



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

November 14, 2014

Mr. Lawrence J. Weber
Senior Vice President and
Chief Nuclear Officer
Indiana Michigan Power Company
Nuclear Generation Group
One Cook Place
Bridgman, MI 49106

SUBJECT: SUMMARY OF CONFERENCE CALL WITH DONALD C. COOK NUCLEAR
PLANT UNIT 1 REGARDING THE FALL 2014 STEAM GENERATOR
INSPECTIONS (TAC NO. MF4714)

Dear Mr. Weber:

On October 9, 2014, the U.S. Nuclear Regulatory Commission (NRC) staff participated in a conference call with representatives of Indiana Michigan Power Company (the licensee) regarding the ongoing steam generator (SG) inspection activities at the Donald C. Cook Nuclear Plant, Unit 1. In support of the conference call, the licensee provided slides (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14287A330) concerning the preliminary results of the fall 2014 SG tube inservice inspections.

The information provided by the licensee in support of the teleconference is part of the enclosed conference call summary. Based on the information provided by the licensee, the NRC staff did not identify any issues that warranted immediate follow up action. However, the staff asked to be notified in the event that any unusual conditions were detected during the remainder of the outage including whether any in-situ pressure tests were performed.

L. Weber

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If you have any questions regarding this matter, I may be reached at 301-415-8371.

Sincerely,

A handwritten signature in black ink, appearing to read "Mahesh Chawla".

Mahesh Chawla, Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-315

Enclosure:
Conference call summary

cc: Distribution via ListServ

CONFERENCE CALL SUMMARY

REGARDING DONALD C. COOK NUCLEAR PLANT, UNIT 1

FALL 2014 STEAM GENERATOR INSPECTIONS

DOCKET NO. 50-315

TAC NO. MF4714

On October 9, 2014, the U.S. Nuclear Regulatory Commission staff of the Steam Generator Tube Integrity and Chemical Engineering Branch (ESGB) of the Division of Engineering participated in a conference call with representatives of Indiana Michigan Power Company (the licensee) regarding the ongoing steam generator (SG) inspection activities at the Donald C. Cook Nuclear Plant, Unit 1. In support of the conference call, the licensee provided slides (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14287A330) concerning the preliminary results of the fall 2014 SG tube inservice inspections.

The Donald C. Cook Nuclear Plant, Unit 1 has four Babcock and Wilcox International Model 51R replacement SGs that were installed in December 2000. Each SG has 3496 thermally treated Alloy 690 tubes with a nominal outside diameter of 0.875 inches and a nominal wall thickness of 0.049 inches. During manufacturing, all tubes were hydraulically expanded at each end for the full depth of the tubesheet. The tubesheet was drilled on a triangular pitch with 1.1875-inch spacing, center-to-center. The radius of row 1 U-bends is 4.75 inches and the U-bends in rows 1 through 13 were stress relieved after bending. The tubes are supported by lattice grid tube supports and flat fan bars constructed from Type 410 stainless steel. Each lattice grid tube support consists of interlocking high (3.15 inches high and 0.135 inches thick) and low (1 inch high and 0.135 inches thick) bars that form a lattice pattern. This lattice provides lateral support in the straight section of the tube.

Abbreviations used in the licensee-provided documents include:

- CL – cold leg
- EPRI – Electric Power Research Institute
- FO – foreign object
- FOSAR – foreign object search and retrieval
- HL – hot leg
- MFP – main feed water pump
- N/A – not applicable
- NEI – Nuclear Energy Institute
- NRC – U.S. Nuclear Regulatory Commission
- PLP – possible loose part
- R#/C# - Row #, Column #
- RPC – rotating pancake coil
- SG – steam generator
- TTS – top of tubesheet
- TW – through-wall
- U1C26 – Unit 1 Cycle 26

Additional clarifying information regarding the licensee-provided document and information not included in the licensee-provided document is summarized below:

