UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 14, 2017

Vice President, Operations
Entergy Nuclear Operations, Inc.
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: SUMMARY OF CONFERENCE CALL WITH PALISADES NUCLEAR PLANT REGARDING THE SPRING 2017 STEAM GENERATOR INSPECTIONS (CAC NO. MF9396)

Dear Sir or Madam:

On May 5, 2017, the U.S. Nuclear Regulatory Commission (NRC) staff participated in a conference call with representatives of Entergy Nuclear Operations, Inc. regarding the ongoing steam generator inspection activities at the Palisades Nuclear Plant.

A list of the conference call participants is contained in Enclosure 1. A list of discussion questions were discussed on the call and are attached to the enclosed conference call summary in Enclosure 2.

If you have any questions regarding this matter, I may be reached at 301-415-1530.

Sincerely,

Jennivine Rankin, Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-255

Enclosure:
1. List of Participants
2. Conference Call Summary

cc: Distribution via ListServ

LIST OF PARTICIPANTS

MAY 5, 2017, CONFERENCE CALL

WITH ENTERGY NUCLEAR OPERATIONS, INC.

PALISADES NUCLEAR PLANT

SPRING 2017 STEAM GENERATOR INSPECTIONS

NUCLEAR REGULATORY COMMISSION

Andrew Johnson
Paul Klein
Jennie Rankin
Mel Holmberg
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ENTERGY NUCLEAR OPERATIONS, INC.

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Barb Dotson
Dan Meatheany
Jeff Hardy
Steve Brown

CONFERENCE CALL SUMMARY

REGARDING PALISADES NUCLEAR PLANT

SPRING 2017 STEAM GENERATOR INSPECTIONS

DOCKET NO. 50-255

CAC NO. MF9396

On May 5, 2017, the U.S. Nuclear Regulatory Commission (NRC) staff participated in a conference call with representatives of Entergy Nuclear Operations, Inc. (the licensee) regarding the ongoing steam generator (SG) inspection activities at Palisades Nuclear Plant (Palisades). The licensee-provided attachment is included at the end of this conference call summary. The data in the attachment is preliminary.

Palisades has two Combustion Engineering Model 2530 replacement SGs. Each SG has 8,219 mill-annealed Alloy 600 tubes with an nominal outside diameter of 0.750 inches and a nominal wall thickness of 0.042 inches. Stainless steel, lattice-type tube supports, diagonal straps, and vertical straps support the tubes at various locations. The tubes were expanded through the full depth of the tubesheet using an explosive process.

Undefined abbreviations used in the licensee-provided document (Attachment 1) include:

- %TW – Percent Through-Wall
- +Pt – Plus-point
- AILPC – Accident Induced Leakage Performance Criteria
- C* – C-star
- Circ – Circumferential
- CL – Cold-Leg
- CM – Condition Monitoring
- CMOA – Condition Monitoring Operational Assessment
- DB – Diagonal Bar
- ECT – Eddy Current Testing
- EFPY – Effective Full Power Year
- EPRI – Electric Power Research Institute
- GPD – Gallons Per Day
- HF – High Frequency
- HL – Hot-Leg
- IQDA - Independent Qualified Data Analyst
- ISI – Inservice Inspection
- MR – Mid-Range
- N/A – Not Applicable
- NDE – Non Destructive Examination
- NRC – U.S. Nuclear Regulatory Commission
- ODSCC – Outside Diameter Stress Corrosion Cracking
- PDA – Percent Degraded Area
- psi – pounds per square inch
- POD – Probability of Detection
- PWSCC – Primary Water Stress Corrosion Cracking
- 1R25 or RF25 – Unit 1 Refueling Outage 25
- SAI – Single Axial Indication
- SCI – Single Circumferential Indication
- SG – Steam Generator
- SGMP – Steam Generator Management Program
- SIPC – Structural Integrity Performance Criteria
- SVI – Single Volumetric Indication
- TEC – Tube End Cold
- TEH – Tube End Hot
- TR – Topical Report

- TSPs – Tube Support Plates
- TTS – Top-of-tubesheet
- TW – Through Wall
- V – Volts
- Vpp – Volts Peak-to-Peak
- VS – Vertical Strap

Information exchanged during the call and not included in the licensee-provided information is summarized below:

- At the time of the call, the licensee was approximately 94 to 95 percent complete with their base scope of eddy current inspections.

- The licensee stated that an ODSCC indication was found in the free span region of the tube located in row 62, column 101 of SG B. The indication was between the 03 and 04 tube support plates on the HL side of SG B. There was no indication of a tube ding at this location. The indication had a measured voltage of 1.18 volts and a maximum depth of 71 percent TW. The indication had a structural equivalent length of 0.65 inches, a structural equivalent depth of 63.5 percent TW, and required in-situ pressure testing to confirm structural integrity of the tube. This indication was one of nine indications that were aligned over a 12-inch length of the tube.

- A historical review of eddy current inspection data was ongoing at the time of the call, but the licensee noted that a preliminary review back to 2010 showed no change in the indication requiring in-situ testing.

- The licensee stated that the wear growth in both SGs was very small and only one tube (in SG A) was found with wear greater than 40 percent TW.

- The licensee noted that at the time of the call, there were 15 potential tubes to be plugged in SG A and 3 potential tubes to be plugged in SG B. The licensee noted they are using mechanical rolled plugs.

- The in-situ testing was scheduled for Saturday, May 6, 2017. After the in-situ testing, foreign object search and retrieval (FOSAR) of possible loose parts (PLPs) would commence. The PLPs noted during the current inspection were mostly low voltage and had "sludge-like" indications. None of the PLPs were noted at upper tube support structures.

- Other than the free span indication that required in-situ pressure testing, there were no unexpected or unusual results.

