From: "Ian Barnes" <tees@[redacted]> EX 6
To: "David C Lew" <DCL@nrc.gov>
Date: 3/1/01 4:48PM
Subject: IP2

Dave,

I am ready to leave for the [redacted] EX. 6 Attached file represents my current status. More obviously can be added, but I don't personally think it is worth it unless unanticipated difficulties arise relative to the IP2 scenario. Am returning March 11 if there any comments.

Ian

CC: "Edmund J. Sullivan" <ejs@nrc.gov>

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ATTACHMENT 1

Review of the January 19, 2001, response to the November 20, 2000, Notice of Violation indicates the following basic areas of staff disagreement with licensee positions:

1. Licensee Oversight of Eddy Current Contractor Performance

In the first paragraph of the stated basis for denial of the violation is the sentence, "Probes, techniques and procedures applied were the most advanced qualified technology available at that time." Inspection Report 05000247/2000-010 clearly identified, however, that the techniques and procedures applied during the 1997 steam generator tube examinations of low radius u-bends did not conform to the requirements of ETSS # 96511 (i.e., the qualified technique that was included in the EPRI Performance Demonstration Data Base in 1996 for detection of circumferential and axial primary water stress corrosion cracking).

Section 1R3 of Inspection Report 05000247/2000-010 documented that the calibration standard used at Indian Point 2 in 1997 (for Plus Point probe examination of low radius U-bends) did not include the 40% through-wall inside diameter axial and circumferential notches that were required by ETSS # 96511 for set-up of the analytical technique. It also pointed out that Analysis Technique Sheet (ANTS) IP2-97-E, "Mag Plus Point U-Bend," substituted the required phase rotation set-up of 10-15 degrees for the 40% ID notch with an instruction to the analyst to adjust phase rotation so that probe motion was horizontal. This latter instruction was viewed by the staff as being technically deficient, due to the insensitivity of the Plus Point probe to probe motion resulting in too small of a signal to allow the adjjustment to be accurately accomplished.

Review of the affidavits from Messrs. Funanich, Maurer and Turley indicates that they considered the Westinghouse 1997 set-up technique to be satisfactory. The primary rationale given for this position was that Westinghouse Data Analysis Procedure DAT-IP2-001,Revision 0, required setting phase such that probe motion was horizontal with the 100% axial notch at 30 to 35 degrees. Review of the ETSS-96511 qualification data set indicated that with this setting the resultant phase of the 40% ID axial notch is in the 10-15 degree range required by ETSS # 96511. None of the affidavits addressed the insensitivity of the Plus Point probe to probe motion. Mr. Funanich did note that ANTS IP2-97-E did not include the phase setting requirement for the 100% axial notch and that his review of data for low radius U-bends showed few of the set-ups met the 30 to 35 degree requirement. He accordingly concluded that the use of shallower than required phase angle setups could result in shallow primary water stress corrosion cracking indications not being detected. No information was provided by Mr. Turley, who performed oversight for the licensee of Westinghouse during the 1997 outage, why the variance from ETSS # 96511 requirements was not identified and corrected. In addition, no information was provided in these three affidavits relative to why the screening requirements of Procedure IP2-001, Revision 0, did not result in Lissajous flaw like signals (as noted in the affidavit from Stephen D. Brown) being identified and a "call" made. The staff concluded from its review that oversight of the 1997 Plus Point probe examinations of low radius U-bends was inadequate, the approach used did not appropriately recognize the characteristics of the Plus Point probe, and that ANTS

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IP2-97-E was implemented without reconciliation with or consideration of the requirements of Procedure IP2-001, Revision 0.

2. Noise

Item 47 of the affidavit by Mr. Brown contains the following statement pertaining to Tube R2C67 (the one tube that was identified in 1997 to exhibit PWSCC), "...This was the first and only industry data point from which a conclusion could be drawn about data quality. Based on this single observation, there was no evidence that tube noise levels might be impacting detection; 2) The noise levels in the U-bend data were within other industry analysis experience prior to and contemporary with the Indian Point 2 timeframe. Thus, Indian Point 2 tube noise levels were not unique; 3) While the U-bend rotating probe data is noisy, this factor alone should not have prevented indications in R2C5 from being reported.

While we would not disagree with Mr. Brown that appropriate Lissajous monitoring should have identified the presence of a PWSCC flaw in Tube R2C5, we cannot accept his overall premise that there was no evidence that tube noise levels might be impacting detection. It is our view that the presence of noise of an amplitude comparable to that created by a PWSCC flaw will tend to mask the presence of the flaw and makes the analyst's task significantly more difficult. In the case of Tube R2C67, the tube noise was relatively low which resulted in a reasonable signal to noise ratio ande made the flaw readily detectable. We believe, however, that the presence of noise in other tubes with amplitudes comparable to that of the Tube R2C67 flaw signal should have been recognized as potentially impacting flaw detection capability, with actions taken to both alert analysts and reduce noise levels so that flaws of potential tube integrity significance are more readily detectable.

3. Denting and Hour-Glassing

During the inspection, the team noted that 19 low-row tube restrictions were detected in 1997 at the upper tube support plate which was a first time occurrence and viewed as indicative of denting progression. The team also found that Con Edison did not have a procedure, method, or criteria for determining if significant hour-glassing of flow slots had taken place. Borescope examinations were performed in the two steam generators that had inspection ports installed in the upper tube support region. These visual examinations were conducted, however, without an examination procedure, method of measuring the amount of hour-glassing, or criteria for determining when hour-glassing was significant. This status is totally inconsistent with a statement made in the affidavit from Thomas C. Esselmann where he concluded that Con Edison had a pro-active and thorough hour-glassing inspection, trending, and investigative program.

The licensee has tried to make an argument that the the most significant factor in evaluating the occurrence of probe restrictions in 1997 was the differing physical geometry of the Plus Point probe, with 14 of 19 instances of restrictions with 0.610-inch Plus Point probes not exhibiting similar restrictions with an identically sized 0.610- inch rotating pancake coil. Additional arguments were made in the affidavits of Messrs. Maurer and Turley relative to probe design differences between the bobbin andPlus Point probes and whether, because of the documentation system used in 1997, the

restrictions were probably past the upper tube suppport plate and in the U-bends. The staff has concluded, however, that the arguments presented have little merit. The analysis conducted by the licensee in 2000 confirmed that hour-glassing of flow slots in the upper tube support plate (even below visually apparent levels) will create stress levels at the apex of low radius U-bends which is sufficient to create primary water stress corrosion cracking. The absence of any prior criteria for determining significant hour-glassing is considered far more relevant than comments about differences in probe design, particularly when consideration is given to the fact that 0.610 inches is 0.165 inches below the nominal inside diameter of the Indian Point 2 tubing.