



January 31, 2017

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Serial No. 17-010
NRA/WDC R0
Docket Nos. 50-336/423
License Nos. DPR-65
NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNITS 2 AND 3
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING END OF
CYCLE 23 AND END OF CYCLE 17 STEAM GENERATOR TUBE INSPECTION
REPORTS (CAC NOS. MF8507 & MF8506)

By letters dated December 14, 2015 and August 2, 2016, Dominion Nuclear Connecticut, Inc. (DNC) submitted the end of cycle 23 and end of cycle 17 steam generator tube inspection reports for Millstone Power Station Unit 2 (MPS2) and Millstone Power Station Unit 3 (MPS3), respectively. In an email dated January 5, 2017, the NRC transmitted a request for additional information (RAI) related to the reports. DNC agreed to respond to the RAI by February 8, 2017.

Attachment 1 provides the response to the RAI for MPS2 and Attachment 2 provides the response to the RAI for MPS3.

If you have any questions regarding this submittal, please contact Wanda Craft at (804) 273-4687.

Sincerely,

Mark D. Sartain
Vice President – Nuclear Engineering and Fleet Support

Attachment:

1. Response to Request for Additional Information Regarding MPS2 End of Cycle 23 Steam Generator Tube Inspection Report
2. Response to Request for Additional Information Regarding MPS3 End of Cycle 17 Steam Generator Tube Inspection Report

Commitments contained in this letter: None

ADD
NR

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ATTACHMENT 1

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING MPS2
END OF CYCLE 23 STEAM GENERATOR TUBE INSPECTION REPORT**

**DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 2**

By letter dated December 14, 2015, Dominion Nuclear Connecticut, Inc. (DNC) submitted the end of cycle 23 steam generator tube inspection report for Millstone Power Station Unit 2 (MPS2). In an email dated January 5, 2017, the NRC transmitted a request for additional information (RAI) related to the report. This attachment provides DNC's response to the NRC's RAI.

RAI - 1

If any foreign objects were visually identified and left in service, please discuss whether an evaluation was performed to confirm that the foreign objects would not challenge the integrity of the steam generator tubes for the period of time until the next inspection.

DNC Response

Foreign objects identified within the steam generators are evaluated for potential to cause degradation which could challenge the integrity of the steam generator tubes. Eleven foreign objects were removed from SG 1 during 2R23. An additional 8 foreign objects were evaluated and dispositioned to remain in place because they were determined to be benign or because the adjacent tubes were already stabilized and plugged.

No indications of foreign object wear were detected during the 2R23 eddy current examinations of SG 1. The combination of the 100% bobbin coil examination of the full tube bundle, the 50% +Point™ examination of the outer six rows of the periphery and open tube lane and the secondary side examination of the tubesheet annulus and periphery, provides reasonable assurance that no objects currently within the tube bundle high flow region threaten tube integrity during the current cycle. The tube locations will be reexamined during the spring 2017 refueling outage.

RAI - 2

Table 1 states that the "largest fan bar width" is 3.15 inches. Please discuss with further detail to which dimension this is referring (e.g., is this 3.15 inches the largest axial height that a tube is "crossed" by a fan bar?). Does each fan bar have a specific axial height at which it crosses over a tube (because of the angle at which the fan bar goes through the tube bundle)?

DNC Response

The tube support/anti-vibration structures within the tube bundle of the MPS2 steam generators are comprised of flat bars attached to various structures outside the tube bundle. The actual dimension of these bars range in width from 1.0 inches to 3.15 inches.

The tubes are supported by a number of lattice grids in the vertical (straight) section of the tube bundles as depicted in Figure 1. The configuration of the support/anti-vibration structures in the U-bend section of the tube bundle are illustrated in Figure 2.

