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September 17, 2008

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852-2738

Serial No. 08-0434
MPS Lic/GAW R0
Docket No. 50-423
License No. NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING THE 2007 STEAM GENERATOR TUBE INSPECTIONS
(TAC NO. MD8659)

By letters dated May 8, 2007 (Serial No. 07-0342), and April 11, 2008 (Serial No. 07-0743), Dominion Nuclear Connecticut, Inc., (DNC) submitted information summarizing the results of the 2007 steam generator tube inspections at Millstone Power Station, Unit 3 (MPS3). These inspections were performed during the eleventh refueling outage (3R11).

In response to a Request for Additional Information (RAI) dated July 8, 2008, DNC is providing the attached information.

Should you have any further questions in regard to this submittal, please contact Mr. Geoffrey A. Wertz at (804) 273-3572.

Sincerely,

J. Alan Price
Vice President – Nuclear Engineering

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by J. Alan Price, who is Vice President – Nuclear Engineering of Dominion Nuclear Connecticut, Inc. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 17th day of September 2008.

My Commission Expires: 4/30/09

Notary Public

Notary Public
Commonwealth of Virginia
316947
My Commission Expires Apr 30, 2009

A001
NRR

Attachment: 2007 Steam Generator Tube Inspections at MPS3 Response to Request for Additional Information

Commitments made in this letter: None.

cc: U.S. Nuclear Regulatory Commission
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ATTACHMENT

2007 STEAM GENERATOR TUBE INSPECTIONS AT MPS3 RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

2007 STEAM GENERATOR TUBE INSPECTIONS AT MPS3
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

By letters dated May 8, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML071350249), and April 11, 2008 (ADAMS Accession No. ML081140138), Dominion Nuclear Connecticut, Inc. (DNC) submitted information summarizing the results of the 2007 steam generator tube inspections at Millstone Power Station, Unit 3 (MPS3). These inspections were performed during the eleventh refueling outage (3R11).

In response to a Request for Additional Information (RAI) dated July 8, 2008, DNC is providing the following information.

NRC Question 1:

For each RFO and SG tube inspection (including mid-cycle inspections), please provide the effective full power months of operation that the SG's had accumulated.

DNC Response 1:

Accumulated Effective Full Power Months of Operation

RFO	SGs INSPECTED	EFPY *	EFPY X 12 = EFPM **
1	A/B/C/D	1.341	16.1
2	A/C	2.420	29.0
3	B/D	3.725	44.7
4	A/C	5.188	62.3
5	B/D	6.544	78.5
mid-cycle	C	7.309	87.7
6	A/C	7.981	95.8
7	B/D	9.561	114.7
8	A/C	10.982	131.8
9	B/D	12.430	149.2
10	A/C	13.777	165.3
11	B/D	15.191	182.3

* Effective Full Power Years
** Effective Full Power Months

NRC Question 2:

Please provide the scope of the secondary side inspections performed in SG A and C during the 2007 RFO, as referenced on page 3 of the April 11, 2008 letter. Also, please discuss the scope and results of any secondary side inspections that were not related to foreign object search and retrieval.

DNC Response 2:

A secondary side inspection (SSI) of the top of tubesheet area was performed during 3R11 following an upper bundle flush (UBF) and sludge lancing. The periphery and several rows into the bundle were inspected.

The results of the SG 'A' SSI were as follows:

- The top of tubesheet visual inspection identified no loose sludge in the annulus.
- The no-tube lane exhibited approximately 1/32" of light, easily disturbed sludge under the blowdown pipe.
- No erosion was evident in the blowdown pipe flow holes.
- No loose parts were identified during the SSI.
- No eddy current testing (ECT) was performed in this SG.

The results of the SG 'C' SSI were as follows:

- The top of tubesheet visual inspection identified a few flakes, randomly distributed around the annulus.
- There was no loose sludge on the top of tubesheet or in the no-tube lane.
- No erosion was evident in the blowdown pipe flow holes.
- One previously identified object at R1 – C4 in the cold leg was revisited. No movement of the metal block was evident since the previous inspection. No additional loose parts were identified during the SSI.
- No ECT was performed in this SG.

As noted above, an UBF was completed on 'A' and 'C' SGs during 3R11. Additional visual and ultrasonic inspections were performed to provide more specific assessment of the condition of the U-bend region and the upper internal region of the SGs.

