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**Dominion™**

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U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
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**DOMINION NUCLEAR CONNECTICUT, INC.**  
**MILLSTONE POWER STATION UNIT 3**  
**SUPPLEMENT TO STEAM GENERATOR TUBE INSERVICE INSPECTION REPORT**

In a letter dated April 7, 2005, Dominion Nuclear Connecticut, Inc. (DNC) provided the steam generator tube inservice inspection (ISI) report for Millstone Power Station Unit 3 (MPS3).

In a letter dated October 17, 2005, the NRC requested additional information to supplement the report. The attachment to this letter provides the supplemental information requested.

Should you have any questions regarding the information provided, please contact Mr. David W. Dodson at (860) 447-1791, extension 2346.

Sincerely,



J. Alan Price  
Site Vice President – Millstone

Attachments: (1)

Commitments: None

A047

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**ATTACHMENT 1**

**SUPPLEMENT TO STEAM GENERATOR TUBE  
INSERVICE INSPECTION REPORT**

**DOMINION NUCLEAR CONNECTICUT, INC.**  
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In a letter dated April 7, 2005, Dominion Nuclear Connecticut, Inc. (DNC) provided the steam generator tube inservice inspection (ISI) report for Millstone Power Station Unit 3 (MPS3).

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**NRC Question 1:**

On Page 3 of the letter dated April 7, 2005 (12-month report), it is stated that possible loose part (PLP) signals were identified for two tubes in Steam Generator (SG) B. No associated tube degradation was reported. Were these loose parts removed from SG B and if not, what hindered the removal of these parts? Discuss any other loose parts that may have been left in service. In addition, provide the results of any evaluations performed to ensure the loose parts left in service will not result in a loss of tube integrity for the period between inspections.

**DNC Response:**

The PLP signals associated with Tubes Row 13 Col 63 and Row 13 Col 64 at the top of the hot leg tube sheet (TSH) in Steam Generator B (SG B) were initially identified via bobbin coil. Subsequent rotating Pancake Coil (RPC) examinations reported no loose parts and no tube degradation. A Secondary Side Inspection (SSI) confirmed the absence of a loose part at this location.

PLP indications were identified at three locations within SG D. A 2-inch x 1/16-inch piece of weld wire located between tubes Row 52 Col 61 and Row 53 Col 61 was removed. SSI confirmed that there was no loose part associated with tubes Row 49 Col 41, Row 49 Col 42, Row 50 Col 42, and Row 51 Col 42. SSI equipment was unable to access the area above the flow distribution baffle and adjacent to tubes Row 50 Col 34, Row 51 Col 32, and Row 51 Col 33. Because the existence of the loose part could not be confirmed visually, five tubes were plugged on a discretionary basis; the three listed above plus tubes Row 50 Col 33 and Row 51 Col 35. Loose parts identified on top of the flow distribution baffle in the past have been small items such as machining curls. Based on the shape of the SVI indications and similarity of eddy current test (ECT) data compared with past outages, and with the plugging of the five tubes, evaluation concluded that the potential loose parts left in service would not result in a loss of tube integrity for the period between inspections.

**NRC Question 2:**

Page 3 of the 12-month report stated that manufacturing burnish marks (MBM) were reported for SG B (9) and SG D (6). The MBMs were determined not to be service induced for both SGs. Discuss whether the MBMs were traceable to the baseline inspection to support that they were not service induced and if their signals had undergone any changes.

**DNC Response:**

These indications were reported with the bobbin coil probe and were compared with the 1985 bobbin coil data. The indications were present in the 1985 (Baseline) bobbin coil data but did exhibit some change and therefore were recorded as Non-Quantifiable Indications (NQI) in the bobbin coil database. It is believed that these changes are not the result of an active damage mechanism, and that they represent differences in examination techniques and equipment. However, since these indications did meet the Reference Manual and ETSS criteria for change, they were scheduled for diagnostic examination with the RPC probe. The indications in question were examined with the RPC 3-coil +Point probe and determined to be volumetric type indications. Currently the RPC probe examination database reports the indications as Volumetric Indications (VOL).

**NRC Question 3:**

Due to dent and dings being areas of increased stress, discuss the scope and results of any dent and ding exams performed during the 9<sup>th</sup> refueling outage [3RO9]. If no inspections were performed, provide the basis for not performing such inspections.