**Figure-1
Typical Lattice Grid Configuration**

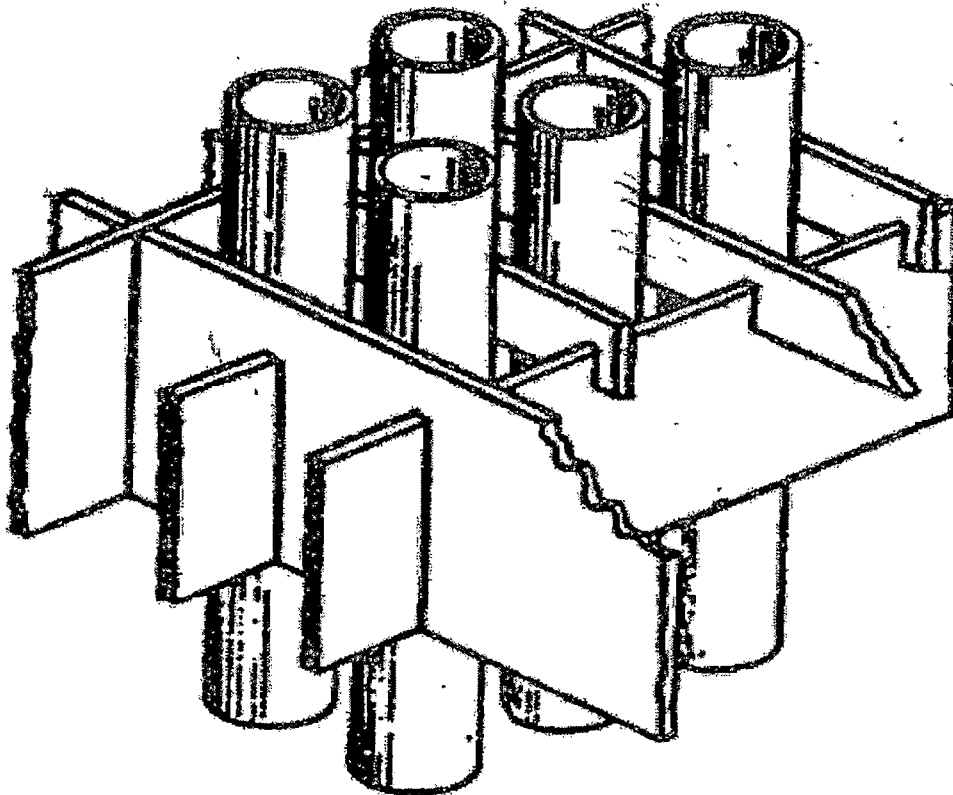
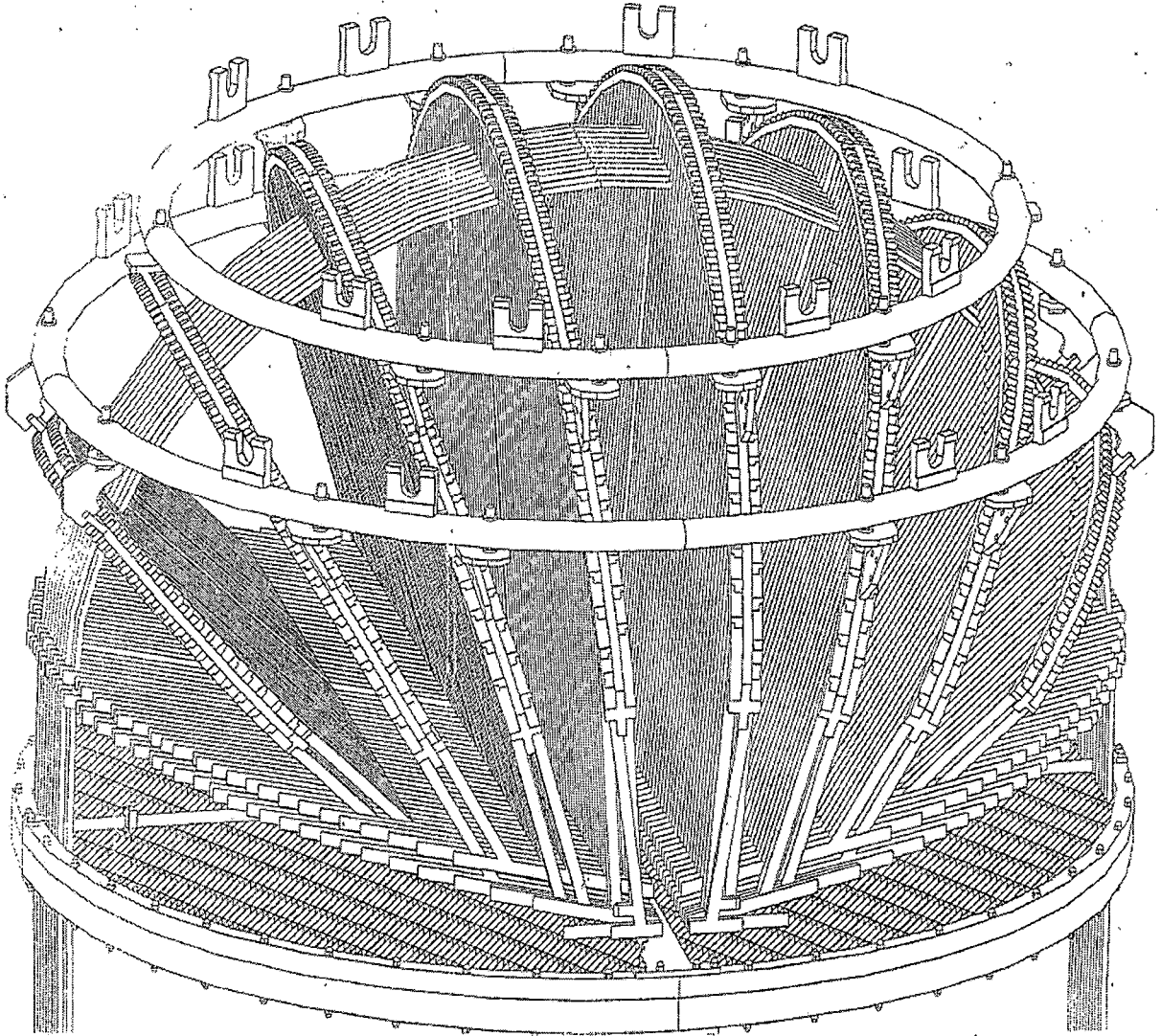