- After the call, the licensee notified the NRC that the in-situ pressure testing was conducted at 2 pm on May 6, 2017. Two-minute hold points were performed at pressures of 1600 psi, 3000 psi, 4000 psi, and 4600 psi. No evidence of leakage was observed at any of the hold points.

The NRC staff did not identify any issues that required follow-up action at this time.

Attachment 1

STEAM GENERATOR TUBE INSPECTION DISCUSSION DURING

PALISADES 2017 (RF25) OUTAGE (Preliminary Information)

STEAM GENERATOR TUBE INSPECTION DISCUSSION DURING PALISADES 2017 (1R25) OUTAGE (Preliminary Information)

Currently Palisades is ~ 93% through the base scope eddy current inspection and starting the special interest inspection scope as of 5/5/2017 at ~ 0430 hours

1. Discuss any trends in the amount of primary-to-secondary leakage observed during the recently completed cycle.

Refer to attached Primary to Secondary Leak Rate for Operational Cycle 25 Primary to Secondary Leak Rate graph. Leakage has been minimal all cycle.

2. Discuss whether any secondary side pressure tests were performed during the outage and the associated results.

No secondary side pressure tests are planned for the 2017 refueling outage (1R25).

3. Discuss any exceptions taken to the industry guidelines.

In cycle 22, Palisades submitted a deviation to the NRC: Technical Justification Supporting Deviation from the EPRI Appendix I ETSS for ODSCC Sizing

Palisades will deviate from the "needed" requirement to use an approved Examination Technique Specification Sheet (ETSS) contained in The "EPRI PWR Steam Generator Examination Guidelines – Revision 7", Section 6.2 for ODSCC sizing. Palisades will instead use a modified ETSS for ODSCC. The modified ETSS will be identical to the ETSS approved per Appendix I of the examination guidelines with the exception that only the sub-set of data from CE plants will be used instead of the combined fleet data set used in the approved ETSS.

A comprehensive review of axial ODSCC in Palisades steam generators shows that Appendix I28432 over sizes maximum depth values for axial ODSCC at Palisades. There is a reasonable basis to submit a deviation request for maximum depth sizing of axial ODSCC indications at Palisades. The request is relatively modest since it uses the Combustion Engineering (CE) subset of the well vetted data of Appendix I28432. The regression slope and standard error of regression are retained. Only the intercept parameter is changed. This provides an across the board reduction of NDE maximum depth sizing of 11.23 %TW. This will lead to about a 1000 psi increase in calculated condition monitoring burst pressures and much better matching of projected and measured NDE maximum depths.

The deviation was implemented in the 2012 (1R22) refueling outage steam generator inspection for the remaining life of the existing Palisade steam generators.

4. For each steam generator, provide a description of the inspections performed including the areas examined and the probes used (e.g., dents/dings, sleeves, expansion-transition, U-bends with a rotating probe), the scope of the inspection (e.g., 100% of dents/dings greater than 5 volts and a 20% sample between 2 and 5 volts), and the expansion criteria.

Full length ECT bobbin coil examination of all in-service tubes (except row 1, 2, and 3 U-bends) in both SGs.

ECT +Point™ coil examinations (both SGs):

- 100% of rows 1, 2, and 3 U-bends.
- 100 examination of in-service freespan ding (DNG) indications >5V between tubesheet hot (TSH) and tubesheet cold (TSC)
- 100% of hot leg from TTS + 3.5-4" (depending on sludge height) to a minimum of 13.5" below the bottom of the expansion transition.
- 100% of free span dings >5V between TSH and TSC.
- 100% of >2V dents at egg crate, diagonal bar, and vertical strap intersections between TSH and TSC.
- 25% of historical %TW calls at diagonal bars and vertical straps, selected from indications not inspected in 1R24
- 100% of historical TRA(trackable anomaly) indications
- The outer 3 peripheral tubes at the cold leg from TTS+4" to TTS-2" for detection of possible loose parts or wear signals.
- The periphery region is defined to be the outer three (3) tubes exposed to the annulus, all tubes in rows 1 through 4, and the inner three (3) tubes around the stay cylinder region.
- One tube around all tubes with foreign object signals as well as the affected tubes.
- 100% of bobbin I-Code indications. I-Code indications include: Absolute Drift Indication (ADI), Dent or Ding with Indication (DDI), Differential Freespan Indication (DFI), Distorted Support Plate Indication (DSI), Distorted Tubesheet Indication (DTI), Loose Part Indication (LPI) and Non-Quantifiable Indication (NQI).

The expansion criteria for each degradation is attached to the back in tables 9-1 through 9-4.

5. For each area examined (e.g., tube supports, dent/dings, sleeves, etc), provide a summary of the number of indications identified to-date of each degradation mode (e.g., number of circumferential primary water stress

corrosion cracking indications at the expansion transition). For the most significant indications in each area, provide an estimate of the severity of the indication (e.g., provide the voltage, depth, and length of the indication). In particular, address whether tube integrity (structural and accident induced leakage integrity) was maintained during the previous operating cycle. In addition, discuss whether any location exhibited a degradation mode that had not previously been observed at this location at this unit (e.g., observed circumferential primary water stress corrosion cracking at the expansion transition for the first time at this unit).

