

From: Gregory Cranston
To: David Lew
Date: Tue, Apr 11, 2000 4:04 PM
Subject: Indian Pt 2 Feeder for Steam Generator Tube Inspection

See attached. Any comments?

CC: William Raymond

ITEM # 100

A/69

6

INDIAN POINT UNIT 2
STEAM GENERATOR TUBE TESTING FEEDER
Inspection Report 5000247/2000-002
Rev. 0, 4/11/2000

- I. Inspection Dates: March 24 - 27, 2000
- II. Scope:
 - A. Observe Indian Point Unit 2 Steam Generator Tube Testing and Test Results. Provide status and any concerns to Region I office, specifically Dave Lew, Performance Evaluation Branch Chief, and Mike Modes.
- III. Inspection Activities:
 - A. Observed data analysts in the old simulator building analyzing data from the eddy current testing. Observed steam generator (SG) tube testing being done remotely from the trailers just outside the old simulator building.
 - B. Discussed the results of the post rupture inspection of the 24SG, row 2, column 5 (R2,C5) tube that caused the primary to secondary leak, with the senior analyst.
 1. Obtained pre-inspection data from the 1997 eddy current inspection and asked why the crack was not detected previously.
 2. According to the analyst, based on the analytical methods used in 1997, the anomaly (that could be observed using additional analysis when looked at in more detail not) did not meet the screening criteria that would be indicative of a problem or require the additional analysis.
 3. The tube leak on SG24 was in R2,C5 and was reported to be a 2" crack at the time of the inspection. Copies of the eddy current data analysis ('topographical map') were faxed to the Region I Performance Evaluation Branch Chief. The enhanced analysis (accomplished by resetting the 20% ID signal to be at about 10 degrees) of the data from the 1997 eddy current testing showed parallel ridges that are indicative of crud build up on the tube OD. However, one of the ridges, using enhanced analysis, did provide information that was indicative of a tube problem. Since the enhanced analysis was not done previously, based on the screening threshold, the problem in the tube was not interpreted as a precursor in 1997. The recent eddy current data (dated 3/24/00) of the 24SG leaking tube was done with a RPC, +Point probe. On this presentation the location of the crack that caused the event is clearly visible.
 - C. During the inspection three additional tube leaks were detected.
 1. The three new leaks discovered in SG 22 are in:
 - a. Row 44, Column 42
 - b. Row 45, Column 39
 - c. Row 45, Column 44
 2. The leaks were very slow - about 1 drop per 30 minutes for two tubes and 1 drop per 60 minutes for the third.
 3. The potential significance of the findings is that the eddy current testing (ECT) examinations had not identified defects in these tubes. The ECT data for one of the tubes had one finding categorized as a non qualified indication (NQI) which had not yet been profiled with a RPC probe. Further licensee review of the ECT data for these tubes, as well as an engineering evaluation of the hydro results, continues.
 4. The location of the leak was the same on all three tubes and was at the tube to tube sheet fillet weld.
 5. This is the same issue described in NRC Information Notice 98-27. The Information Notice was written primarily for Once Thru Steam Generators (OTSG) but stated that the tube end cracking may not be limited to OTSGs.

INDIAN POINT UNIT 2
STEAM GENERATOR TUBE TESTING FEEDER
 Inspection Report 5000247/2000-002
 Rev. 0, 4/11/2000

6. The leaks were detected using the mid-range, +Point probe at 300 KHz. This was identified using the RPC probe and was not seen with the Cecco probe.

D. Re-examinations

1. The licensee is planning to redo all Row 2 & 3 tubes with the high frequency probe. They currently only have two probes but expect more to arrive on Sunday, 3/26,2000.

E. Additional actions and areas under investigation:

1. There are two indications in the U bend area of 24SG that they are scheduled for insitu testing. No schedule date yet.
2. The table shown below, Pluggable Tube Summary, shows the minimum number of additional tubes that will be plugged for each SG. This includes all Row 2 tubes and all tubes that had indications at the support plates (SPI). Not identified are those tubes that had indications in the U bend area, sludge area and tube sheet area that will be retested using the high frequency probe.

Pluggable Tube Summary:

Steam Generator	21	22	23	24	Total
Row 2 Tubes	72	49	45	57	223
SPI Indications	27	9	19	32	87
Total	99	58	64	89	310

Note: The number of tubes currently plugged are: SG21 - 313; SG22 - 405; SG23 - 301; and, SG24 - 306. Each steam generator (SG) has 3,260 tubes.

