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June 22, 2010

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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SUBJECT: Response to Request for Additional Information – 2009 Steam Generator Tube Inspection Report – ME 2475

Palisades Nuclear Plant
Docket 50-255
License No. DPR-20

References:
1. Entergy Nuclear Operations, Inc. letter dated October 22, 2009, "2009 Steam Generator Tube Inspection Report" (ML092950525)
2. NRC e-mail dated March 3, 2010, "Palisades – 2009 Steam Generator Tube Inspection Report – ME 2475 – Request for Additional Information"

Dear Sir or Madam:

By letter dated October 22, 2009 (Reference 1), Entergy Nuclear Operations, Inc. (ENO) submitted information pertaining to the 2009 steam generator tube inspections at the Palisades Nuclear Plant.

By electronic mail dated March 3, 2010 (Reference 2), the Nuclear Regulatory Commission requested additional information on the 2009 steam generator tube inspection report.

Attachment 1 provides the ENO response for the requested information.

Summary of Commitments

This letter contains no new or revised commitments.

Sincerely,

Terry Davis for PKAnderson

pka/jlk

Attachment: 1. RAI Response on Palisades 2009 Steam Generator Tube Inspection Report

cc: Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

ATTACHMENT 1
RAI RESPONSE ON PALISADES 2009 STEAM GENERATOR TUBE INSPECTION REPORT

Request for additional information received by electronic mail March 3, 2010

Nuclear Regulatory Commission (NRC) Request

1. *Table 5 lists the tube in row* [R] *2 column* [C] *57, in* [steam generator] *SG B, as being plugged due to a single axial indication of primary water stress corrosion; however, this tube is not listed in either Table 6A or 6C. Please clarify and confirm that all service-induced indications are reported in Tables 6A, 6B, and 6C. Please discuss the size of this indication and the previous inspection results for this tube. Please clarify the nature of this indication since Table 4 implies that an outside diameter stress corrosion crack* [ODSCC] *indication was detected in the U-bend region and Table 5 indicates a primary water stress corrosion crack* [PWSCC] *was detected (assuming these Tables are referencing the same indication/tube).*

Entergy Nuclear Operations, Inc (ENO) Response

1. Table 4 is a "Tube Plugging Summary by Degradation Mechanism."

   Table 5 (from Reference 1 in the cover letter), is "Identification of Tubes Plugged" for both SGs E-50A (A) and E-50B (B). (Tables 5A and 5B contain nomenclature, acronyms and abbreviations that are used in this attachment.)

   Table 6A is "Location and Measured Sizes of Service Induced Indications" for both SGs, which were repaired by tube plugging, except for three volumetric indications not at support structures that remain in service (SG B, R55 C82 – one indication, and R137 C92 – two indications).

   Table 6B is "Steam Generator E-50A Indications" with indications that are due to tube wear and the tubes remain in service.

   Table 6C is "Steam Generator E-50B Indications," with indications that are due to tube wear and the tubes remain in service.

   Provided below, in Table A is a list of tubes with all the wear indications not identified in Tables 6A, 6B and 6C.

Table A - Steam Generator E-50A/B Indications
(All wear indications removed from Tables 6B and 6C due to being plugged by service induced indications)

No.	SG	Row	Column	Depth in Percent	Location	Elevation	Status
1	A	36	55	16	03C	0.67	plugged
2	A	44	65	19	02H	0.87	plugged
3	A	44	65	13	04H	-0.65	plugged
4	A	75	100	17	03H	0.84	plugged
5	A	75	100	10	03H	-0.99	plugged
6	A	114	37	18	01C	-0.6	plugged
7	A	114	37	18	08C	0.71	plugged
8	A	114	37	33	DBH	1.38	plugged
9	A	114	37	40	VS2	-0.97	plugged
10	A	114	37	13	VS2	0.91	plugged
11	A	114	37	17	VS6	0.69	plugged
12	B	80	73	19	03H	-0.74	plugged

Table 5 correctly lists the tube in SG B, R2 C57 as being plugged due to a single axial indication of PWSCC. Table 4 is incorrect as the indication is PWSCC, not ODSCC. A corrected Table 4 is provided at the end of this attachment.

The indication in SG B, R2 C57 measured 1.68 volts Peak to Peak, 20 degrees phase angle, and 0.31 inches in length, which satisfied all industry structural performance criteria per SG-SGMP-09-07, the Palisades Cycle 21 Steam Generator Condition Monitoring Assessment, section 6.7. When the noise in the U-bend was rotated horizontal, the phase angle of the indication read 14 degrees, or about 35% max depth. This indication did not display a strong flaw response but was reported conservatively, primarily since this is in a row 2 and located at the apex and was slightly more prominent than in historical data (may be due to better signal to noise [S/N] ratio due to new OMNI tester). The indication may not be service induced since precursors to this indication are evident as far back as 1998 data (first +PT RPC test) and little change is noted from 2001, 2006 and 2007.

NRC Request

2. *Please discuss whether any tube-to-tube wear indications were detected during the 2009 outage.*

ENO Response

2. No tube to tube wear indications were observed during the 2009 outage.

NRC Request

3. Two indications associated with dings were detected. Please discuss the size (voltages) of these dings and discuss how these indications were initially reported (i.e., with the bobbin coil, rotating coil, or both). If the voltage of the dings is near five volts, discuss your basis for not performing additional rotating probe inspections at dings less than five volts (given that circumferentially oriented flaws may also occur at dings).

