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Docket Number 50-346

License Number NPF-3

Serial Number 3291

October 22, 2006

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555-0001

Subject: Supplemental Information Regarding the 2005 Steam Generator Tube Inspections (TAC No. MD0528)

Ladies and Gentlemen:

By letters dated February 17, 2005 (Serial Number 3125), April 29, 2005 (Serial Number 3147), and February 16, 2006 (Serial Number 3218) the FirstEnergy Nuclear Operating Company (FENOC) reported the results of the Davis-Besse Nuclear Power Station (DBNPS) steam generator tube inspections performed during the Cycle 14 Mid-Cycle Outage (14MCO). On August 4, 2006, by facsimile the Nuclear Regulatory Commission provided FENOC with additional questions regarding the DBNPS 2005 steam generator inspections. The responses to these questions are provided in Attachment 1 to this letter. Attachment 2 identifies that there are no commitments contained in this submittal.

Should you have any questions or require additional information, please contact Mr. Gregory A. Dunn, Manager – FENOC Fleet Licensing, at (330) 315-7243.

Very truly yours,

Mark B. Bezilla, Vice President - Nuclear

TSC

Attachments

A047

cc: Regional Administrator, NRC Region III
NRC/NRR Project Manager
NRC Senior Resident Inspector
Utility Radiological Safety Board

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION DAVIS-BESSE NUCLEAR POWER STATION 14th CYCLE MID-CYCLE OUTAGE (14 MCO) STEAM GENERATOR INSPECTION (TAC NO. MD0528)

Question #1:

Discuss whether any indications were identified as dents or dings. If so, identify the tube and provide the size and orientation of the flaw along with the size of the dent/ding.

DBNPS Response:

The designation for tubing deformation as a ding is not used at DBNPS; only dents are designated as tubing deformation.

Four hundred and fifty eight dented locations were inspected with the plus point and pancake eddy current examination technique (253 locations in Once Through Steam Generator 2-A and 205 locations in OTSG 1-B). This inspection scope included 434 locations of previously reported dents and new dents using a 2.5 volt bobbin threshold and 24 locations of greater than 0.5 volts between the 15S and UTS in the periphery region. No indications in dents were identified in either OTSG for this examination scope. One tube with one dent was removed from service for reasons unrelated to the dent.

Question #2:

Discuss the number and size of any flaws within the sleeved portions of tubes or within 6-inches of the bottom of the sleeves.

DBNPS Response:

During 14MCO a total of 126 sleeves were inspected with a sleeve bobbin probe (42 sleeves in OTSG 2-A and 84 sleeves in OTSG 1-B). Eighty seven sleeves (both upper and lower rolls) were inspected with the plus point eddy current examination technique (42 tubes in OTSG 2-A and 45 tubes in OTSG 1-B). The lower roll plus point eddy current examination inspected both lower rolls down to at least six inches past the sleeve. The three hundred and twenty four remaining sleeves (lower sleeve roll to six inches past the sleeve in the parent tube) were inspected with the plus point eddy current examination technique (157 tubes in OTSG 2-A and 167 tubes in OTSG 1-B). Within the scope of these examinations a 100% plus point eddy current examination was completed for the region six inches below the sleeves. No indications were reported in either OTSG for this examination scope.

Question #3:

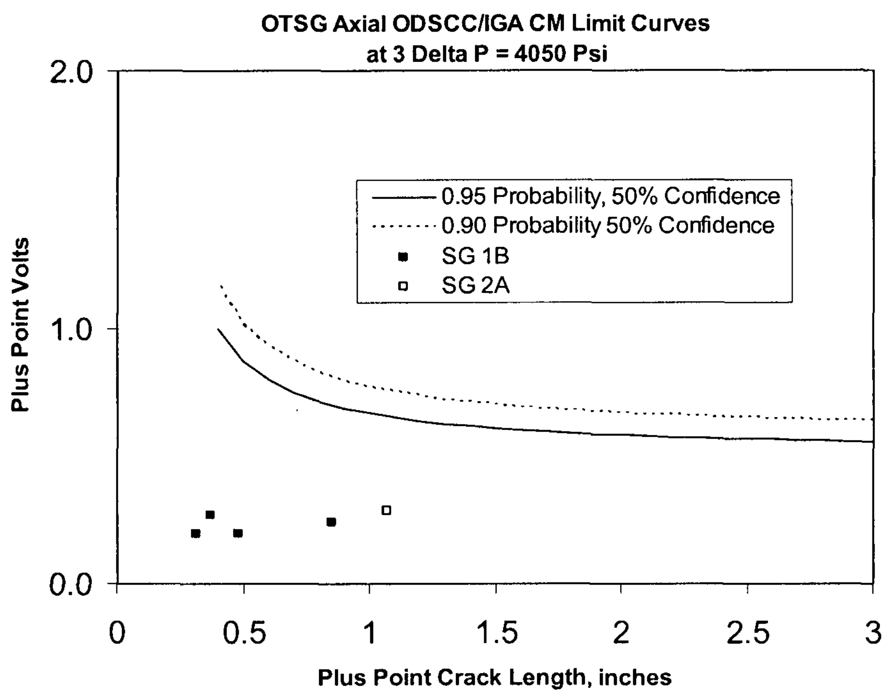
Identify any tubes in which groove intergranular attack/stress corrosion cracking was observed during your 2005 inspections. Discuss the severity of the flaws detected.