Results of these additional inspections for SG 'A' are as follows:

- The top of the seventh support plate (08H & 08C) exhibited a light deposit, which appeared to have settled out from the water.
- The broached holes were very clear compared to the previous outage (3R10).
- All support blocks, wedges, and associated welds were satisfactory.
- All anti-vibration bars were satisfactory.
- Visual inspection of the upper internal region identified a light, easily disturbed, uniform coating of deposits on the steam drum.
- No major blockage in the perforated holes of the secondary separators were evident and the chevrons appeared straight with a light deposit.
- The primary separator swirl vanes exhibited no sign of erosion on the leading edge of the vanes during visual inspection.
- All deck welds and supports were satisfactory.
- All feed-ring supports and associated welds were satisfactory.
- All 30 of the J-tubes were inspected internally. Previously observed flow accelerated corrosion (FAC) on J-tubes 1, 15, 16 and 30 had continued to progress consistent with observations of the other three SGs during previous outages. No other degradation was observed.
- Due to the above noted FAC, J-tubes 1, 15, 16, and 30 were weld repaired during 3R11 and the welds were observed to be satisfactory during post-weld inspection.

- Ultrasonic thickness readings taken on the feed-ring 14" tee and 14" x 10" reducers identified below nominal wall thickness at the toe of the 10" reducer to the feed-ring piping weld. Although minor wear was observed, these components were all found to be structurally acceptable.

Results of these additional inspections for SG 'C' are as follows:

- Visual inspection of the upper internal region confirmed that the broached openings of the 7th tube support plate (TSP) facing the annulus were mostly clear with little or no evidence of fouling or blockage as compared to a 3R10 baseline inspection of the same area.
- Most all of the broaches viewed that were facing away from the annulus (in-bundle) exhibited some form of fouling. An estimated 80 to 90% of the broach openings on the 7th TSP also exhibited partial fouling during the 3R10 visual examination.
- Inspections were performed both pre and post sludge lancing and UBF activities during 3R11 to evaluate the impact of not cleaning during 3R10. Both pre and post UBF inspections on the top of the 7th TSP identified less blockage during 3R11 as compared to 3R10.
- All anti-vibration bars, wedges and support blocks inspected at the 7th TSP / U-bend elevation appeared satisfactory.
- There was no erosion evident on the primary separator swirl vane edges.

NRC Question 3:

Regarding your rotating probe examinations, please clarify the following:

a. The axial extent of the "Hot Leg Transition" examinations (e.g., 3-inches above to 3-inches below the top of the tubesheet);
b. The percentage of overexpansions and bulges examined in SGs 'B' and 'D'; and
c. The scope of inspections of dents and dings.

DNC Response 3:

a. The axial extent of the "Hot Leg Transition" examinations was 3-inches above to 3-inches below the top of the tubesheet.
b. 44% of the hot leg overexpansions (OXPs) in SG 'B' and 74% of the hot leg OXPs in SG 'D' were examined. (In aggregate, 62% of the hot leg OXPs were examined.) These percentages included OXPs acquired and analyzed, even if they may have been outside the nominal axial scopes of +3.00 to -17.00 for the OXP examination or +3.00 to -3.00 for the Top of Tubesheet (TTS) examination.
c. The MPS3 steam generator eddy current database contains all dent and ding indications greater than or equal to 2.0 volts. Rotating Coil (RPC) examinations were performed on:

    1) All hot-leg dent and ding indications reported to be greater than or equal to 3.0 volts during the previous examination. The hot-leg is defined as tube end hot (TEH) to 2 inches above the 7th support (08H +2.00"). These examinations were included in the pre-outage scope for MPS3 SG inspections.
    2) All newly reported dent and ding indications identified during bobbin coil examinations, greater than or equal to 3.0 volts, and

3) Any previously reported dent or ding indications of any size that exhibit change over time (i.e., an indication with a recorded amplitude variation of 0.5 volts or a phase angle deviation of 10 degrees or more, when compared against the previous two inspections).

Total Number of Dent and Ding Indications

SG	Total DENT & DING indications >= 2.0 Volts	Total DENT & DING indications >= 3.0 Volts	Total number of Hot Leg, plus new DENT & DING indications examined with RPC during 3R11
B	622	360	153
D	540	336	169

NRC Question 4:

Regarding your inspections for possible loose parts and wear attributed to loose parts, please address the following:

a. For the cold-leg, it appears that the bobbin coil was mainly relied on for detecting possible loose parts and wear attributed to loose parts. Please discuss the extent to which a turbo mix was used to analyze the bobbin coil data to assist in detecting these indications.
b. For the possible loose parts and wear attributed to loose parts that were detected, please discuss the extent to which the indications were detected through a review of the bobbin coil data, rotating probe data, or both. In addition, please discuss the extent to which any of these indications were initially found during visual inspection.
c. It was indicated that no "known foreign objects" were left in SGs 'B' and 'D'. Please discuss the extent to which indications of possible loose parts were inspected visually. Please discuss whether any wear indications attributed to loose parts were left in service. If these indications were left in service, please discuss the extent to which a visual inspection was performed to confirm the absence of the loose part.