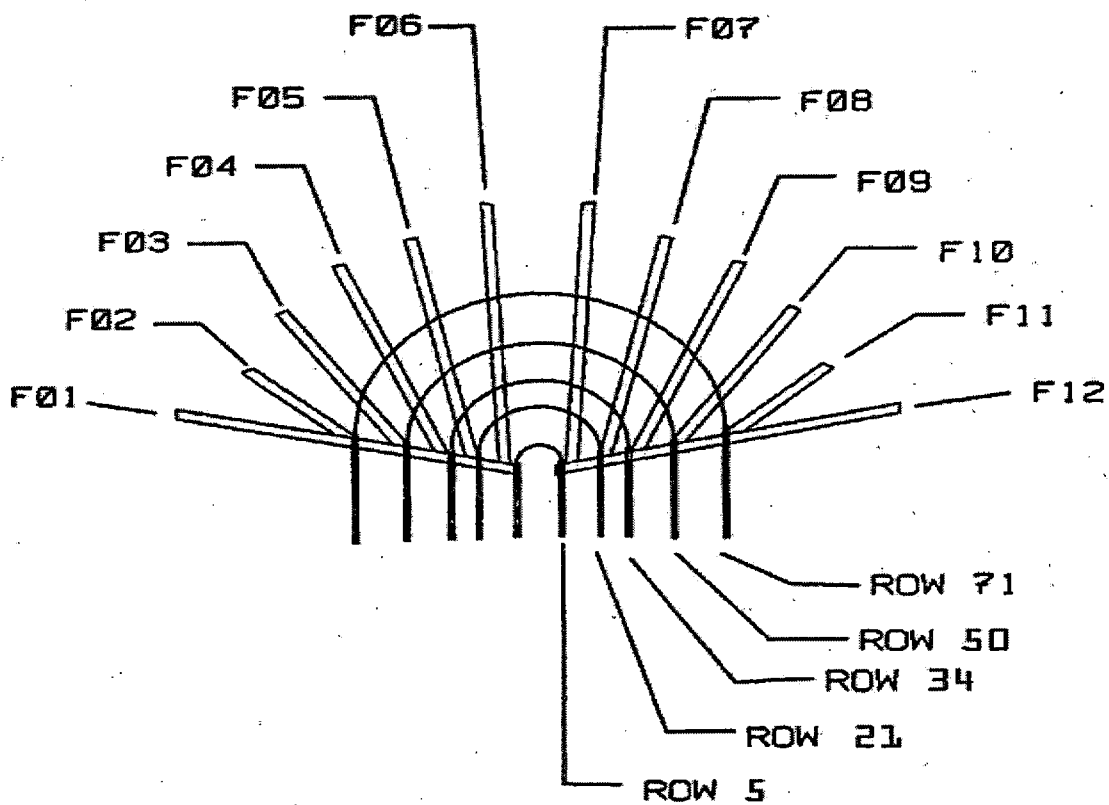
Figure-2
U-bend Support/Anti-vibration Configuration



The fan bars are of various widths and the two fan bars at a given tube/fan bar intersection are offset from one another. This offset distance varies from one fan bar to another.