**DNC Response:**

DNGs (Dings) and DNTs (Dents) were reported during the 3RO9 examination greater than or equal to 2 volts on channel 1 (630 kHz diff) and channel P1 (630/150 kHz diff mix) respectively with the bobbin coil probe. During the 3RO9 examination there were 345 DNTs reported in 197 tubes and 202 DNGs reported in 154 tubes in SG B. In SG D there were 315 DNTs reported in 188 tubes and 261 DNGs reported in 211 tubes.

A RPC examination was performed on all hot leg DNTs and DNGs greater than or equal to 3 volts. This RPC examination consisted of 89 DNTs in 73 tubes and 89 DNGs in 65 tubes in SG B and 161 DNTs in 104 tubes and 82 DNGs in 70 tubes in SG D. All of these RPC examinations resulted in no detectable degradation (NDD) being recorded for the locations of interest.

**NRC Question 4:**

On Page 4 of the 12-month report, it is reported that 2 single volumetric indications (SVI) are due to hand-hole installation during SG fabrication. Discuss which tubes (e.g., Row 27 Column 39) are related to the installed hand-holes and if the SVIs were traceable to the baseline inspection. In addition, discuss whether the SVI signals had undergone any changes.

**DNC Response:**

The two tubes related to the installation of hand-holes are Row 1 Col 1 and Row 5 Col 1.

Due to the location and small inner radius of tube (Row 1 Col 1) this small indication is not detectable with bobbin coil examination techniques. This indication was detected with the RPC probe during the Row 1 and 2 rotating U-bend examinations. This was the first time that this location had been examined with the RPC probe; thus, no historical RPC data was evaluated.

The indication in tube Row 5 Col 1 was reported during the 3RO1 examination as being 2.00 Volts at 144 Degrees and reported during the 3RO9 examination as being 1.82 Volts at 152 Degrees, which is essentially unchanged considering the variations in diametric offset, equipment, and calibrations over the years.

**NRC Question 5:**

It was stated on Page 5 of the 12-month report that an SVI in Tube Row 1 Column 1 (R1C1) appeared to be a manufacturing defect similar to tubes plugged prior to startup. Discuss whether previous rotating pancake coil (RPC) exams of Tube R1C1 have been performed. In addition, discuss any changes the SVI may have undergone from any previous exams.

**DNC Response:**

This information was provided in the response to question 4 above.

**NRC Question 6:**

Page 5 of the 12-month report indicates that 5 tubes with SVI and/or PLP signals were plugged due to the area not being accessible for visual inspection. Were the 5 tubes stabilized in case there was a loose part present?

**DNC Response:**

As noted above, Secondary Side Inspection (SSI) equipment was unable to access the area above the flow distribution baffle and adjacent to tubes Row 50 Col 34, Row 51 Col 32, and Row 51 Col 33. Because the existence of the loose part could not be visually confirmed, or refuted, five tubes were plugged on a discretionary basis; the three listed above plus tubes Row 50 Col 33 and Row 51 Col 35. None of these five tubes were stabilized.

**NRC Question 7:**

Discuss whether a visual inspection was performed on Tube R5C1 which contained a SVI with no associated loose part signal (from eddy current). In addition, provide the results of the inspection if a visual inspection was performed.

**DNC Response:**

The SVI was located four inches above the seventh support plate. While an inspection port adjacent to this location was installed prior to initial operation of the Unit, access was subsequently blocked by the installation of the SG hydraulic snubbers and associated support structure. SSI equipment was unable to access the area for visual inspection. Therefore, none was performed.

**NRC Question 8:**

In regards to the staff's review summary of the 8<sup>th</sup> refueling outage dated April 25, 2004, discuss any other restricted or ovalized tubes that may have been identified (even though not plugged) during this outage.

**DNC Response:**

One tube with an obstruction not allowing the insertion of a probe that would provide sufficient eddy current fill factor was plugged during 3RO8. No similar tubes were identified during 3RO9.

**NRC Question 9:**

Table 1 of the annual report indicates that RPC was performed for 50 percent of Row 1 and Row 2 U-bends. Please provide the basis for not expanding the scope of the U-bend inspection given that an indication was found in Row 1.

**DNC Response:**

Based on a review of ECT data for tube Row 1 Col 1, neither a crack-like indication nor degradation in excess of the plugging limit was detected. As such, neither the Unit Technical Specifications nor the SG Examination Guidelines prescribed a sample expansion. However, we did review the results and determined that the degradation that occurred during the installation of the hand-holes would not be expected to be present in any of the other tubes not directly adjacent to the hand-holes. All of the tubes directly adjacent to the hand-hole were examined during 3RO9.

