

Ex 6

From: "Ian Barnes" [redacted]
To: "Wayne L Schmidt" <wls@nrc.gov>
Date: Tue, Jul 18, 2000 11:04 PM
Subject: 1997 ECT PROGRAM REVIEW WRITEUP

Wayne,

Attached is a relatively brief write-up of results of review of 1997 eddy current program. Hope you can make some use of it in the inspection report. Since Westinghouse did not use a qualified plus point examination technique from the EPRI Performance Demonstration Data Base, I would still like to see the specific plus point technique from Calculation DDM-96-009 which they say qualifies them for examination of low radius u-bends. It does not affect your exit meeting, I believe, but I would like to pull the final string. Caius, if you have any real heartburn with what I have written please let me know.

Pax Vobiscum,

Ian

CC:

Ex 6

"Caius V Dodd" <doddcv@[redacted]> <GVC@nrc.gov>

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REVIEW OF IP2 1997 STEAM GENERATOR EDDY CURRENT PROGRAM

Ian Barnes

A comparison review was performed of Westinghouse Procedure DAT-IP2-001, "Data Analysis Technique Procedure," Revision 0, against the requirements of the Electric Power Research Institute (EPRI) "PWR Steam Generator Examination Guidelines," Revision 4. Subsequent reference to the latter document will be as "EPRI Guidelines, Revision 4." Westinghouse Procedure DAT-IP2-001, Revision 0, provided the analysis guidelines that were in effect for the steam generator (SG) tubing eddy current examinations conducted during the 1997 Indian Point 2 Cycle 13 refueling outage. The areas of primary focus during this review were: (a) the training and testing of eddy current analysts, (b) conformance of Procedure DAT-IP-001, Revision 0, to the EPRI Guidelines, Revision 4, and (c) the adequacy and qualification status of the technique used for plus point probe examination of low radius u-bends.

1 TRAINING AND TESTING OF ANALYSTS

Section 6.2 (Site-Specific Performance Demonstration) of the EPRI Guidelines, Revision 4, states, in part, "...The actual preparation and administration of the analyst demonstration program should be approved by the utility with assistance from the ISI vendor, another vendor not involved in the steam generator examination, or other qualified individuals. It is important that strict rules be established during the initial preparation and future maintenance and updating of the performance demonstration so that the overall integrity of the program is maintained...."

A number of requests were made prior to and during the June 19-23, 2000, onsite inspection for the furnishing of lesson plans and practical test data that were utilized for the training and testing of the 1997 refueling outage eddy current analysts. On July 14, 2000, Westinghouse personnel faxed additional information to supplement test scores that had been previously provided. The received information consisted of: (a) a copy of a handwritten log for May 4-10, 1997, describing onsite activities; (b) a one page training introduction outline, (c) setup instructions for the combined Cecco-5 and bobbin probe, and (d) information regarding the contents of the practice data sets. No information was received regarding the contents of the written and practical tests. The practice data sets for the plus point probe (Reels 12 and 20) were noted to contain ID flaws at free span locations. Due to the lack of identification at IP2 of primary water stress corrosion cracking (PWSCC) in low radius u-bends prior to 1997, data from other SGs was used for the plus point practice data sets.

The inspectors considered the incomplete status of the eddy current analyst training and testing information to be an indicator that the site-specific performance demonstration requirements of the EPRI Guidelines, Revision 4, had not been appropriately implemented for the 1997 refueling outage. Specifically, the submitted information, and the elapsed time in obtaining it, were not indicative of the establishment of strict rules relative to preparation, maintenance, and updating of the site-specific performance demonstration. Due to the delay in obtaining records, the degree of involvement of the licensee in the process for training and testing of eddy current analysts was not established.

2 DATA ANALYSIS GUIDELINES

Review of Westinghouse Procedure DAT-IP2-001, Revision 0, showed that the guidance for plus point probe examinations was directed towards use of rotating probes containing a standard pancake coil (115 mils diameter), a plus point coil, and a high frequency shielded pancake coil (80 mils diameter). No specific guidance was provided with respect to the use of the medium frequency plus point probe for examination of low radius u-bends. Table 7 of this procedure, entitled "Set-Up For +Point," was also noted, however, to inappropriately require the analyst to adjust phase rotation so that probe motion was horizontal. The inspectors considered this guidance to be technically deficient, due to the insensitivity of the plus point probe to probe motion resulting in too small a signal to allow the adjustment to be accurately accomplished. It was additionally noted that improper phase rotation setting can negatively impact the ability to detect small PWSCC indications.