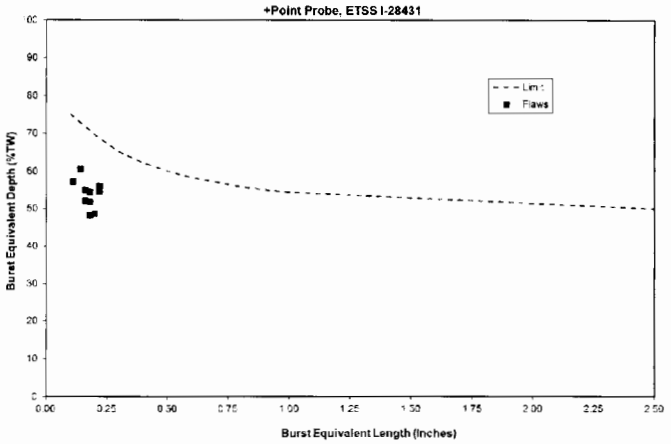
As of 5/4/2017 @ 0300 hours

SG	Location	Type	Number Indications	Number Tubes	Integrity Acceptable
A	TSH	Axial ODSCC	12	10	YES
A	TSH	Axial PWSCC	1	1	YES
A	TSH	Circ PWSCC	0	0	N/A
A	TSH	Circ ODSCC	3	3	YES
A	TSH	Volumetric	0	0	N/A
A	TEC to TEH	Wear > 40	1	1	YES
B	TSH	Axial ODSCC	3	2	YES
B	TSH	Axial PWSCC	0	0	N/A
B	TSH	Circ PWSCC	0	0	N/A
B	TSH	Circ ODSCC	0	0	N/A
B	TSH	Volumetric	0	0	N/A
B	TEH to TEC	Wear > 40	0	0	N/A
A	Tube Supports	Axial ODSCC	0*	0*	N/A
A	Freespan	Axial ODSCC	0*	0*	N/A
B	Tube Supports	Axial ODSCC	0*	0*	N/A
B	Freespan	Axial ODSCC	9*	1*	N/A
	Total		29	18	

*Some support/freespan indications have been identified but are not completely through the data resolution process as of this snapshot. Updated quantities may be presented verbally during the phone call.

SG A

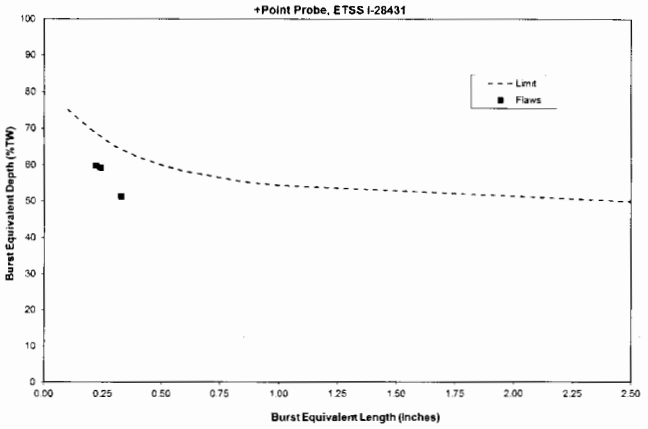
- Axial ODSCC at TSH



- Axial PWSCC within tubesheet. Indication parameters:
  - Max voltage: 1.67 V
  - Length: 0.45"
  - Max depth: 100 %TW
  - SIPC and AILPC criteria satisfied
- Circ ODSCC at TSH. Max indication parameters (not the same indication):
  - Voltage: 0.97 V
  - Circumferential extent: 0.47" (72 degrees)
  - Depth: 79 %TW
  - PDA: 9.7
  - SIPC and AILPC criteria satisfied
- Tube support wear:
  - Max depth: 46 %TW
  - SIPC and AILPC criteria satisfied
- No foreign object wear flaws

SG B

- Axial ODSCC at TSH



- Axial ODSCC in the Free Span
  - Max Voltage: 1.18
  - Length: 0.65"
  - Max depth 70.5%
  - Exceeded Screening for Burst
- No foreign object wear flaws

Both SGs – Support Structure Wear

- Average growth rate is essentially zero
- 95/50 growth rate is <3 %TW/EFPY

Freespan

There is one indication in SGB (Tube 62-101) that has an indication between the 04hot and 03hot support plates. It has a total length of ~ 12 inches with 9 indications. The second indication is the largest and exceeded the screening criteria for burst. It has been scheduled for in-situ testing. The details of the flaw are identified above for SGB.

U-Bends

There are no U-bend repairable indications reported to date.

6. Describe repair/plugging plans.

Currently there are 15 potential tubes requiring tube plugging in SG E-50A and **3** potential tubes in SG E-50B.

All stress corrosion cracking (SCC) indications will be plugged. Any circumferential SCC indications near the top-of-tubesheet (TTS) will be stabilized and plugged. C* depth is applicable to the HL and CL

All wear indications (at support structures) greater than or equal to 40%TW will be plugged.

7. Describe in-situ pressure test and tube pull plans and results (as applicable and if available).

Based on the available data to date, there is one tube that will be tested in SGB.

8. Discuss the following regarding loose parts:

What inspections are performed to detect loose parts?

The hot leg top of tube sheet (TTS) region is inspected with +Pt up to a nominal 4 inches, but not less than 3.5 inches and not less than the height of the sludge pile, above TTS. A similar inspection is performed for the cold leg TTS region 3 tubes deep along periphery and tube lane and 3 inches above the TTS. Foreign object search and retrieval (FOSAR) will be performed for the periphery, tube lane annulus, and stay cavity areas.

A description of any loose parts detected and their location within the SG

As of 5/4/2017 at 0300 hours, the following are the number of potential loose parts identified with the plus point inspection:

E-50A	164 PLP Calls in 136 Tube Locations
E-50B	105 PLP Calls in 90 Tube Locations

The vast majority of the indications are historical. None have resulted in tube degradation.

If the loose parts were removed from the SG

Anticipate FOSAR start on 5/6/2015.

Indications of tube damage associated with the loose parts

To date, ECT has not identified any wear associated with loose parts. Visual inspection may yet identify foreign object wear.

9. Discuss the scope and results of any secondary side inspection and maintenance activities (e.g., in-bundle visual inspections, feedring inspections, sludge lancing, assessment deposit loading, etc).

Sludge lancing was not performed.