The bobbin coil data for tubes Row 3 Col 1, Row 4 Col 1, and Row 6 Col 1 were reanalyzed in the location of the hand-hole for any indication of a discontinuity. None were found. Tubes Row 1 Col 1, Row 2 Col 1, and Row 5 Col 1 were examined with RPC in the portion of the tube adjacent to the hand-hole. Only tubes Row 1 Col 1 and Row 5 Col 1 recorded indications of discontinuities. Both of these tubes were removed from service on a discretionary basis even though the degradation was below plugging limit.

**NRC Question 10:**

On Page 4 of the 12-month report, it was indicated that 4 tubes with indications attributed to Freespan indications, possibly MBMs which could not be confirmed by historical bobbin data were left in service. Please describe these indications in greater detail. If they are not traceable to previous inspections, why were they not considered degraded and plugged?

**DNC Response:**

**Tube Row 9 Col 42:** This indication was first reported during the 3RO9 bobbin coil examination at 06C - 0.71 inches. This indication was examined with the RPC probe and a SVI indication was reported. Bobbin historical review of this location indicated that no indication was present prior to the 3RO9 examination. This indication does not appear to be tube-to-support plate wear. This indication was possibly caused by a transient loose part. The indication was sized using EPRI volumetric technique 21998 and reported at a maximum depth of 32% through wall. This indication will be retested during subsequent outages for this SG and monitored for growth.

**Tube Row 27 Col 39:** This SVI indication was initially reported with the bobbin coil as a non-quantifiable indication (NQI) during 3RO9. A diagnostic examination was performed with RPC and the indication was confirmed to be volumetric in nature. A historical review of the bobbin data was performed. This indication was not observed in the bobbin data until the 2001 examination of this tube. This indication had not been reported until the 3RO9 examination.

**Tube Row 38 Col 20:** This indication was first reported during the 3RO9 bobbin coil examination. Bobbin historical review of this tube indicates that this indication was present in the baseline (1985) data. There is a small ding associated with this indication. The RPC probe examination indicated a volumetric indication and a ding. This indication should have been reported as a volumetric indication (VOL) instead of a single volumetric indication (SVI). This indication will be reexamined during the next subsequent outage for this SG and reported correctly.

**Tube Row 52 Col 91:** This indication was first reported during the 3RO9 bobbin coil examination. Bobbin historical review of this tube indicates that this indication was not present in the baseline (1985) data. This indication first appears in the 3RO2 (1991) examination but was not reported. Due to the peripheral location of this tube and lower elevation, this indication could have possibly been caused by a transient loose part. The indication was sized using EPRI volumetric technique 21998 and reported at a maximum depth of 24% through wall. This indication will be retested during subsequent outages for this SG and monitored for growth.

The origin of the four indications could be either construction damage or foreign object wear. The absence of prior rotating probe data for these locations makes it difficult to determine the origin with certainty. None of the locations have had PLPs reported either previously or during the current examination. Loose parts and/or associated damage have generally been located in the area between the top of the tube sheet and the bottom of the flow distribution baffle, in the periphery of the bundle (e.g., Row 52 Col 91). The indications on the other three tubes were located at higher elevations and more internal to the tube bundle. These are more likely related to construction damage, thus continued wear at these locations would not be expected. Conservatively, the consequences of these indications being loose part related is discussed in the balance of this section.

Due to the migratory nature of most foreign objects, it is difficult to predict with a high degree of certainty the number and size of future foreign object wear flaws. However, a review of historical Millstone Unit 3 operating experience provides a means of assessing the level of threat to tube integrity that may be potentially presented by the foreign objects that are found.

In total, since 3RO6 84 PLP indications in 42 unique tube clusters have been identified by eddy current inspection. Since 1993, 24 foreign objects have been identified during secondary side visual examinations. Despite the large number of objects identified and the long operating period preceding rotating probes inspections (i.e., significant rotating probe inspection samples at the top of tubesheet location were first employed during 3RO6) no degradation exceeding the structural performance criteria has been identified. The absence of flaws, which exceed the structural criteria, is due to the tendency for the objects to migrate (due to operation and/or sludge lancing), the small mass of the objects, and the continued removal of objects during each outage.

Based upon the above discussions and the conservatisms associated with the ECT sizing technique, there is reasonable assurance that continued operation of the four tubes for two additional cycles will not generate additional foreign object wear that could exceed the structural integrity performance criteria. Further, the SVI findings of 3RO9 were within the bounds predicted in the operational assessment completed at the end of 3RO8.