

**From:** "Ian Barnes" [redacted] **EX 6**  
**To:** "Wayne L Schmidt" <wls@nrc.gov>  
**Date:** Thu, Jul 27, 2000 9:44 AM  
**Subject:** IP2 JULY 20, 2000, MEETING HANDOUT

Attached are my responses to Items 2, 4, and 5. This is my third attempt at sending this, so I hope it goes through this time.

Ian

**CC:** <BEH@nrc.gov>, "Gregory Cranston" <GVC@nrc.gov>, "Stephanie M Coffin" <SMC1@nrc.gov>, "Caius V Dodd" <doddcv@[redacted]> **EX 6**, "David C Lew" <DCL@nrc.gov>

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Act, exemptions 6  
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## COMMENTS ON JULY 20, 2000, IP2 HANDOUT

Ian Barnes, July 26, 2000

### Item Number 2

**There was no specific corrective action in response to a new and significant defect at the apex of R2C67. The flaw had been sized at 50% through-wall. ConEd should have recognized that corrective action was required in accordance with 10CFR Part 50, Appendix B.**

- The licensee has indicated in its response to this item that a qualified technique, ETSS 96511, was used during the 1997 inspection. The reality is that the 1997 examinations used a calibration standard which did not contain the 40% through-wall (TW) ID axial and circumferential notches required by ETSS 96511 for setup. In addition, the instructions provided to the analysts for examination of low radius u-bends (i.e., Analysis Technique Specification Sheet # IP2-97-E, Revision 0) simply required phase rotation be adjusted so that probe motion was horizontal, with no phase rotation requirements established for either the 100% TW or the 20% TW EDM notches that were present in the 1997 Westinghouse calibration standard. This approach is inconsistent with any plus point probe qualification.
- The comment made by the licensee regarding the noise levels in R2C67 being bounded by the response of the samples used in the EPRI studies is believed irrelevant. The R2C67 flaw was indicated by the c-scan to be not associated with noise ridges. What is at issue is that significant noise was present in the eddy current data acquired from low radius u-bends, with the capability to mask flaws present in noise regions. Following the initial identification in 1997 of PWSCC in a low radius u-bend, coupled with the potential for flow slot hourglassing (and resulting increased stresses at the apex of the bends) indicated by the number of tubes found to be restricted at the top tube support plate, it is believed that the licensee should have implemented review actions to assure other PWSCC flaws were not present.
- The licensee should have been additionally sensitized by the fact that Dominion Engineering had predicted prior to 1997 that PWSCC would not be expected for several cycles in low radius u-bends.

### Item 4

**The correct calibration standards were not used.**

The use by the licensee of a general statement from the EPRI PWR Steam Generator Examination Guidelines, Revision 4, regarding method of manufacture and types of artificial flaws required to be present in calibration standards is not relevant. Paragraph 7.1 in the EPRI Guidelines states, "Nondestructive examination of steam generator tubes shall be conducted using techniques capable of detecting and/or sizing the types of degradation known or reasonably expected to exist in accordance with industry experience. An inspection technique is qualified if sensors (coils, transducers, etc.) used have been proven capable by performance demonstration to meet the requirements of Appendices H and/or J.

Paragraph H.1 in Appendix H, "Performance Demonstration For Eddy Current Examination," of the EPRI Guidelines states, in part, "...Each organization that performs eddy current examinations shall use techniques and equipment qualified in accordance with this Appendix...."

Paragraph H.2.1.1 in Appendix H identifies that calibration method is an essential variable to insure proper data acquisition. Paragraph H.2.1.2 in Appendix H further requires the Analysis Technique Specification Sheet to define the method of calibration used for signal characterization.

The licensee has also stated "There is no further guidance provided for specific depths of the notches. Although the 1997 IP-2 calibration standards did not include a 40% ID notch, they met the requirements at that time." This posture totally ignores the obligation discussed above to use a technique that is qualified in accordance with the requirements of Appendix H of the EPRI Guidelines.

The current qualified technique in the EPRI Performance Demonstration Data Base for detection of PWSCC in low radius u-bends is ETSS # 96511Pwsccl\_ubend.doc. This technique was entered in the EPRI data base approximately 1 year before the 1997 outage examinations and was thus available for IP2 use in 1997. The calibration requirements contained in the qualified technique specified the use of a phase rotation setting of 10° for 40% TW axial and circumferential ID notches, thus necessitating the use of a calibration standard containing such flaws for compliance with the technique calibration requirements.

#### Item 5

**The probe setup was incorrect. Probe motion was set to horizontal.**

The licensee has claimed that the setup used in 1997 met the then applicable ETSS probe setup guidelines/requirements. It was additionally stated that the 1997 plus point technique set phase such that residual probe motion was horizontal with the 20% ID notch at 0 to 5°.

The insensitivity of the plus point probe to probe motion results in too small a signal to allow the adjustment to be made accurately, and is contrary to the guidance of ETSS # 96511Pwsccl\_ubend.doc. No information has been provided, to date, that would support a statement that a phase rotation setting of 0 to 5° was used for the 20% TW ID notch. The only guidance provided to the analysts by Analysis Technique Specification (ANTS) Sheet # IP2-97-E, Revision 0, was to adjust phase rotation so that probe motion was horizontal, with no instructions provided with respect to phase rotation criteria to be used for axial or circumferential notches. The absence of such instructions results essentially in delegation to the analyst for determination of setup requirements.

ETSS # 96511Pwsccl\_ubend.doc, as previously stated in **Item 4** above, specified the use of a phase rotation setting of 10° for 40%TW axial and circumferential ID notches. The actual probe setup used obviously did not satisfy that criteria, since the calibration standard used did not contain these notches.

Paragraph H.4.3 in Appendix H of the EPRI Guidelines does permit use of alternative calibration methods without requalification, if it can be demonstrated that the calibration method is equivalent to those described in the qualified acquisition technique or qualified analysis method. Eddy current acquisition and analysis was performed in 1997, however, without demonstrating that the sole requirement of setting probe motion horizontal was equivalent to the requirements of ETSS # 96511Pwsccl\_ubend.doc. The licensee statements should also be considered in the context of the qualification that was performed by Wesingouse to demonstrate that the magnetic bias plus point probe used at IP2 in 1997 was equivalent to the non-magnetic bias probe used for ETSS #

96511Pwsc\_ubend.doc. This equivalency qualification used a phase rotation setting of  $40^\circ$  for a 100% TW EDM notch which corresponds to a phase rotation setting of  $\sim 15^\circ$  for a 20% TW EDM notch and  $\sim 23^\circ$  for a 40% TW EDM notch. The requirements of ANTS Sheet # IP2-97-E, Revision 0, obviously also did not comply with the requirements of the Westinghouse equivalency qualification.