10. Discuss any unexpected or unusual results.

Currently there are no unexpected or unusual results. There are no tubes that have failed the screening criteria requiring in-situ pressure testing

11. Provide the schedule for steam generator-related activities during the remainder of the current outage.

The base – scope bobbin and top of tube sheet inspections are nearly complete. Special interest examinations are ongoing. U-bend examinations are pending. Nominal SG schedule is as follows:

In-situ testing 5/6/17
Scheduled complete ECT 5/8/17
Scheduled complete repair 5/9/17
Scheduled SG closeout 5/10/17
Nozzle dam removal and manway installation complete 5/12/2017

The following is the primary to secondary leak trend for the last fuel cycle
Note: Units in gallons per day

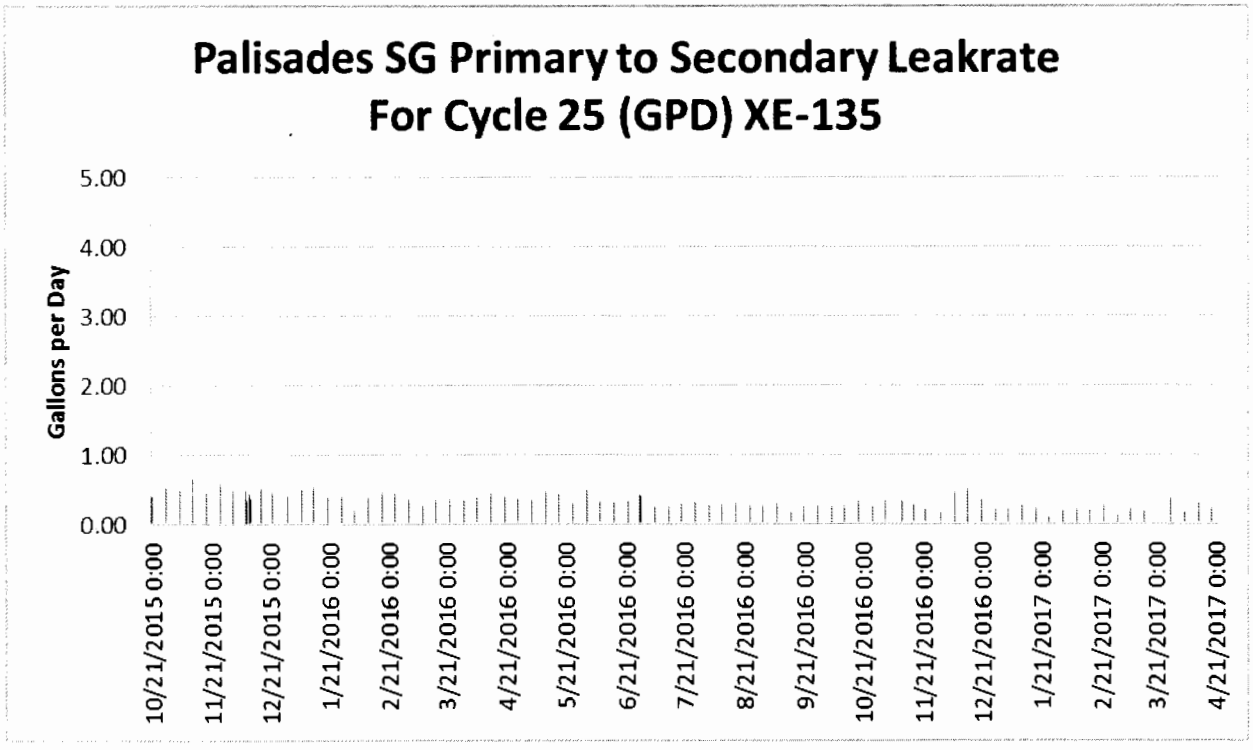
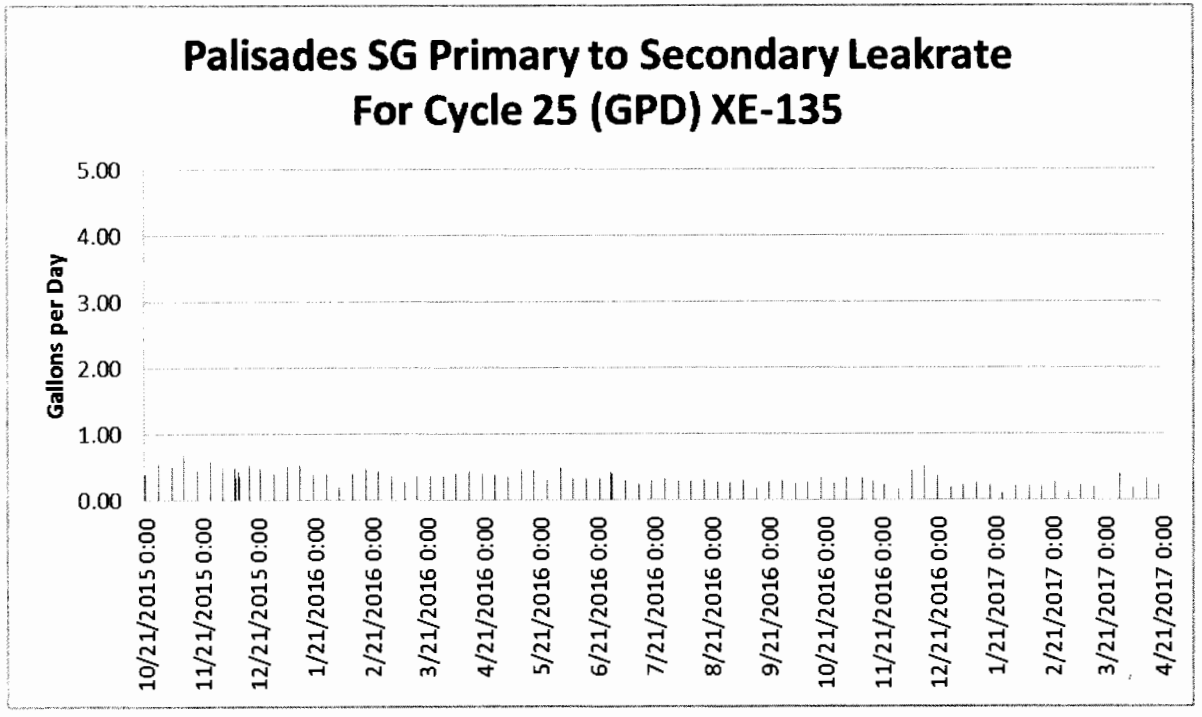


