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U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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DOMINION ENERGY KEWAUNEE, INC.
KEWAUNEE POWER STATION
2011 STEAM GENERATOR TUBE INSPECTION REPORT

As required by Kewaunee Power Station (KPS) Technical Specification (TS), Dominion Energy Kewaunee, Inc. (DEK) hereby submits the steam generator tube inspection report for the KPS spring 2011 refueling outage (KR31).

KPS TS 5.6.5 requires submittal of the report within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with TS 5.5.7, "Steam Generator (SG) Program". During the 2011 KPS refueling outage, a steam generator inspection was performed in accordance with TS 5.5.7. KPS initially entered into MODE 4 following completion of the inspection on March 23, 2011.

The SG tube inspection report for KPS spring 2011 refueling outage is provided in the attachment to this letter.

If you have questions or require additional information, please feel free to contact Mr. Jack Gadzala at 920-388-8604.

Very truly yours,

Stephen E. Scace
Site Vice President, Kewaunee Power Station

Attachment

1. 180-Day NRC Report Regarding Steam Generator Tube Inspection per Technical Specification 5.5.7

Commitments made by this letter: NONE

A001
NRR

cc: Regional Administrator
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ATTACHMENT 1

2011 STEAM GENERATOR TUBE INSPECTION REPORT

180-DAY NRC REPORT REGARDING STEAM GENERATOR TUBE INSPECTION PER TECHNICAL SPECIFICATION 5.5.7

KEWAUNEE POWER STATION
DOMINION ENERGY KEWAUNEE, INC.

ATTACHMENT 1

180-DAY NRC REPORT REGARDING STEAM GENERATOR TUBE INSPECTION PER TECHNICAL SPECIFICATION 5.5.7

Kewaunee Power Station (KPS) Technical Specification (TS) 5.6.5 requires that a report be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.7, "Steam Generator (SG) Program".

During the spring 2011 KPS refueling outage, a steam generator inspection in accordance with TS 5.5.7 was completed for both steam generators 1A and 1B. Initial entry into MODE 4 following completion of the inspection occurred on March 23, 2011; therefore, this report is required to be submitted by September 19, 2011.

KPS steam generator lower assemblies were replaced in 2001 with Alloy 690 thermally-treated tubing. Tube supports are of a quatrefoil broached hole design and are fabricated from ASME SA-240 Type 405 stainless steel (405SS). In the U-bend region, three sets of anti-vibration bars provide support. The anti-vibration bars are also fabricated from 405SS.

The spring 2011 inspection marked the 3rd inservice inspection since steam generator lower assembly replacement. At the time of this inspection, the steam generators had accumulated approximately 79 effective full power months since the 1st inservice inspection. Therefore, the steam generators were within the second half of the first 144 effective full power months (EFPM) inspection period as described in TS 5.5.7.d.2.

Each specific item required to be reported on by TS 5.6.5 is restated below, followed by the requisite information.

a. The scope of inspections performed on each SG

The following primary side inspections were performed in both steam generator 1A and steam generator 1B.

- 100% Full-Length Inspection utilizing Bobbin Coil
- 20% Hot Leg Top of Tube Sheet (TTS) (+/- 3 inches) utilizing Rotating Coil, biased toward the peripheral tubes
- 20% Row 1 U-bend region utilizing Rotating Coil
- 100% of Dings, Dents, and Bulges > 2 volts with Rotating Coil
- 100% of Bobbin identified Possible Loose Parts with Rotating Coil
- 100% of Bobbin identified I-codes with Rotating Coil

The following secondary side inspections were performed in both steam generator 1A and steam generator 1B.

1. SG 1A and SG 1B steam drum upper internals.

   Scope – The primary and secondary separators, drains, and the feed water ring with all associated components.

   Results – Primary separators 1, 2, and 3, for both SG 1A and SG 1B, were inspected for structural integrity, signs of degradation, and deposit accumulation. All baffle plates, supports, welds, riser I.D., and swirl vanes appeared visually intact with no defects. No gross deposit accumulation was observed.

   The components of the secondary separator banks and all associated drains for both SG 1A and SG 1B were also inspected for overall structural integrity and deposition. Other than the normal tightly adhered surface deposit, the banks visually appeared to be in excellent mechanical condition. All drains, drain cups, support brackets, and associated welds visually appeared solid and intact. Of note, several perforated plates have some areas of misdrilled flow holes, apparently from original manufacture. These defects are cosmetic in nature and do not appear to have affected the secondary bank operation/efficiency.

   The feed ring and associated components were inspected in both SG 1A and SG 1B for general condition including j-nozzle to riser barrel overspray and j-nozzle to feed ring I.D. interface. J-nozzle outlets and feed ring interfaces showed no visible signs of flow accelerated corrosion or erosion. The riser barrel staining from the j-nozzle outlets is typical of this steam generator design and no material loss could be determined visually or by select UT thickness readings.