Specific subjects noted where strengthening of the procedure appeared warranted were:

- Inclusion of specific guidance relative to screening low frequency bobbin coil data for the presence of loose parts. The only current reference to loose parts noted during the review was in paragraph 9.2.1 which instructed the analyst to consider loose parts found in the SG when evaluating bobbin coil data.
- Development of more explicit guidance relative to data quality expectations, including measures to detect probe skipping and hanging.

3 LOW RADIUS U-BEND EXAMINATION TECHNIQUE USED IN 1997

The inspectors were informed by licensee personnel that the licensee technical requirements for the 1997 SG tube examinations (Cycle 13 refueling outage) were contained in Specification No. NPE-72217, "Eddy Current Examination of Nuclear Steam Generator Tubes, Indian Point 2," Revision 10. Paragraph 4.3 of this specification states, in part, "...The examination technique shall be performed using qualified methods that are capable of detecting axial, skew, and circumferential cracking. The techniques used shall be qualified to the EPRI Steam Generator Examination Guidelines, Appendix H,"

The inspectors ascertained from review of the EPRI Performance Demonstration Data Base that a qualified technique (ETSS # 96511Pwsccl_ubend.doc) for detection of circumferential and axial PWSCC in low radius u-bends was included in the data base in May 1996. This technique utilized a calibration standard containing 100% through-wall (TW) axial, and 40% TW axial and circumferential inside diameter EDM notches. A phase rotation setting of 10° was specified for the 40% TW notches.

The 1997 analysis of SG low radius u-bends at IP2 was performed in accordance with the requirements of Analysis Technique Specification (ANTS) Sheet # IP2-97-E, Revision 0. This ANTS sheet instructed the analyst to adjust phase rotation so that probe motion was horizontal, which was both not in accordance with ETSS # 96511Pwsccl_ubend.doc and, as discussed in 2. above, considered technically deficient. It was additionally noted that phase rotation criteria for axial or circumferential notches

were not included in the ANTS sheet.

It was ascertained from review of Westinghouse Drawing 1B79882, Revision 0, which pertained to the ACGT-006-97 EDM notch calibration standard that was used for the 1997 plus point probe examinations of low radius U-bends, that the calibration standard did not include the 40% TW inside diameter axial and circumferential EDM notches required by ETSS # 96511Pwsccl_ubend.doc. This drawing was approved on March 14, 1997, shortly before the May 1997 refueling outage. The reasons for Westinghouse not using an EPRI Performance Data Base qualified technique in 1997, which had been in existence for approximately 1 year, were not ascertained. The examination in 1997 of low radius u-bends, using a different calibration standard and phase rotation settings to that required by ETSS # 96511Pwsccl_ubend.doc, is viewed as a violation of Criterion IX of 10 CFR50, Appendix B, and paragraph 4.3 in Specification No. NPE-72217, Revision 10.

4 OTHER OBSERVATIONS

Included in the documents furnished by Westinghouse for NRC review was an extract from Calculation Note DDM-96-009, "Documentation of Appendix H Compliance and Equivalency." Appendix 1 of this document pertained to the plus point coil. During review of Appendix 1, the inspectors noted that an examination technique specification sheet, File: pls-pt18.doc, dated April 26, 1996, also contained questionable phase rotation settings. The phase rotation setting for a 100% TW EDM notch was indicated to be 20°, and probe motion horizontal. Establishing a phase rotation of 20° for a 100% TW EDM notch will result in the rotation setting for a 20% TW EDM notch being less than zero and the rotation setting for a 40% TW EDM notch being of the order of 3-5°. These rotation settings were viewed as potentially having a significant negative affect on the ability to detect PWSCC flaws. The indicated examination scope for File: pls-pt18.doc was PWSCC and outside diameter stress corrosion cracking in expansions and dented and non-dented intersections. An examination technique specification sheet, with an indicated examination scope of PWSCC in low radius u-bends, was not included in the furnished document extract. The applicability of File: pls-pt18.doc to low radius u-bends has not currently been verified.