Enclosure

- The examinations at the top of the tubesheet were from 3 inches above to 3 inches below the top of the tubesheet.
- Based on the operational assessment from the previous outage, the number and severity of wear indications is consistent with expectations.
- The majority of the larger fan bar wear indications were seen in the previous outage (i.e., very few of the fan bar wear indications are new indications).
- The growth rates of the more significant fan bar wear indications are relatively small. For example, the 38 percent TW indication at R78/C62 in SG 11 grew by 6 percent TW from 32 percent TW in the previous outage. The growth rate of the larger fan bar wear indications has decreased by approximately 20 percent.
- The most significant lattice grid indication in SG 12 is located at the 3rd hot leg support in R56/C86 and is 18 percent TW.
- The large number of loose part indications is the result of a strainer failure in the main feed pump from the previous operating cycle.
- With respect to the table on pages 4 and 5, "not attempted" includes the meaning that the licensee will not attempt to retrieve the loose part from the SGs.
- The licensee indicated that the polymer found near tube R82/C54 is about 1.5 to 2 inches in length and 0.5 inches in diameter. It was classified as "poly" based on its white color. The licensee plans to assess the chemical composition of this polymer to determine if it is acceptable to leave it in service.
- Sludge lancing in the previous inspection removed about 75 pounds of material in total.
- Based on visual inspections, the top of the tube bundle appeared to be free of deposits. Prior deposit mapping studies indicated that there may be deposit buildup in this region.

The NRC staff did not identify any issues that required follow-up action at this time, however, the staff asked to be notified in the event that any unusual conditions were detected during the remainder of the outage including whether any in-situ pressure tests were performed.

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Status: (10/9/14 @ 1144)

	Full Length (Bobbin) % Complete	Hot Leg Top of Tubesheet (RPC) % Complete	Cold Leg Top of Tubesheet (RPC) % Complete	Overall % Complete
SG 11	83.8	0	0	57.2
SG 12	82.1	0	0	56.2
SG 13	74.9	0	0	51.1
SG 14	78.5	0	52.8	62.2

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

R1: No primary-to-secondary leakage has been detected since the steam generators were replaced in 2000. This includes the recently completed cycle of operation.

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

R2: No steam generator secondary side pressure tests were planned or performed during the outage.

3. Discuss any exceptions taken to the industry guidelines.

R3: No exceptions have been taken to the EPRI Steam Generator Guidelines (inclusive of the examination, integrity, insitu, leak or water chemistry guidelines) or the NEI 97-06 Steam Generator Program Guidelines.

4. For each SG, 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 percent of dents/dings greater than 5 volts and a 20 percent sample between 2 and 5 volts), and the expansion criteria.

R4:

Exam	<i>Full Length</i>	<i>HL/CL TTS</i>	<i>Special Interest-Lattice Grids & Fan Bars</i>	<i>Special Interest Foreign Objects</i>	<i>Special Interest New Bobbin</i>	<i>Special Interest Dents & Dings</i>	<i>Special Interest Proximity</i>
Probe	<i>Bobbin</i>	<i>+Point</i>	<i>+Point</i>	<i>+Point</i>	<i>+Point</i>	<i>+Point</i>	<i>+Point</i>
All SGs	100%	~25%	All wear ≥ 30% TW	All PLPs/FO Wear All confirmed but not removed FO locations New FO I'd by FOSAR	All I-codes	All current dents/dings ≥ 2 volts	All indications of proximity
Expansion Criteria	N/A	C-1, C-2, C-3 criteria	N/A	Minimum 1 tube bound	N/A	N/A	N/A

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

R5:

SG	Fan Bar Wear	Lattice Grid Wear	Foreign Object Wear
SG 11	710	5	0
SG 12	461	13	0
SG 13	430	8	0
SG 14	828	15	0
Totals	2429	41	0

Fan Bar Significant Indications

- SG 11 – R78/C62 – 38% fan barFB4
- SG 12 – R76/C64 – 37% fan barFB4
- SG 13 – R70/C54 – 34% fan barFB4
- SG 14 – R77/C65 – 32% fan barFB5

Lattice Grid Significant Indications

- SG 11 – R34/C36 – 16% lattice grid 04H
- SG 12 – R62/C66 – 12% lattice grid 03H
- SG 13 – R42/C42 – 12% lattice grid 05H
- SG 14 – R57/C45 – 10% lattice grid 03H

Foreign Object Wear Significant indications

- None to date

Based upon our ongoing condition monitoring assessment tube integrity (both structural and accident induced leakage integrity) was maintained during the previous operating cycle.

No new degradation mechanisms have been identified during the course of the inspection and no locations along the tube exhibited a degradation mode that had not previously been observed at this location at this unit.