2. General condition of SG 1A and SG 1B upper bundle regions.

   Scope – The tube bundle U-bend region and the anti-vibration bars (AVBs).

   Results – Inspections of the upper bundle U-bends and AVBs, for both steam generators revealed light surface deposit accumulations. The AVB structures viewed appeared solid and entirely intact, with no observable wear or fouling.

3. SG 1A and SG 1B general area 7th Tube Support Plate (TSP) conditions.

   Scope – As accessible through a primary separator swirl vane.

   Results – The 7th TSP was accessed for both steam generators by manipulating a video probe through the AVBs on the outer radius of the tube bundle. Little to no loose deposit material was viewed on the peripheral or inner bundle region of the support plate. All tube broach openings observed were completely open. Additionally, no visual evidence of fouling or heavy tube scale was noted.

4. SG 1A and SG 1B Top of Tube Sheet (TTS) cleanliness conditions.

   Scope – Face of tube sheet annulus and divider lane region, both preceding (SG 1A only) and following a 3000 psi static and center tie rod sludge lancing process.

   Results – Pre-lancing inner bundle condition (3 full length passes - SG 1A only) was considered very good. Loose deposit accumulations of no more than 0.125" were observed throughout the bundle and tapered off approximately 5 tubes from the periphery.

   Following the sludge lance process, both SG 1A and SG 1B reported 16 pounds of deposit removal each (32 pounds total). The annulus and divider lane regions in both steam generators were effectively cleaned with little to no loose deposit material observed. Views from the periphery and divider lane into the bundle revealed very clean conditions. Additionally, the hard deposits viewed from the divider lane appeared positively affected from the high pressure lancing.

5. Detailed secondary side foreign object search and retrieval (FOSAR) visual exams.

   Scope – TTS periphery and divider lane regions in both SG 1A and SG 1B.

   Results – Following the sludge lance process, foreign object searches were conducted in both steam generators in the TTS periphery and divider lane regions. The only foreign objects observed in SG 1B were two small sludge rocks that were left as found. The first measured 0.125" x 0.125" x 0.359" and was located in the cold leg side of the generator. The second measured 0.125" x 0.125" x 0.125" and was located in the hot leg side of the generator. Exams performed within SG 1A revealed two foreign objects that were subsequently removed. The first object was a small (0.0625" x 0.0625" x 1.0") metallic machine curl that was located in the hot leg side of the generator. The second was a small (0.0625" x 0.0625" x 0.25") unidentified non-metallic object that fell apart upon removal.

b. Active degradation mechanisms found

No active degradation mechanisms were found during the spring 2011 inspection in either steam generator SG 1A or SG 1B. In addition, the secondary side visual inspections performed on both steam generators identified no component degradation that could compromise tube integrity.

c. Nondestructive examination techniques utilized for each degradation mechanism

No degradation mechanisms were detected during the spring 2011 SG inspection. All eddy current techniques that were utilized were qualified techniques per Appendix H and Appendix I of the Pressurized Water Reactor (PWR) Steam Generator Examination Guidelines, Revision 7. The techniques listed in Table 1 were used for the relevant and potential degradation mechanisms as discussed within the inspection Degradation Assessment, Appendix H and Appendix I document:

Table 1 – Inspection Method for Applicable Degradation Mechanism

Mechanism	Location	Detection Method(s)
Loose Part Wear	Free Span and TTS	Bobbin Rotating Visual
Wear	Anti-Vibration Bars / U-bends	Bobbin
Wear	Tube Support Plates	Bobbin
Pitting	Hot Leg & Cold Leg Sludge Pile	Bobbin
PWSCC	Any Location	Rotating
OD IGA/SCC	Any Location	Rotating

d. Location, orientation (if linear), and measured sizes (if available) of service induced indications

There were no service induced indications detected during the spring 2011 inspection in either SG 1A or SG 1B.

e. Number of tubes plugged during the inspection outage for each active degradation mechanism

Zero tubes were plugged during the spring 2011 inspection. No active degradation mechanisms were identified during the spring 2011 inspection.

f. Total number and percentage of tubes plugged to date

To date, following the spring 2011 inspection, there are zero tubes plugged in SG 1A and zero tubes plugged in SG 1B.

g. The results of condition monitoring, including the results of tube pulls and in-situ testing

Condition monitoring was completed. Neither SG 1A nor 1B exceeded any performance criteria during the last inspection cycle (since fall 2006 inspection). No damage mechanisms were required to be evaluated due to the lack of a degradation mechanism being found during the inspection. Therefore, no tube pulls or in situ pressure testing was conducted. The steam generator operational assessment from the fall 2006 inspection was concluded to be conservative and no corrective actions were required.

h. The effective plugging percentage for all plugging in each SG

There are zero tubes plugged and zero sleeves installed in SG 1A and SG 1B. Therefore, effective plugging is 0% (zero) for both steam generators.