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February 16, 2011

NL-11-018

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

**SUBJECT:** Response to Request for Additional Information on IP2 Steam Generator Inspection Report  
Indian Point Unit Number 2  
Docket No. 50-247  
License No. DPR-26

**REFERENCE:** 1. Entergy Letter to NRC (NL-10-079) regarding IP2 Steam Generator Tube Inspection – Spring 2010 Refueling Outage, dated August 24, 2010.  
2. NRC Letter to Entergy regarding Request for Additional Information on The Steam Generator Tube Inspection Report for Refueling Outage 19 (TAC ME4614) dated February 3, 2011.

Dear Sir or Madam:

Entergy Nuclear Operations, Inc. (Entergy) submitted a report of the results of the Indian Point 2 (IP2) Steam Generator Examination Program for the 2010 refueling outage in Reference 1. The NRC has requested additional information (Reference 2) which is provided in Attachment 1.

There are no new commitments identified in this submittal. If you have any questions or require additional information, please contact Mr. Robert Walpole, Licensing Manager.

Sincerely,

RW/sp

**Attachment:** 1. Response to Request for Additional Information - IP2 SG Inspection Report

**cc:** Mr. John P. Boska, Senior Project Manager, NRC NRR DORL  
Mr. William M. Dean, Regional Administrator, NRC Region 1  
NRC Resident Inspector, IP2  
Mr. Francis J. Murray, Jr., President and CEO, NYSERDA  
Mr. Paul Eddy, New York State Dept. of Public Service

A-001  
NRR

**Attachment 1 To NL-11-018**

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

**- IP2 SG INSPECTION REPORT**

**ENTERGY NUCLEAR OPERATIONS, INC.  
INDIAN POINT NUCLEAR GENERATING UNIT NO. 2  
DOCKET NO. 50-247**

REQUEST FOR ADDITIONAL INFORMATION  
STEAM GENERATOR TUBE INSERVICE INSPECTION REPORTS  
2010 REFUELING OUTAGE 19

The following repeats the NRC requests for additional information sent by letter dated February 3, 2011 regarding the steam generator tube inspection report for the IP2 inspection in refuel outage 19, as well as the Entergy responses. The report was sent to NRC in the Entergy letter of August 24, 2010.

RAI 1

Please discuss the scope and results of any secondary side inspections, including visual inspection for loose parts, foreign object search and retrieval inspections, and any upper bundle inspections (including feeding inspections). Also, please clarify which steam generators (SGs) had secondary side inspections during RFO 15.

Response

During 2R19 all 4 steam generators (SGs) had secondary side visual inspections performed at the top of the tubesheet (TTS). These visual inspections included foreign object search and retrieval inspections and in-bundle inspections. The foreign object search and retrieval inspections were performed in the annulus and tubelane following sludge lancing. The in-bundle inspections were performed from the TTS approximately every 10<sup>th</sup> column of both the hot leg and cold leg following sludge lancing. No upper bundle inspections were performed.

As a result of the foreign object search and retrieval inspections, numerous small foreign objects were detected and a number of them were retrieved from the SGs. All objects left in the SGs were small in size, were evaluated, and were determined to be too small to challenge tube integrity before the next scheduled inspection. Thus, the structural integrity performance criteria of NEI-97-06 and Technical Specification 5.5.7 will be satisfied until the next SG inspection. No degradation due to loose parts wear was identified with either visual or eddy current inspections.

During 2R15 all 4 SGs had secondary side visual inspections performed. The inspection scope was similar to that performed in 2R19.

RAI 2

Please discuss the scope and results of any tube plug inspections.

Response

All tube plugs were inspected and all plugs were dry with no indications of leakage, unusual deposits, or weld cracks observed.

RAI 3

In Section 5 of the RFO 19 SG tube inspection report, the text indicates that 207 indications of tube wear were found at the anti-vibration bars of 127 tubes, while the table in Section 5 indicates there

were only 102 tubes with wear. A manual count of the tubes and indications provided in Section 10 indicated that 207 indications of tube wear in 103 tubes. Please clarify.

#### Response

There are 207 indications of tube wear in 103 tubes. The text in section 5 was in error as a result of double counting tubes with multiple size wear indications.

#### RAI 4

Please discuss whether any rotating/array probe inspections of the tube ends were performed. If not, why not? In addition, please clarify the following statement from page 3 of the report, "DNTs [Dents] within the tubesheet are not required for inspection based upon PWSCC [primary water stress corrosion cracking] at the BLG/OXP [Bulges/Overexpansions] is not listed as potential for this inspection."

#### Response

No rotating/array probe inspections of the tube ends were performed during 2R19. The SG degradation assessment for 2R19 determined that stress corrosion cracking at tube ends is a non-relevant tube degradation mechanism at IP2. Non-relevant degradation mechanisms are those mechanisms which have not been observed in similar SGs operating under similar conditions and which laboratory results indicate are not likely to occur in the Indian Point 2 SGs. Due to the significant differences between the IP2 replacement SGs and the SGs that have experienced this kind of degradation, an evaluation of this damage mechanism was performed prior to 2R19. In this evaluation, numerous approaches were undertaken to show that at 8.62 accumulated Effective Full Power Years for IP2, that less than 1 tube is predicted to have initiated PWSCC. In addition, one or two additional operational cycles would be required for the PWSCC to grow to a depth where detection would reliably be performed. Therefore, there was no substantive basis to perform Rotating Probe inspections of the IP2 tube ends during 2R19.

In 2R17 (2006) 166 tubes were inspected to the tube end and no degradation was detected.

The statement from page 3 of the report documents the above discussion.

#### RAI 5

Please discuss whether any primary-to-secondary leakage was observed in the cycles since the last tube inspections. If so, please discuss the source.

#### Response

No primary-to-secondary leakage has been observed since the last tube inspections.

#### RAI 6

Please discuss how many high row tubes (non-stress relieved after bending) have potentially higher residual stresses based on eddy current data (i.e., 2-sigma tubes). If any are present, discuss the extent to which these tubes were preferentially selected for rotating probe inspections at locations such as the expansion transition and dents/dings.

## Response

Entergy did not use the 2-sigma screening process to preferentially select locations for rotating probe inspections. Entergy utilized the degradation assessment process to define the scope, locations and techniques for the SG inspections performed during 2R19. The industry methodology to screen eddy current data to identify SG tubes that may have potentially higher residual stresses applied only to Alloy 600TT tubing manufactured at the Westinghouse Blairsville facility. The tubing in the IP2 SGs was fabricated by Sanvik.