Table 8-1: Eddy Current technique Table

Degradation Mechanism	Probe Type	EPRI ETSS	Demonstrated Applicability	Extended Applicability	Detection?	Sizing?	POD	Sizing Parameters
BOBBIN								
Tube to Tube Wear	Bobbin	13091.1 Rev. 0	Freespan tube-to-tube wear	None	Yes	CMOA		Depth = 0.94*NDE + 1.24 Sy,x = 1.57 N = 40 R= 1.0
Axial ODSCC	Bobbin	I28413 Rev. 3	Freespan (excluding u-bend), eggcrate, sludge pile, & broached TSPs with or without dents ≤2Vpp	None	Yes	No	POD: Log-Logistic Slope = 4.296 Intercept = -5.679	
Axial ODSCC	Bobbin	24013.1 Rev. 2	Freespan including dings ≤5V	None	Yes	No		
Foreign Object Wear	Bobbin	27091.2 Rev. 1	Foreign object wear (part not present); I-690 tubing	Extended for I-600 tubing	Yes	CMOA		Depth = 0.79*NDE + 12.85 Sy,x = 13.49 N = 271 R= 0.8
Support Wear	Bobbin	96004.1 Rev. 13	AVBs, TSPs, vertical and diagonal straps	Dents <5V	Yes	CMOA		Depth = 0.98*NDE + 2.89 Sy,x = 4.19 N = 76, R = 0.98
Pitting	Bobbin	96005.2 Rev. 9	Freespan in the presence of copper	Sludge Pile	Yes	CMOA		Depth = 0.27*NDE + 28.42 Sy,x = 13.36 N = 62, R = 0.41
Axial ODSCC								
Axial ODSCC	+Point™	I28424 Rev. 3 (detect); I28431 Rev. 2 (sizing)	TSP (with or without dents <=2vpp) and sludge pile	None	Yes	Depth: CMOA BED: CMOA BEL: CMOA	POD: Log-Logistic Slope = 11.4155 Intercept = -17.7154	Depth = 0.9994*NDE + 0.4998 Sy,x = 11.856 N = 589, R = 0.88 BED = 0.9941*NDE + 2.7324 Sy,x = 10.685 N = 589, R = 0.895 BEL = 0.6451*NDE + 0.0785 Sy,x = 0.106 N = 589, R = 0.723

Degradation Mechanism	Probe Type	EPRI ETSS	Demonstrated Applicability	Extended Applicability	Detection?	Sizing?	POD	Sizing Parameters
Axial ODSCC	+Point™	I28425 Rev. 3 (detect) I28432 Rev.2 (sizing)	Freespan (excluding u-bend), eggcrate, & broached TSPs with or without dents ≤2Vpp	None	Yes	Depth: CMOA BED: CMOA BEL: CMOA	POD: Log-Logistic Slope = 6.7176 Intercept = -9.146	Depth = 1.0069*NDE + 0.3736 Sy,x = 12.329 N = 676, R = 0.862 BED = 0.972*NDE + 3.698 Sy,x = 12.153 N = 676, R = 0.859 BEL = 0.516*NDE + 0.208 Sy,x = 0.2 N = 676, R = 0.592
Axial ODSCC	+Point™	10411.1 Rev. 0	Low Row U-bends	Higher Row U-bends	Yes	CMOA		Depth =1.16*NDE -10.4 Sy,x = 19.02 N=17, R=0.69
Axial ODSCC	+Point™	21409.1 Rev. 7	Support structures, freespan, sludge pile, & tubesheet crevice	U-bends	Yes	PDA: Information Length: Information		PDA = 0.3*NDE +26.49 Sy,x = 18.14 N = 9 R = 0.36 Length = 1.14*NDE +0.03 Sy,x = 0.21 N = 9 R = 0.94
Axial ODSCC	+Point™	22401.1 Rev. 4	Dented TSPs	Freespan dings & dented eggcrates, diagonal bars and vertical straps	Yes	Depth: Information Length: CMOA		Depth = 0.13*NDE + 74.55 Sy,x = 14.44 N = 22, R = 0.13 Length = 0.74*NDE + 0.27 Sy,x = 0.27 N = 22, R = 0.62
Axial PWSCC								
Axial PWSCC	+Point™	20511.1 Rev. 8	Expansion Transitions	Tubesheet	Yes	Depth: CMOA PDA: Information Length: CMOA		Depth = 0.68*NDE + 14.45 Sy,x = 12.44 N = 33, R= 0.64 PDA = 0.21*NDE + 28.77 Sy,x = 7.95 N = 32, R= 0.33 Length =1.10*NDE - 0.01 Sy,x = 0.13 N = 32, R= 0.87

The following is the primary to secondary leak trend for the last fuel cycle
Note: Units in gallons per day