DNC Response 4:

a. The bobbin coil eddy current examination data is analyzed on eight channels acquired at four different frequencies. Channels 1, 3, 5, and 7 are operated in the differential mode and channels 2, 4, 6, and 8 are operated in the absolute mode. Additionally, four process channels are created by 'mixing' frequencies and suppressing unwanted signals (i.e., tube support plates). A turbo-mix is created on one of the process channels (P4) to suppress the affects of the expansion transition on the displayed eddy current output signal. This enhances the capabilities of detection for degradation signals that could otherwise be masked by the relatively large extraneous signal deflection associated with the geometry change (expansion transition) located coincident with the top of the tubesheet. However, the induced currents are distributed more broadly on channels operating at lower frequencies (i.e., channels 7 and 8), and have a greater depth of penetration. As a result, lower

frequencies provide better detection capabilities for the presence of conductive material located in close proximity to the tube outside diameter (OD) (i.e., loose parts). Process channels P1 and P4 are reviewed for degradation in the tubesheet region and channels 7 and 8 are screened at the top of tubesheet interface for evidence of possible loose parts. These eddy current testing (ECT) techniques are used to supplement the visual examinations on the secondary side top of tubesheet, which is also performed to detect loose parts.

b. Bobbin coil and RPC examinations were conducted from the cold and hot legs, respectively. These two ECT techniques are performed in parallel on the primary side. The secondary side activities (e.g., water lancing, secondary side visual examinations, and Foreign Object Search and Retrieval (FOSAR)) are conducted concurrent with the primary side activities. Any one of these three techniques might record the initial detection of a possible loose part (PLP)/foreign object. Upon detection, the other techniques were employed (along with a review of historical data) to further characterize the indication. During 3R11, one new foreign object was reported in the 'B' SG and four new foreign objects were found in the 'D' SG during ECT.

3R11 Identified Foreign Objects and Detection Technique

Object	Location	Detection Technique	Confirmation Technique
Small metal object	SG B - R33 C87 Hot-leg top of tubesheet	Rotating coil	Visual
Metal turning	SG D – R44 C82 and R44 C83 Hot-leg top of tubesheet	Rotating coil	Visual
Metal turning	SG D – R28 C111 and R28 C112 Hot-leg top of tubesheet	Rotating coil	Visual
Broken piece of drill bit	SG D – R52 C79 and R53 C80 @01C + 0.66	Bobbin	Rotating coil and visual
Metal shaving	SG D – R33 C16 and R34 C16 Hot-leg top of tubesheet	Rotating coil	Visual

c. All PLP indications that were confirmed by diagnostic techniques were resolved by FOSAR or by post sludge lance ECT (one region of the SG 'D' produced numerous PLP indications based on the presence of scale that was removed during sludge

lancing). FOSAR either visually confirmed that a loose part was not present or, if present, removed the loose part. Two tubes in SG 'D' (Row 53 Column 80 and Row 52 Column 79) associated with PLP indications exhibited significant wear and were plugged. None of the other tubes with PLP indications or adjacent tubes (bounding tubes were also examined with diagnostic techniques) exhibited wear.

NRC Question 5:

Please clarify the difference between single volumetric indications and volumetric indications. What is the nature of these indications (e.g., wear from loose parts, intergranular attack)? Please discuss the extent to which these indications have changed with time.

DNC Response 5:

Volumetric Indications are wear related (i.e., anti vibration bar (AVB) wear or loose part wear). During 3R11, VOL was a code used by resolution analysts, for volumetric indications. The bobbin coil data is typically used for sizing wear at structures, such as AVB wear, and rotating coil data is used for sizing wear associated with loose parts.

Single Volumetric Indications are free-span volumetric indications that are not traceable to either the baseline data or a known loose part. The code SVI was used by the resolution analysts to identify Single Volumetric Indications. All of these indications were examined with a rotating coil and will be re-examined with a rotating coil in subsequent outages. All of these indications were present during the previous examination data and have exhibited no growth.

All of the single volumetric indications and volumetric indications at MPS3 are believed to be mechanically induced; manufacturing burnish mark (MBM), AVB wear, or wear from foreign objects. None of these indications are believed to be intergranular attack (IGA).

NRC Question 6:

Please discuss the extent to which tubes (both stress relieved and non-stress relieved tubes) with non-optimal tube processing (as evidenced by an offset in the eddy current data) have been identified (refer to Information Notice 2002-21, Supplement 1). Please discuss the extent to which these tubes were included in the "special interest" rotating probe examinations.

DNC Response 6:

In response to the cracking detected at Seabrook, and the subsequent issuance of Information Notice 2002-21, DNC began reviewing all of the low row (i.e., rows 1-10), ECT data for the 'offset' signals believed to be indicative of high residual stress due to non-optimal tube processing. Over the course of the next two outages, (3R09 in April 2004 and 3R10 in October 2005), all of the MPS3 steam generator tubes in rows 1-10 were analyzed for this condition in each of the four steam generators with none found.

Although, no tubes were found to contain the offset signals, DNC conducts a robust examination regimen at MPS3, which continues to provide the necessary elements and controls to ensure the detection of outside diameter stress corrosion cracking regardless of material type, location, or steam generator history.