DBNPS Response:

The groove intergranular attack/stress cracking corrosion indications observed during 14MCO are listed below:

SG	Row	Tube	Ind	Volts	TSP	Inch	Probe	Depth %	Ax Len
2A	95	69	SAI	0.29	UTS	-21.63	520PP	60	1.07
1B	24	95	SAI	0.24	15S	-1.67	520PP	43	0.85
1B	25	98	SAI	0.2	15S	-2.11	520PP	40	0.31
1B	29	104	SAI	0.2	15S	-1.7	520PP	27	0.48
1B	70	60	SAI	0.27	15S	18.41	520PP	50	0.37

These indications were plotted and compared to the pre-established performance criteria for this damage mechanism which related the plus point voltage value and crack length to the structural limit of three times normal operating differential pressure. All the identified indications were below the Condition Monitoring acceptance curves. This demonstrated that the degraded tube burst pressures were above the three times normal operating differential pressure requirement of 4050 psi with a greater than 0.95 probability at 50% confidence.



Question #4:

Discuss the cause of the volumetric indications (other than wear) detected during the outage. For example, the volumetric indications identified in SG 1B in tubes 10-47, 78-67 and 81-73, and in SG 2A in tube 146-50.

DBNPS Response:

Volumetric indications other than wear observed during 14MCO are listed below:

SG	Row	Tube	Ind	Volts	TSP	Inch	Probe	Depth %	Ax Len	Circ Len	Deg. Mode
2A	146	50	SVI	0.53	15S	17.4	520PP	36	0.39	0.25	OD Wear from Internal AFW Alignment Pin
1B	10	47	SVI	0.52	UTE	-1.49	520MB	31	0.18	0.21	ID IGA in Roll Transition
1B	60	29	SVI	0.41	LTE	1.63	520PP	98	0.23	0.2	ID IGA in SRR Heel
1B	78	67	SVI	1.84	LTE	0.73	520PP	41	0.35	0.3	ID IGA in Roll Transition
1B	81	73	SVI	1.05	LTE	0.94	520PP	27	0.2	0.19	ID IGA in Roll Transition

There was one small volumetric wear indication in SG 2A tube 146-50. This was as a result of tube contact with the abandoned internal AFW header dowel pin support stay which required plugging. The eddy current inspection demonstrated that the AFW header was not moving and was greater than 0.25 inches away from all in service tubes. The OTSG eddy current inspection for movement of the internal AFW header analysis is performed on 100% of the in-service periphery tubes using a site-specific qualified bobbin coil technique.

It appears that flow conditions in SG 2A during this time period were suitable to support some tubing movement sufficient to cause contact with the support stay and initiate wear. With benefit of looking back there was some evidence of the indication in the bobbin data from 12RFO, but this was not apparent in the 13RFO data due to the bobbin coil probability of detection. The flaw in SG 2A tube 146-50 was not large enough to be a challenge to tube integrity. A 100% bobbin exam of the AFW header region was performed so no inspection escalation was necessary. There has been no other similar indication observed in the history of the Davis-Besse OTSGs.

There were also four volumetric indications located in roll transitions. This mechanism is believed to be the result of IGA that was forming in the roll transitions similar to that observed in a tube pull performed in 1996 (2A-58-119), where a small amount of grain drop out was observed to form a band of patch intergranular attack in the roll transition region of this tube. The grain drop out in these four tubes had grown to be more severe than that observed in the tube pull. These flaws were not large enough to be a challenge to tube integrity. This region of grain drop out is believed to provide the initiation sites for the roll transition stress corrosion cracking that is beginning to be observed.

Question #5:

Discuss the nature, cause, and severity of the obstruction identified in SG 2A in tube 61-109. Discuss the largest size probe to ever pass through this tube and the probe sizes used on this tube during your 2005 inspections.

DBNPS Response:

Tube 61-109 of SG 2A was removed from service during 14MCO due to an obstruction. This tube contains a large dent that has provided a challenge to inspect over the entire history of this OTSG. Historically the maximum size 0.480 inch bobbin coil was able to pass with difficulty through this dent; therefore, this tube was plugged to prevent this tube from being a challenge in future inspections.

Question #6:

Following the identification in the shop rerolls in 2005; you indicated that you were planning to investigate construction records for other unusual design characteristics. Discuss whether you have identified any other unique conditions which could affect a tube's susceptibility to degradation. In addition, discuss any other corrective actions taken as a result of the discovery of the shop rerolls (other than the performance of the tube inspections).