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Degradation Mechanism	Probe Type	EPRI ETSS	Demonstrated Applicability	Extended Applicability	Detection?	Sizing?	POD	Sizing Parameters
Axial ODSCC	+Point™	I28425 Rev. 3 (detect) I28432 Rev.2 (sizing)	Freespan (excluding u-bend), eggcrate, & broached TSPs with or without dents ≤2Vpp	None	Yes	Depth: CMOA BED: CMOA BEL: CMOA	POD: Log-Logistic Slope = 6.7176 Intercept = -9.146	Depth = 1.0069*NDE + 0.3736 Sy,x = 12.329 N = 676, R = 0.862 BED = 0.972*NDE + 3.698 Sy,x = 12.153 N = 676, R = 0.859 BEL = 0.516*NDE + 0.208 Sy,x = 0.2 N = 676, R = 0.592
Axial ODSCC	+Point™	10411.1 Rev. 0	Low Row U-bends	Higher Row U-bends	Yes	CMOA		Depth =1.16*NDE -10.4 Sy,x = 19.02 N=17, R=0.69
Axial ODSCC	+Point™	21409.1 Rev. 7	Support structures, freespan, sludge pile, & tubesheet crevice	U-bends	Yes	PDA: Information Length: Information		PDA = 0.3*NDE +26.49 Sy,x = 18.14 N = 9 R = 0.36 Length = 1.14*NDE +0.03 Sy,x = 0.21 N = 9 R = 0.94
Axial ODSCC	+Point™	22401.1 Rev. 4	Dented TSPs	Freespan dings & dented eggcrates, diagonal bars and vertical straps	Yes	Depth: Information Length: CMOA		Depth = 0.13*NDE + 74.55 Sy,x = 14.44 N = 22, R = 0.13 Length = 0.74*NDE + 0.27 Sy,x = 0.27 N = 22, R = 0.62
Axial PWSCC								
Axial PWSCC	+Point™	20511.1 Rev. 8	Expansion Transitions	Tubesheet	Yes	Depth: CMOA PDA: Information Length: CMOA		Depth = 0.68*NDE + 14.45 Sy,x = 12.44 N = 33, R= 0.64 PDA = 0.21*NDE + 28.77 Sy,x = 7.95 N = 32, R= 0.33 Length =1.10*NDE - 0.01 Sy,x = 0.13 N = 32, R= 0.87

Degradation Mechanism	Probe Type	EPRI ETSS	Demonstrated Applicability	Extended Applicability	Detection?	Sizing?	POD	Sizing Parameters
Axial PWSCC	+Point™	96703.1 Rev. 17	Dents/Dings	Tubesheet, Dented supports	Yes	Depth: CMOA Length: CMOA		Depth = 0.90*NDE + 7.56 Sy,x = 15.28 N = 46, R= 0.81 Length =1.00*NDE + 0.13 Sy,x = 0.28 N = 46, R= 0.91
Axial PWSCC	+Point™	96511.2 Rev. 16	Low Row U-bends	Higher Row U-bends	Yes	CMOA		Depth = 0.56*NDE + 19.06 Sy,x = 14.97 N = 24, R= 0.66
Axial PWSCC	+Point™ High Freq	99997.2 Rev. 10	Low Row U-bends	Higher Row U-bends	Yes	CMOA		Depth = 0.95*NDE – 5.61 Sy,x = 10.50 N = 24, R= 0.85
Circ ODSCC								
Circ ODSCC	+Point™	21410.1 Rev. 6 Note 4	Expansion Transitions	U-bends, freespan dings, dented supports	Yes	Depth: Information PDA: CMOA Length: Not usable		Depth = 0.13*NDE +60.10 Sy,x = 24.50 N = 40, R= 0.14 PDA = 1.02*NDE +21.84 Sy,x = 23.58 N = 38 R = 0.47 Length = 1.24*NDE +0.42 Sy,x = 0.69 N = 38 R = 0.69
Circ ODSCC	+Point™	22842.1 Rev. 4	Dented Supports	Freespan dings, u-bends	Yes	CMOA (Note 3)		Length = 0.52*NDE + 0.03 Sy,x = 0.26 N = 18, R= 0.75
Circ PWSCC								
Circ PWSCC	+Point™	I11524 Rev. 0	Expansion Transitions	U-bends, Dents/Dings, Tubesheet	Yes	No	POD: Log-Logistic Slope = -20.522 Intercept = 13.733	

Degradation Mechanism	Probe Type	EPRI ETSS	Demonstrated Applicability	Extended Applicability	Detection?	Sizing?	POD	Sizing Parameters
Circ PWSCC	+Point™	20510.1 Rev. 7	Expansion Transitions	U-bends	No (see I11524)	CMOA		Depth = 0.73*NDE + 8.16 Sy,x = 19.27 N = 37, R= 0.53 PDA = 0.82*NDE + 2.83 Sy,x = 6.98 N = 37, R= 0.88 Length = 1.01*NDE + 0.16 Sy,x = 0.26 N = 37, R= 0.89
Circ PWSCC	+Point™	96511.2 Rev. 16	See "Axial PWSCC" section of this table					
Circ PWSCC	+Point™	96701.1 Rev. 12	Expansion Transitions	Dents/Dings and tubesheet	No (see I11524)	CMOA		Depth = 0.84*NDE + 10.32 Sy,x = 9.56 N = 16, R= 0.92 PDA = 1.01*NDE + 8.55 Sy,x = 7.53 N = 16, R= 0.90 Length = 0.91*NDE + 0.22 Sy,x = 0.15 N = 16, R= 0.97
Circ PWSCC	+Point™ High Freq	99997.2 Rev. 10	See "Axial PWSCC" section of this table					
Wear								
Tube to Tube Wear	+Point™	13901.1 Rev. 1	Freespan tube-to-tube wear	U-bends	Yes	CMOA		Depth = 1.04*NDE -0.91 Sy,x = 1.50 N = 40 R= 1.0
Wear	+Point™	10908.4 Rev. 1	AVBs	Dented/non-dented Supports, Foreign object wear (part present)	Yes	CMOA		Depth = 1.06*NDE + 0.13 Sy,x = 3.78 N = 49, R = 0.99
Foreign Object Wear (Note 1)	+Point™ or .115 Pancake	27901 through 27907	Foreign object wear (part not present)	Volumetric Freespan Wear (part not present)	Yes	CMOA		See latest revision of specific ETSS [10.b]
Pitting								
Pitting	+Point™	21998.1 Rev. 4	Volumetric in freespan	Sludge Pile	Yes	CMOA		Depth = 1.02*NDE + 5.81 Sy,x = 6.28 N = 63, R= 0.94