As shown in Figure-3, the contact area where a tube is crossed by a particular fan bar depends on the position of the tube within the tube bundle, U-bend radius, and the angle of the fan bar.

Figure 3
Fan Bar Arrangement



RAI - 3

In the middle of page 2 of 11, it is stated that the visual examinations on the primary side reveal no degradation. It is then indicated that secondary side visual examinations were performed in SG 1. At the end of the page, it indicates that the "results of the visual examinations performed were satisfactory." Please clarify whether this statement refers to the secondary-side visual examinations performed in SG 1. If not, please discuss the results of the steam drum visual examinations.

DNC Response

The statement refers to the secondary-side visual examinations performed in SG 1.

ATTACHMENT 2

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING MPS3
END OF CYCLE 17 STEAM GENERATOR TUBE INSPECTION REPORT**

**DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3**

By letter dated August 2, 2016, Dominion Nuclear Connecticut, Inc. (DNC) submitted the end of cycle 17 steam generator tube inspection report for Millstone Power Station Unit 3 (MPS3). In an email dated January 5, 2017, the NRC transmitted a request for additional information (RAI) related to the reports. This attachment provides DNC's response to the NRC's RAI.

RAI - 1

Please discuss the results of the following secondary side inspections performed during RFO 17:

- a. The results of the post-sludge lancing visual examination of the TTS annulus and no-tube lane: If any foreign objects were visually identified and left in service, please discuss whether an evaluation was performed to confirm that the foreign objects would not challenge the integrity of the steam generator tubes for the period of time until the next inspection.*
- b. The results of the visual investigation of accessible locations having eddy current indications potentially related to foreign objects: If any foreign objects were visually identified and left in service, please discuss whether an evaluation was performed to confirm that the foreign objects would not challenge the integrity of the steam generator tubes for the period of time until the next inspection.*
- c. The results of the secondary side upper internal examinations within SG B: was any degradation observed?*

DNC Response

- a. Secondary side visual inspections were performed in the four steam generators (SGs) during MPS3's refueling outage 17 (3R17). These examinations included performing a post-water lance inspection of the tubesheet annulus and tube lane using an articulating camera to support viewing into the bundle of the four SGs. The inspection also included visual examination for degradation of the visible tube supports, the flow distribution baffle, and the wrapper to ensure structural integrity of these components.

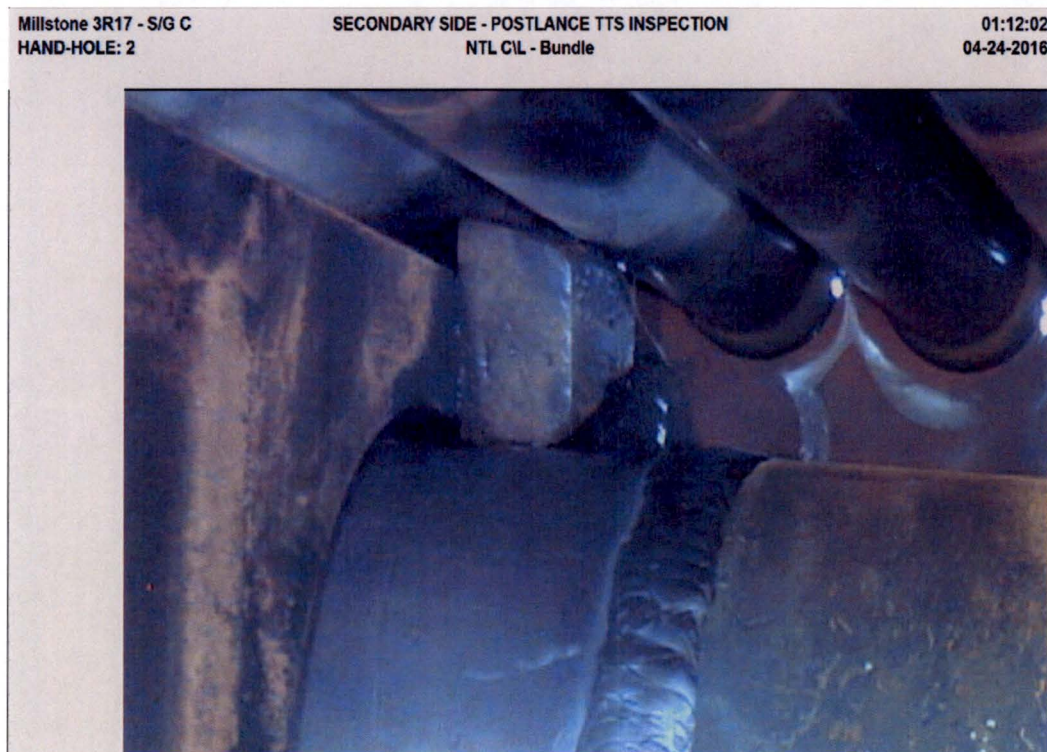
Since the secondary side inspections were performed after chemical cleaning and water lancing activities, the top-of-tubesheet (TTS) inspections revealed exceptionally clean conditions.