DBNPS Response:

As a result of identifying double rolls in the lower tubesheet of OTSG 1-B, a review of the manufacturing records for the Davis-Besse OTSGs for the identification of any unknown design changes or construction features that could potentially impact the OTSG tubing integrity was performed. This review did not identify any remaining unknown design or fabrication features that could affect OTSG integrity, therefore no additional corrective actions were required.

Question #7:

Confirm that no cracks were observed at wear scars.

DBNPS Response:

During 14MCO all reported wear indications (wear scars) received a plus point exam and no crack like indications were observed in this inspection.

Question #8:

Confirm that no indications were identified during your rotating probe examinations in the sludge pile region that were not also identified with a bobbin probe.

DBNPS Response:

No confirmed sludge pile region indications were observed during 14MCO and the supplemental sludge pile region rotating probe exams in this region did not identify any indications.

Question #9:

You identified an indication in SG 2A which was attributed to an alignment pin (dowel pin) associated with an internal auxiliary feedwater header. You also indicated that the indication increased in size when compared to the prior outage. Discuss the dates and results of your visual inspections of the secured internal auxiliary feedwater header, header to shroud attachment welds, and the external header thermal sleeves. Discuss whether the header will remain stable during all postulated accident conditions such that tube integrity will not be affected. Discuss the eddy current criteria you use to ensure the header is not moving (or approaching the tubes) for the time period between the visual inspections of the header. Summarize the basis for this criteria.

DBNPS Response:

In 1981, a tube leak was experienced by the SG 2A at Davis-Besse Nuclear Power Station. Eddy current testing and visual examinations revealed that the internal AFW headers and the brackets that attached them to the upper steam wrapper were damaged. This degradation resulted in damage to some of the peripheral once-through steam generator (OTSG) tubes due to movement of the internal header during plant operation. The AFW internal headers were subsequently stabilized and functionally replaced by external headers. The repairs were qualified for postulated accident conditions to preserve the integrity of the OTSGs.

The internal AFW header and supporting welds are visually inspected each 10-year inservice inspection (ISI) interval per Technical Specification 4.4.5.8. Inspections in 1990 and 1998 showed no evidence of movement or degradation of the AFW header or degradation of the AFW supply nozzles and thermal sleeves, therefore these welds are still considered qualified for postulated accident conditions to preserve the integrity of the OTSGs. One AFW nozzle was found stuck in 1998 during visual inspection and the header at this nozzle location was inspected in 2000 with no evidence of movement or change in the header. The next 10-year ISI interval begins in 2012; therefore the next visual inspection is scheduled for 16RFO.

During each OTSG eddy current inspection, an AFW header analysis is performed on

100% of the in-service periphery tubes using a site-specific qualified bobbin coil technique. The analysis is performed by a specially trained analyst(s) using the bobbin probe data and a special calibration method. The data is reviewed for the presence of a header signal and the gap is estimated for each indication detected. When the gap is greater than 0.250", it is beyond the ability of the technique to accurately measure and no measurement is made. In this case, a signal may be present, but the amplitude is too small and is outside the bounds of the established calibration curve. The 14MCO AFW header analysis confirmed that no AFW header movement had occurred.

Question #10:

Summarize the number of tubes with rerolls in each SG.

DBNPS Response:

At the completion of 14MCO there were a total of 104 inservice repair rolls in OTSG 2-A and 8 inservice repair rolls in OTSG 1-B. These repair rolls were installed using the repair roll process that was tracked for leakage under FTI Topical Report No BAW2303, Revision 04, "OTSG Repair Roll Qualification Report".

Question #11:

Confirm that all tubes in which degradation was identified had adequate tube integrity at the time of the inspection.

DBNPS Response:

The observed degradation at the 14MCO outage was evaluated in a manner consistent with NEI 97-06. The observed degradation did not challenge the structural margin requirements at the 14MCO inspection or challenge required leakage integrity limits under postulated accident conditions.

The following abbreviations were used in above Attachment 1.

Ax Len	Axial Length
Circ Len	Circumferential Length
CM	Condition Monitoring
DNT	Dent
Deg. Mode	Degradation Mode
IGA	Intergranular Attack
IND	Indications
ID	Inside Diameter
LTE	Lower Tube End
LTS	Lower Tube Sheet
MCO	Mid-Cycle Outage
MVI	Multiple Volumetric Indications
OTSG	Once Through Steam Generator
OD	Outside Diameter
SAI	Single Axial Indication
SCC	Stress Corrosion Crack
SG	Steam Generator
SRR	Shop Repair Roll
SVI	Single Volumetric Indication
TSP	Tube Support Plate
UTE	Upper Tube End
UTS	Upper Tube Sheet
xxS	Support Plate Number

COMMITMENT LIST

The following list identifies those actions committed to by the Davis-Besse Nuclear Power Station (DBNPS) in this document. Any other actions discussed in the submittal represent intended or planned actions by the DBNPS. They are described only for information and are not regulatory commitments. Please contact Mr. Gregory A. Dunn, Manager – FENOC Fleet Licensing, at (330) 315-7243 of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	DUE DATE
None	N/A