6. Describe repair/plugging plans.

R6: Tube repairs will be limited to mechanical plugging and stabilization (if required). Single cycle and double cycle plugging scenarios are being evaluated.

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

R7: Insitu screenings are in progress as the remaining data is being reviewed by our tube integrity engineer; however no insitu testing is expected. No conditions have been detected which would suggest a tube pull will be required during this inspection.

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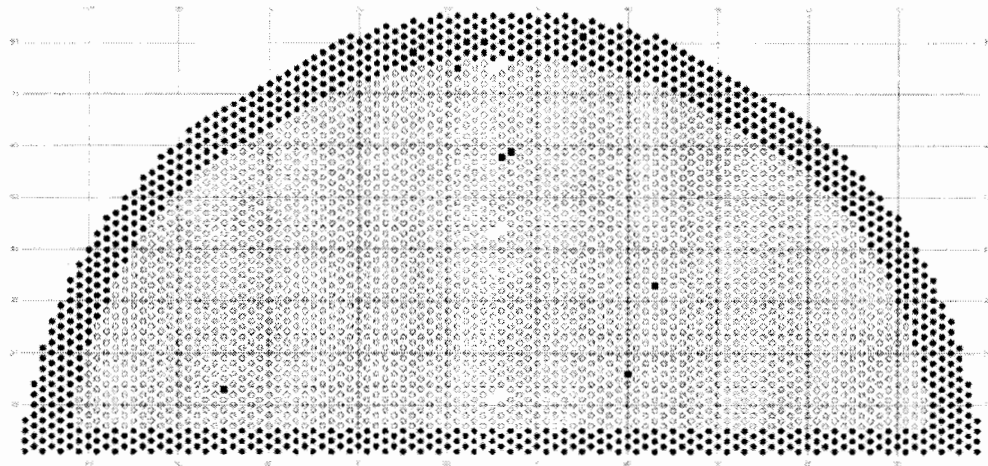
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8. Discuss the following regarding loose parts:

- what inspections are performed to detect loose parts
- a description of any loose parts detected and their location within the SG (including the source or nature of the loose part, if known)
- if the loose parts were removed from the SG
- indications of tube damage associated with the loose parts

R8: Loose part inspections include:

- Visual inspections at the top of the hot and cold leg tubesheets
 - Divider lane
 - Bundle periphery
 - Historical loose part locations
- +Point probe examination is being performed on the hot and cold leg peripheral tubes (+/- 3") at the top of tubesheet. The typical examination pattern is shown below by the red tubes.



- Bobbin coil examination of the tube bundle is being performed using a turbo mix has been noted as enhancing bobbin probe detection of foreign object wear at the top of tubesheet

Loose parts were prioritized based on engineering evaluations which included applying a comparative wear analysis to those foreign objects which could not otherwise be dispositioned based, for instance, on legacy status or size. This approach is consistent with the prescriptions of EPRI Report 1020989, Steam Generator Management Program: Foreign Object Prioritization Strategy for Triangular Pitch Steam Generators. The following table summarizes the loose parts detected, retrieval status, priority and suspected source. Currently, (RPC inspections in progress) no tube damage has been attributed to these objects.