Inspection findings were similar in each of the SGs. The chemical cleaning and water lance operations were successful in removing loose deposits throughout the tube bundle and at the top-of-tubesheet. In-bundle views from the periphery showed the tubesheet to be very clean in each of the SGs. The no-tube lane

was clean and the center stay rod and blowdown piping were in good condition in each of the SGs.

In the four MPS3 SGs, only one foreign object, which was first observed and evaluated during 3R8 (2002), remains in steam generator C. The foreign object is a block of metal lodged between the blowdown piping and tube R1C4 on the cold leg side (Figure-1). Tube R1C4 was plugged and stabilized during 3R8. The existence of this foreign object is confirmed to be confined at this location during every secondary-side visual examination.

Figure-1
Foreign Object Between Blowdown Piping and Tube R1C4

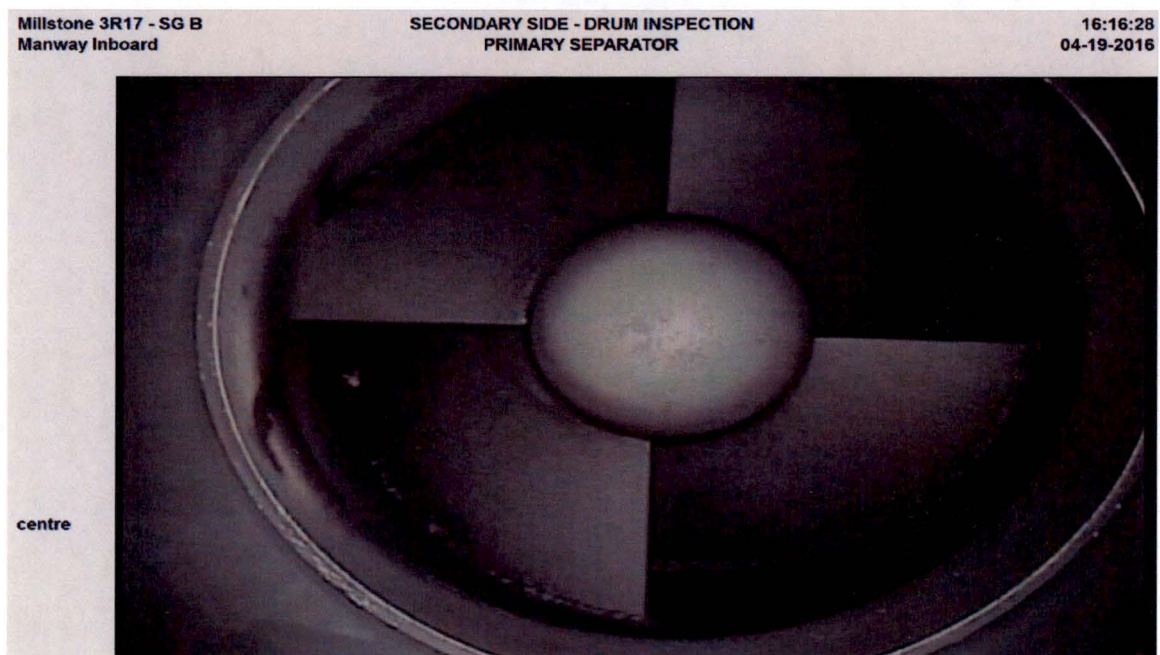


- b. During 3R17, no visually identified foreign objects associated with eddy current indications were left in service.
- c. Upper internals inspections were performed in SG-B only. The upper internals inspection included examinations of the steam drum and upper bundle region. The secondary moisture separator chevrons were found to be in good condition. The perforated holes of the outer plate showed minor buildup of sludge in the bore of the hole. No holes were observed to be plugged. The chevrons were straight and showed a light coating of sludge deposit. The primary moisture separator swirl vanes appeared to be in good condition (Figure 2). The vanes

had a slight deposit on them but the edges were sharp, with no indication of erosion. Ladders, drains, wedges, supports and associated welds throughout the upper internals were acceptable.