ENO Response

3. Two indications associated with dings were detected. One indication with a ding was identified in SG B, R79 C148, the indication was reported from both bobbin and +PT RPC. The indication had a reportable 2.08 volt ding and also met the bobbin reporting criteria for a freespan ding indication. From +PT RPC, this indication appeared in the presence of a ding signal. This tube was removed from service and repaired by tube plugging.

   The second ding indication in SG A, R80 C61 was reported from both bobbin and from +PT RPC. The indication did not show a visible ding from bobbin but met the bobbin freespan reporting criteria regardless of dings present. From +PT RPC, the indication was present within a visible ridge in the tube. This tube was removed from service and repaired by tube plugging.

   The voltages for both service induced indications were less than 5 volts. The ding inspection scope was 100% +PT RPC exam of freespan dings >5V between TSH and TSC in both SGs. The dent inspection scope for all supports was 100% +Pt coil exam of dents >2.0V at eggcrates, diagonal bars and vertical straps. A ding (DNG) is reported in freespan and a dent (DNT) is reported at structures.

   With regard to circumferential ODSCC initiation, the only industry events have been associated with drilled-hole style tube support plates. The Palisades recirculating SG tube support design does not permit the type of tube stress patterns that may be associated with the postulated circumferential ODSCC at freespan dings observed in plants with drilled-hole style tube support plates (TSPs). All dents >2V were inspected with the +Pt probe; no degradation was detected. No circumferential ODSCC was reported at dent locations or in freespan dings.

NRC Request

4. *It was indicated that, "leakage did not exceed the 0.3 gallon per minute limit." Please clarify whether the leakage being referred to was the calculated accident induced leakage. In addition, please clarify the statement that, "no leakage was predicted for the 2007 to 2009 operating cycle." Is this "operating" or accident-induced leakage?*

ENO Response

4. "Leakage did not exceed the 0.3 gallon per minute limit," refers to the Palisades accident induced leakage of 0.3 gallons per minute.

   "No leakage was predicted for the 2007 to 2009 operating cycle," refers to the in-situ pressure test, where no leakage was observed. For the 2007 to 2009 operating cycle period, no leakage was predicted for either operating or accident conditions.

NRC Request

5. *During the 2007 outage, two tubes were plugged due to a loose part at the eighth cold-leg tube support (R129 C108 and R128 C109). Only one of these tubes was stabilized. Please discuss whether any indications were detected on the tubes surrounding the location of the loose part.*

ENO Response

5. Both tubes contained possible loose part indications but only one of them, R129 C108, contained a wear indication at this location, which was reported by both bobbin and RPC.

   All tubes surrounding the loose part indications at tubes R129 C108 and R128 C109 were eddy current tested. All surrounding tubes to R129 C108 and R128 C109 were +PT RPC tested in the area of the reported loose parts in 2007 and no indications or possible loose parts were observed in the area of the reported loose parts at the eighth cold eggcrate (08C).

   In 2009, no indications or possible loose parts were reported from bobbin testing in these surrounding tubes at 08C. These surrounding tubes at 08C were not +PT RPC tested in 2009.

NRC Request

6. *A few axial stress corrosion cracking indications were identified at the tube supports. One of these indications grew from non-detectable to a size that required in-situ pressure testing. Please clarify whether it was reported as a flaw or an I-code. Did both analysts report this indication? If not, discuss any implications. Did either analyst's team use automatic data screening?*

ENO Response

6. The indication that grew from non-detectable to a size that required in-situ pressure testing was reported as flaw-like from bobbin results and subsequently plus point RPC tested.

   The flaw was detected within the procedural eddy current review process by the secondary analyst only. There are no further implications. Both primary and secondary analyses were manual. Automatic data screening was not used. The tube was screened per the steam generator degradation assessment based on amplitude sizing. The tube did not leak or burst at operating or design limit pressures.

Corrected Table 4
Tube Plugging Summary by Degradation Mechanism

TUBE PLUGGING SUMMARY	SG E-50A	SG E-50B
Wear – Vertical Straps	1	0
Wear – Diagonal Bar	0	0
Wear – Loose Part	0	0
Wear – Dent (could not be sized TBP)	0	0
Wear – Tube to Tube (TBP)	0	0
Wear – Volumetric	0	0
Possible Loose Part (TBP)	0	0
Circumferential ODSCC TTS	0	0
Axial ODSCC TTS	7	2
Axial ODSCC Freespan	0	0
Axial ODSCC Eggcrate or Vertical Strap	5	6
Axial ODSCC in Greater Than 5 Volt Dents	0	0
Axial ODSCC in Less Than 5 Volt Dents	1	1
Axial PWSCC Tubesheet	1	0
Circumferential PWSCC Tubesheet	3	0
Axial ODSCC in U-bend	0	0
Axial PWSCC in U-bend	0	1
Restricted Tube	0	0
Administrative (TBP)	0	0
2009 Outage Total	18	10
Prior Outage Tubes Plugged	108	74
Pre-service Tubes Plugged	308	309
Total Tubes Plugged Post 2009 Outage	434	393
Percentage of Tubes Plugged Post 2009 Outage	5.3%	4.8%
Effective Tubes Plugged	434	393
Effective Tubes Plugged Percentage	5.3%	4.8%