SG	Description	Location	Leg	Retrieved	Priority	Source	Tube Damage
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					Category		(%TW)
11	Wire (legacy)	R53/C19	HL TTS	Not attempted	3	Unknown	None
	Debris	R7/C107	CL TTS	Yes	2	MFP Strainer	None
	Debris	R32/C102	CL TTS	Yes	2	MFP Strainer	None
	Debris	R85/C55	CL TTS	Yes	2	MFP Strainer	None
	Strainer piece	R84/C64	HL TTS	Yes	1	MFP Strainer	None
	Unknown	R66/C40	HL TTS	No	2 or 3	Unknown	None
	Strainer piece	R84/C56	HL TTS	Yes	1	MFP Strainer	None
	Metal piece	R44/C98	HL TTS	Yes	3	Unknown	None
	Debris	R81/C71	HL TTS	Yes	2	MFP Strainer	None
	Strainer piece	R37/C49	HL TTS	Not attempted	3	MFP Strainer	None
12	Weld slag (legacy)	R83/C49	HL TTS	Not attempted	3	Unknown	None
	Sludge (legacy)	R57/C39	HL TTS	Not attempted	3	Lancing	None
	Hard collar(legacy)	R56/C36	HL TTS	Not attempted	3	Lancing	None
	Bristle	R83/C41	HL TTS	Not attempted	3	MFP Strainer	None
	Strainer bits	R85/C53	HL TTS	Yes	3	MFP Strainer	None
	Bristle	R85/C59	CL TTS	Not attempted	3	MFP Strainer	None
	Bristle	R81/C71	CL TTS	Yes	1	MFP Strainer	None
	Unknown	R39/C23	HL TTS	Not attempted	3	Unknown	None
	Bristle	R29/C103	HL TTS	Yes	3	MFP Strainer	None
	Strainer piece	R44/C98	HL TTS	Not attempted	3	MFP Strainer	None
	Metallic curl	R47/C97	HL TTS	Yes	2	Unknown	None
	Strainer piece	R76/C32	HL TTS	Yes	1	MFP Strainer	None
	Poly	R82/C54	CL TTS	Not attempted	1	Unknown	None
	Sludge	R83/C67	CL TTS	Not attempted	3	Lancing	None
	Unknown	R81/C69	CL TTS	Not attempted	2	Unknown	None
	Poly?	R1/C21	HL TTS	Yes	1	Unknown	None
	Sludge	R4/C28	CL TTS	Not attempted	3	Lancing	None
	Unknown	R6/C80	CL TTS	Not attempted	3	Unknown	None
	Unknown	R74/C30	HL TSS	Yes	--	Unknown	None
	Strainer piece	R77/C41	HL TSS	No	1	MFP Strainer	None
SG	Description	Location	Leg	Retrieved	Priority	Source	Tube Damage

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					Category		(%TW)
13	Copper nut (legacy)	R85/C61	CL TTS	Not attempted	3	Unknown	None
	Rectangular plate (legacy)	R67/C27	CL TTS	Not attempted	3	Unknown	None
	Curved metal s (legacy)	R42/C12	HL TTS	Not attempted	3	Unknown	None
	Curved metal s (legacy)	R65/C25	HL TTS	Not attempted	3	Unknown	None
	Curved plate (legacy)	R13/C43	HL TTS	Not attempted	3	Unknown	None
	Metal plate (legacy)	R54/C16	HL TTS	Not attempted	3	Unknown	None
	Sludge (legacy)	R63/C43	HL TTS	Not attempted	3	Lancing	None
	Possible strainer	R83/C67	CL TTS	Yes	1	MFP strainer	None
	Metal plate	R81/C71	HL TTS	Yes	1	Unknown	None
	Granular debri	R85/C61	HL TTS	Not attempted	3	Unknown	None
	Tiny wire	R2/C50	HL TTS	Not attempted	3	Unknown	None
14	Thin bristle	R85/C53	HL TTS	Not attempted	3	Unknown	None
	Debris	R81/C37	HL TTS	Disintegrated	2	Unknown	None
	Mag. base hook	NTL	TTS	Yes	--	Unknown	None

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

R9: Secondary side activities include top of the tube sheet visual inspections as discussed previously. No abnormal conditions were noted during these inspections; with the exception of the foreign objects summarized above.

Sludge lancing was performed in each of the steam generators. Removal weights are noted below:

SG 11: 11.5 lbs.
 SG 12: 9 lbs.
 SG 13: 12 lbs.
 SG 14: 10.5 lbs.
 Total: 43 lbs.

A visual inspection was performed in the SG 14 steam drum. The primary and secondary hatches were examined as were a sample of the primary and secondary separators, accessible areas of the feeding, a sampling of j-nozzles, decking and support structures. In addition, limited upper bundle views were gathered of the tube bundle and U-bend support structure via remote camera through the separators. No signs of erosion or degradation were identified in any of the areas examined.

10. Discuss any unexpected or unusual results.
 R10: None

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

<i>R11: Eddy current inspection complete:</i>	<i>10/11/14</i>
<i>Plugging complete:</i>	<i>10/13/14</i>
<i>Nozzle dam removal:</i>	<i>10/15/14</i>
<i>Reinstall primary manways:</i>	<i>10/16/14</i>

L. Weber

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If you have any questions regarding this matter, I may be reached at 301-415-8371.

Sincerely,

/RA/

Mahesh Chawla, Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-315

Enclosure:
Conference call summary

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