary side corrosion products. Additionally, the unexpanded tube end was on the cold leg side of the steam generator. It is widely recognized that should tube degradation occur in the tubesheet area, it is expected to occur first in the hot leg side of a steam generator. A rotating coil examination of the full length of tube within the tubesheet was performed as a conservative measure to ensure no indications existed in this area of the tubing and none were found.

In the EPRI PWR Steam Generator Examination Guidelines, an unexpanded tube is assigned the standard three-letter code "NTE" (no tubesheet expansion). In this document, each three-letter code is assigned a particular category that describe actions required to assist in the correct disposition of results. An NTE is a Category VII type indication. These require additional reviews (lead analyst or historical) and additional diagnostic sampling or engineering evaluations. For this case, additional diagnostic sampling was performed in the form of a full length rotating coil examination. Thus, the actions taken are in accordance with the EPRI Guidelines. While some utilities have plugged such unexpanded tubes to eliminate the need for future inspections, such an action is not required. The tube

was left in service based on the results of the full-length inspection and the above information.

10. Please discuss how the distorted dent and support signals were dispositioned. [November 15, 1999 letter]

HBRSEP, Unit No. 2, Response:

The Final Eddy Current Report for RO-19 lists the following subject indications: One distorted dent indication (DDI), three distorted dent signals (DDS), and five distorted support signals (DSS). In accordance with the analysis procedure developed for the examination, a DDI is a distorted dent indication identified by the initial bobbin examination. The "I" code indications (e.g., distorted dent indication [DDI], distorted support indication [DSI], and non-quantifiable indication [NQI]) are subject to historic review and diagnostic (rotating coil) examination to resolve the indication. If the indication is traceable to previous inspections or baseline results, it may be dispositioned with an "S" code from the bobbin results. If historic data is inconclusive, a diagnostic examination is performed with the appropriate "S" code assigned if no flaw information is present. The subsequent diagnostic examinations for the RO-19 indications, which consisted of a plus-point rotating coil examination, showed the indications were not flaw-like. Therefore, these indications were dispositioned and recorded as DDS or DSS as appropriate. As stated in the November 19, 1999, report, there were no repairable tube indications reported for the RO-19 examination.

11. For the four "indications not found," were the tubes in which those indications initially reported identified and subsequently inspected. What was the percentage wall thickness of these indications during the prior inspection? [November 15, 1999 letter]

HBRSEP, Unit No. 2, Response:

The four tubes that received an Indication Not Found (INF) code are associated with indications not found during the current inspection, but were present in previous inspections. Additional research and review of past data determined that incorrect locations had been previously reported and that these four indications were present in RO-19. No significant changes in these indications were noted in this data review and comparison to previous results.

Tube	Past History		RO-19		Comments
	Location (inches)	% TW	Location (inches)	% TW	
R3C30	5H+30.59	MBM	5H+25.83	MBM	Previous inspection in RO-17
R40C49	3C+26.46	MBM	3C+4.26	MBM	Previous inspection in RO-17
R18C49	6H-0.8	MBM		MBM	Reported as MBM during RO-17 using a rotating coil after examining another indication. This small MBM indication is not detectable (found) by bobbin probe, as it is in close proximity of a support.
R41C58			4A+0.30	NQI/MBM	This bobbin indication was originally called a NQI by the Primary Analyst and was resolved as a MBM between 3A and 4A AVB's.

For the 1998 (RO-18) inspections:

12. Denting at tube supports and in the free span was reported. Are these dents manufacturing related or corrosion related? [March 14, 1998 letter]

HBRSEP, Unit No. 2, Response:

For the dents that have been identified through periodic eddy current examinations, most have been attributed to initial manufacture, while a small number have been attributed to transient loose parts based on their location. The latter are generally low in amplitude as compared to those that are manufacturing related. HBRSEP, Unit No. 2, has identified no active denting mechanism or active degradation. For the eleven tubes that have been plugged to date, these have been identified as loose part/mechanical wear or restriction/inability to pass a probe.