Degradation Mechanism	Probe Type	EPRI ETSS	Demonstrated Applicability	Extended Applicability	Detection?	Sizing?	POD	Sizing Parameters
Specialty Probes								
Axial ODSCC	Ghent (Note 2)	20407.1 Rev. 7	Support structures & freespan	None	Yes	Both: CMOA (PDA and Length Only)		PDA = 0.38*NDE +35.92 Sy,x = 14.92 N = 26 R = 0.42 Length = 0.33*NDE +0.36 Sy,x = 0.13 N = 26 R = 0.48
Axial PWSCC	Ghent (Note 2)	20508.1 Rev. 6	Expansion Transitions	None	Yes	CMOA (Length Only)		Length = 2.08*NDE -0.29 Sy,x = 0.15 N = 32 R = 0.8
Axial PWSCC	Ghent (Note 2)	20509.1 Rev. 5	Dented support structures	None	Yes	Not qualified		
Circ ODSCC	Ghent (Note 2)	20406.1 Rev. 7	Top of tubesheet & expansion transitions	None	Yes	Depth: CMOA PDA: CMOA Length: CMOA		Depth = 0.55*NDE +35.18 Sy,x = 24.02 N = 22 R = 0.52 Length = 1.81*NDE -0.07 Sy,x = 0.54 N = 22 R = 0.78 PDA = 1.34*NDE +13.72 Sy,x = 23.98 N = 22 R = 0.58
Circ PWSCC	Ghent (Note 2)	20507.1 Rev. 6	Expansion Transitions	None	Yes	CMOA		Depth = 0.9*NDE +1.91 Sy,x = 13.43 N = 21 R = 0.79 Length = 0.8*NDE +0.34 Sy,x = 0.27 N = 21 R = 0.79 PDA = 0.99*NDE +4.64 Sy,x = 6.37 N = 21 R = 0.87

Multiple ETSSs are available for depth sizing of foreign object wear, each depending on the shape of the wear scar and the coil being used. If foreign object wear (with no part present) is reported, an appropriate +Point™ or pancake coil technique will be selected for performing CMOA. The associated NDE uncertainties and CMOA limits will be documented in the CMOA report.

The Ghent probe will only be used if needed for clarification of the eddy current response or for additional sizing information associated with unusual or unexpected indications.

In lieu of the stated ETSS slope, a slope value of 1.0 will be conservatively assumed for integrity assessment.

The sizing performance of ETSS H-21410.1 with respect to circumferential depth profiling of ODSCC is described by EPRI TR-107197-P1, which utilized the same sizing methodology as ETSS H-21410.1. The performance parameters are as follows: Depth = 1.0*NDE, Sy,x = 13.8; PDA = 1.05*NDE – 0.011, Sy,x = 13.43

Table 9-1: Inspection Scope Summary – Wear

Damage Mech.	Location	E/P D/S	Probe / ETSS	Scope	Expansion / Comments
Wear	Eggcrates DB/VS	E/D/S	Bobbin / 96004.1	100% bobbin except row 1-3 u-bends.	+Point all new wear, all wear ≥40%TW, all bobbin I-codes
		E/D/S	+Point 10908.4	100% +Point row 1-3 u-bends.	
		P(SCC)/ D	+Point / (see SCC sections)	+Point all eggcrate wear, and 25% of DB/VS wear not previously inspected, in order to detect any SCC coincident with wear.	If SCC is coincident with significant DB/VS wear, then +Point all DB/VS wear in the affected SG. In-situ testing will be required per CDME-07-119
	Dented VS/DB (≤ 5Vpp)	E/D	Bobbin / 96004.1	100% bobbin except row 1-3 u-bends. Identifies coincident wear and denting (see [3.e])	+Point all bobbin I-codes and all bobbin indications of coincident wear and denting
		E/D/S	+Point 10908.4	100% +Point row 1-3 u-bends, plus all bobbin indications of coincident wear and denting. (see CDME-07-119)	
	Dented VS/DB (> 5Vpp)	E/D/S	+Point 10908.4	Apply this technique to all VS/DB dents >5Vpp reported by bobbin probe to ensure detection and sizing of wear (see CDME-07-119)	If wear cannot be sized (depth or voltage), then in-situ testing will be required
	Tube to Tube Contact Wear	E/D/S	Bobbin / 13091.1	100% bobbin except row 1-3 u-bends.	+Point all new wear, +Point all bobbin I-Codes
		E/D/S	+Point 13901.1	+Point row 1-3 u-bends. +Point highest eggcrate through the square bend for the tubes surrounding R99 C140 in SGB	
	Loose Part Wear	E/D	Bobbin / 27091.2	100% bobbin and FOSAR both SGs.	+Point all bounding tubes with loose part wear or loose part indication or visually detected loose part
		E/D/S	+Point 27901-27907 10908.4	27901 thru 27907 when loose part not present (CMOA) 10908.4 when loose part present (CM)	