3. For tubes with indications in the tube sheet area, including the three tubes in 22SG that leaked (see C.1 above), a decision will be made later as to whether to plug those tubes or apply the F* criteria and re-roll the tubes. The decision will be based on cost/benefit and ALARA considerations.
4. Work activities on Sunday were related to conducting retests on tubes with indications or other data gathering concerns.
5. The additional, new high frequency probes arrived early Sunday morning and were made available for retests. The advantage of the high frequency probe is that the signal does not penetrate as far. Consequently, if there is crud on the tube OD it will not appear as a ridge on the data analysis presentation as described in I.A. above, which makes it easier to see a crack indication.
6. The licensee is doing condition monitoring (backward looking assessment) to confirm that tube integrity was maintained for all tubes (other than 24SG - R2, C5) since the time of the 1997 inspection.
7. Twelve (12) hot leg tubes in 24SG will be re-rolled starting Sunday night (3/26/00) due to indications observed in the tube to tube sheet area per F*. The length of the re-roll varies for each tube. The original roll length is about 2.25". The tube sheet is about 22" thick. The re-rolls will vary from about 2" to 7" in length, done in about 2" increments with some overlap. The tubes being re-rolled are:

INDIAN POINT UNIT 2
STEAM GENERATOR TUBE TESTING FEEDER
 Inspection Report 5000247/2000-002
 Rev. 0, 4/11/2000

Row	Col
13	33
15	8
15	7
16	42
18	24
19	30
20	32
20	46
26	32
28	43
33	29
39	42

IV. Testing Status

A. The number of tests to be conducted and their status as of May 27, 2000 is as follows:

1. Cecco Inspection Program:

SG	Tube Inspections	Tests Acquired	Tests Analyzed and Complete	Retests	Percent Complete	Total Remaining Inspections
21	3858	3855	3855	3	99.92%	3
22	3837	3835	3835	2	99.95%	2
23	3949	3929	3929	20	99.49%	20
24	3943	3942	3942	1	99.97%	1
Total	15587	15561	15561	26	99.83%	26

INDIAN POINT UNIT 2
STEAM GENERATOR TUBE TESTING FEEDER
 Inspection Report 5000247/2000-002
 Rev. 0, 4/11/2000

2. Bobbin Inspection Program:

SG	Tube Inspections	Tests Acquired	Tests Analyzed and Complete	Retests	Percent Complete	Total Remaining Inspections
21	4284	4282	4282	2	99.95%	2
22	4397	4397	4397	0	100.00%	0
23	4520	4518	4518	2	99.96%	2
24	4257	4257	4257	0	100.00%	0
Total	17458	17454	17454	4	99.98%	4

3. U-Bend +Point Inspection:

SG	Tube Inspections	Tests Acquired	Tests Analyzed and Complete	Retests	Percent Complete	Total Remaining Inspections
21	248	87	82	5	33.06%	161
22	184	75	66	9	35.87%	109
23	208	91	90	1	43.27%	117
24	227	223	223	4*	98.24%	4
Total	867	476	461	19	53.17%	391

*The four retests in 24SG are Row 2, columns 4, 43, 71, & 74.

4. B&W Roll Plug Inspection

SG	Tube Inspections	Tests Acquired	Tests Analyzed and Complete	Retests	Percent Complete	Total Remaining Inspections
21	57	56	56	1	98.25%	1
22	85	85	85	0	100.00%	0
23	10	10	10	0	100.00%	0
24	42	42	42	0	100.00%	0
Total	194	193	193	1	99.48%	1

INDIAN POINT UNIT 2
STEAM GENERATOR TUBE TESTING FEEDER
 Inspection Report 5000247/2000-002
 Rev. 0, 4/11/2000

5. Special Interest +Point Inspection:

SG	Tube Inspections	Tests Acquired	Tests Analyzed and Complete	Retests	Percent Complete	Total Remaining Inspections
21	186	85	58	1	31.18%	101
22	203	0	0	0	0.00%	203
23	130	0	0	0	0.00%	130
24	137	137	137	0	100.00%	0
Total	656	222	195	1	29.73%	434

6. Special Interest Re-roll Candidate Inspection:

SG	Tube Inspections	Tests Acquired	Tests Analyzed and Complete	Retests	Percent Complete	Total Remaining Inspections
21	127	0	0	0	0.00%	127
22	19	0	0	0	0.00%	19
23	852	0	0	0	0.00%	852
24	52	52	52	0	100.00%	0
Total	1050	52	52	0	4.95%	998

7. All Programs Summary:

SG	Tube Inspections	Tests Acquired	Tests Analyzed and Complete	Retests	Percent Complete	Total Remaining Inspections
21	8760	8365	8333	12	95.13%	395
22	8725	8392	8383	11	96.08%	333
23	9669	8548	8547	23	88.40%	1121
24	8658	8653	8653	5	99.94%	5
Total	35812	33958	33916	51	94.71%	1854