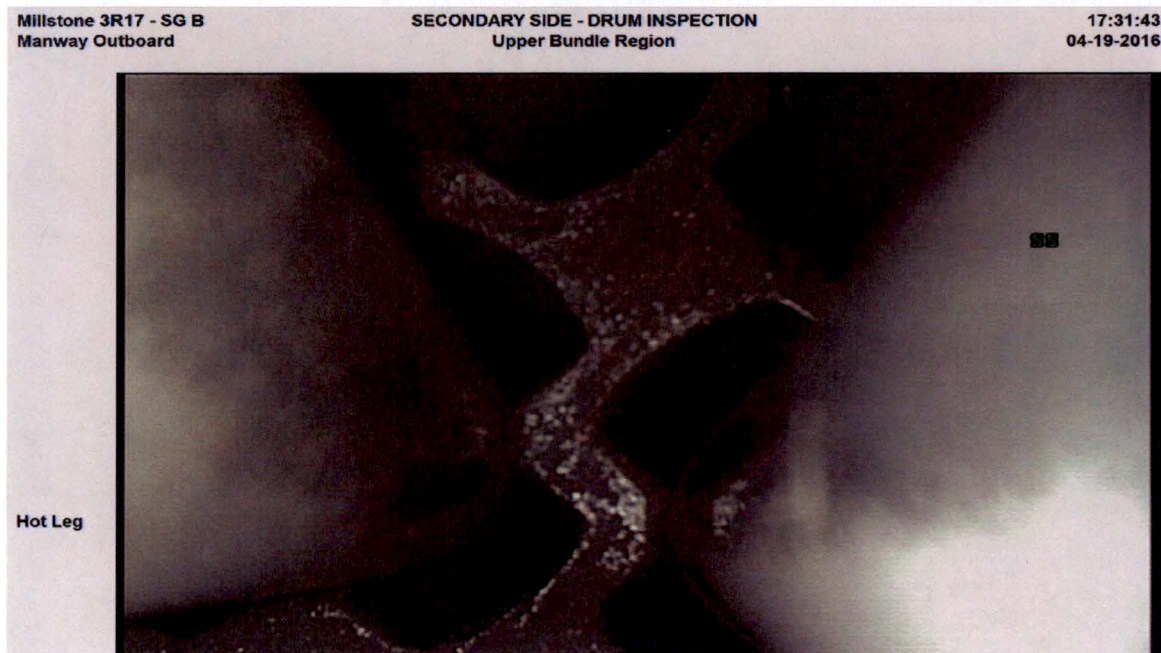
Thirty J-nozzles located on the main feed water pipe were internally and externally inspected and found to be in good condition. Overspray from the J-nozzles was also noted on the primary separator riser barrels.

Figure-2
Primary Moisture Separator



Internal visual inspections of the steam drum and upper bundle inspections above the 7th tube support plate found SG B to be in good structural condition. The majority of the loose sludge deposits in the upper tube bundle region were removed by the chemical cleaning. The views obtained of the broached holes at the periphery revealed no occlusion of the 7th tube support plate (Figure 3).

Figure-3
7th Support Plate: Broached Holes Free of Deposits



Based on a visual inspection, the condition of the secondary side of each of the MPS3 SGs was as expected, with no visible damage, degradation, or abnormalities.

RAI – 2

Please discuss whether any primary side inspections in the channel head were performed (e.g, cladding, divider plate, plugs). If so, please discuss the results.

DNC Response

After opening the steam generator primary channel heads, a general, as-found inspection was performed to look for any obvious abnormalities such as the presence of foreign objects or discoloration. Any water remaining in the bottom of the bowl was vacuumed out at this time. Then a more detailed bowl scan was performed which focused on the steam generator tubesheet cladding, the tube to tubesheet welds, the partition divider plate (DP), stub runner (SR), DP to channel head cladding weld, SR to DP weld, and the SR to tubesheet cladding weld. These examinations were performed in each bowl of SG B and D (hot leg and cold leg) to identify any gross degradation in the welds. No degradation to any of the listed structures was observed during the examination.

The cladding was visually examined for any discoloration or rust stains which could indicate a breach of the cladding. The examination of the cladding was performed during the as-found and as-left examination. No discoloration or rust stains were observed.