Table 9-2: Inspection Scope Summary – Axial ODSCC/PWSCC

Damage Mech.	Location	E/P D/S	Probe / ETSS	Scope	Expansion / Comments
Axial ODSCC	Non-dented and ≤ 2Vpp Dented Eggcrates DB/VS Freespan	E/D	Bobbin / I28413	100% bobbin except row 1-3 u-bends.	+Point all bobbin I-Codes
		E/D	+Point / I28425	+Point inspection of all bobbin I-Codes for ODSCC detection	
		E/S	+Point / I28432	+Point depth and length sizing of detected ODSCC	
	+Point Row 1-3 U-bends	P/D/S	+Point / 10411.1	100% +Point row 1-3 u-bends.	+Point sizing of any low row indications.
	Freespan Ding ≤ 5Vpp	E/D	Bobbin / 24013.1	100% bobbin except row 1-3 u-bends.	+Point all bobbin I-Codes
		E/D/S	+Point / 22401.1	+Point inspection of bobbin I-Codes at dinged freespan locations for ODSCC detection, and length sizing of detected ODSCC.	
	Freespan Ding >5Vpp Dented >2Vpp Eggcrates DB/VS	E/D/S	+Point / 22401.1	+Point inspection to detect and length size axial ODSCC at dinged and dented locations.	
	Sludge Pile and Exp Transition	E/D	+Point / I28424	+Point 100% H/L TTS +3" to 13.5" below the bottom of the expansion transition; +Point inspection of cold leg bobbin I-Codes	+Point 100% of region in affected SG; ensure 20% inspected in the other SG
		E/S	+Point / I28431	+Point inspection for depth and length sizing of detected Axial ODSCC indications at the sludge pile and expansion transitions.	
Axial PWSCC	Row 1-3 U-bends	E/D/S	+Point / (MR) 96511.2	100% +Point Row 1-3 u-bends	If SCC is detected in row 3, then inspect all u-bends in row 4 of the affected SG, and 20% of row 4 in the unaffected SG.
		E/D/S	+Point / (HF) 99997.2		
	Dented Eggcrates DB/VS Dinged Freespan	P/D/S	+Point / 96703.1	+Point all >2Vpp dents at structures and dings >5Vpp in freespan; +Point inspection of bobbin I-Codes	If an indication is detected, then a scope expansion will be determined based on the dent voltage and significance of the indication.
	Tubesheet and Exp Transition	E/D/S	+Point / 20511.1	+Point 100% H/L TTS +3" to 13.5" below the bottom of the expansion transition; +Point inspection of cold leg bobbin I-Codes	+Point 100% of region in affected SG; ensure 20% inspected in the other SG

Table 9-3: Inspection Scope Summary – Circumferential ODSCC/PWSCC

Damage Mech.	Location	E/P D/S	Probe / ETSS	Scope	Expansion / Comments
Circ ODSCC	Row 1-3 U-bends	P/D/S	+Point / 22842.1 & 21410.1	100% +Point row 1-3 u-bends	If SCC is detected in row 3, then inspect all u-bends in row 4 of the affected SG, and 20% of row 4 in the unaffected SG
	Dented Eggcrates DB/VS Dinged Freespan	P/D/S	+Point / 22842.1 & 21410.1	+Point all >2Vpp dents at structures and dings >5Vpp in freespan; +Point inspection of bobbin I-Codes;	If an indication is detected, then a scope expansion will be determined based on the dent voltage and significance of the circumferential indication
	TTS and Expansion Transition	E/D/S	+Point / 21410.1	+Point 100% H/L TTS +3" to 13.5" below the bottom of the expansion transition; +Point inspection of cold leg bobbin I-Codes	+Point 100% of region in affected SG; ensure 20% inspected in the other SG
	Expansion Transition	E/S	+Point / EPRI TR-107197-P1	Sizing of circumferential indications per EPRI TR-107197-P1	
Circ PWSCC	Row 1-3 U-bends	P/D	+Point (MR) / 96511.2	100% +Point row 1-3 u-bends	If SCC is detected in row 3, then inspect all u-bends in row 4 of the affected SG, and 20% of row 4 in the unaffected SG
		P/D	+Point (HF) / 99997.2		
	Dented Eggcrates DB/VS. Dinged Freespan	P/D	+Point / I11524	+Point all >2Vpp dents at structures and dings >5Vpp in freespan; +Point inspection of bobbin I-Codes	If an indication is detected, then a scope expansion will be determined based on the dent voltage and significance of the circumferential indication
		P/S	+Point / 96701.1	Sizing of circumferential PWSCC	
	Row 1-3 U-bends	P/D	+Point / I11524	100% +Point row 1-3 u-bends	If SCC is detected in row 3, then inspect all u-bends in row 4 of the affected SG, and 20% of row 4 in the unaffected SG
		P/S	+Point / 20510.1	Sizing of u-bend circumferential PWSCC	
	TTS and Exp Transition	E/D	+Point / I11524	+Point 100% H/L TTS +3" to 13.5" below the bottom of the expansion transition; +Point inspection of cold leg bobbin I-Codes	+Point 100% of region in affected SG; ensure 20% inspected in the other SG
		E/D/S	+Point / 96701.1		

Table 9-4: Inspection Scope Summary – Pitting

Damage Mech.	Location	E/P D/S	Probe / ETSS	Scope	Expansion / Comments
Pitting	Sludge Pile	P/D	Bobbin / 96005.2	100% bobbin exam of the region	+Point all bobbin I-Codes
		P/S	+Point / 21998.1	+Point sizing of detected pitting	

SUBJECT: SUMMARY OF CONFERENCE CALL WITH PALISADES NUCLEAR PLANT REGARDING THE SPRING 2017 STEAM GENERATOR INSPECTIONS (CAC NO. MF9396) DATED JUNE 14, 2017

DISTRIBUTION:
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RidsAcrsAcnw_MailCTR Resource
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RidsNrrPMPalisades Resource
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MHolmberg, RIII
RidsRgn3MailCenter Resource
PKlein, NRR
AJohnson, NRR
EDuncan, RIII
AHuyn, NRR

ADAMS Accession Nos.
PKG ML17166A504
Summary ML17160A181
Attachment ML17166A497

***via memo**

OFFICE	NRR/DORL/LPL3/PM	NRR/DORL/LPL3/LA	NRR/DE/ESGB/BC(A)*
NAME	JRankin	SRohrer	AJohnson
DATE	6/12/2017	6/12/2017	5/31/2017
OFFICE	NRR/DORL/LPL3/BC	NRR/DORL/LPL3/PM	
NAME	DWrona	JRankin	
DATE	6/13/2017	6/14/2017	

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