

ATTACHMENT A

**PROPOSED STEAM GENERATOR TUBE
EXAMINATION PROGRAM
1993 REFUELING OUTAGE**

**CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
INDIAN POINT UNIT NO. 2
DOCKET NO. 50-247
DECEMBER, 1992**

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Indian Point 2
Proposed Steam Generator Tube Examination Program
1993 Refueling Outage

1. Bobbin Coil Probe

A standard 700 or 720 mil bobbin coil eddy current probe will be used to perform the initial eddy current testing. If any tube does not permit passage of the standard 700 mil probe, the tube will be tested with a 610 mil bobbin coil probe.

Tubes that do not pass the 610 mil probe will be plugged. Furthermore, the tubes immediately adjacent to any tube that does not pass the 610 mil probe will also be subjected to an eddy current examination.

The examination will be conducted from either the hot or cold leg side of the channel head. All tubes requiring full length inspection will be examined from the mouth of the tube through the tubesheet, around the U-bend, to the mouth of the tube on the opposite side.

One hundred percent [100%] of the tubes [both hot and cold legs] will be examined from the tubesheet to the first support plate.

Selected tubes in Steam Generators 21, 22, 23, and 24 will be eddy current examined for both dents and defects over their full length. The examination will be performed at 10, 100, 400 and 600 KHz.

The tubes selected for full length examination are given in Tables 1, 2, 3 and 4. In Steam Generator 21, 707 tubes, or 21.9% of all active tubes will be examined. In Steam Generator 22, 568 tubes, or 19.3% of all active tubes will be examined. In Steam Generator 23, 679 tubes, or 22.5% of all active tubes will be examined. In Steam Generator 24, 705 tubes, or 23.4% of all active tubes will be examined. The selection of tubes for examination over their entire length is based upon tubes that were not examined in the 1989 or 1991 refueling outages, and a re-examination of some tubes in the periphery hard spot area of the tube bundle.

The 1993 full length examination program presented will allow the full length tube examination cycle to be completed in a four examination period. The 1989 examination was the first examination in the cycle. The last examination to complete the cycle will be in 1995.

2. Rotating Pancake Coil Probe

In addition, 103 tubes in Steam Generator 21 will be examined with the Rotating Pancake Coil [RPC] probe on an exploratory basis to detect defects including axial and circumferential intergranular corrosion and/or cracking in the tubesheet, tube support plate and U-bend regions. The tubes to be examined by the RPC probe are listed in Table 5. The tubes and exam locations were examined by the RPC probe during the 1991 outage.

TABLE 1

TUBES TO BE EDDY CURRENT EXAMINED OVER THEIR FULL LENGTH

STEAM GENERATOR 21

Columns	Rows	# of Tubes
1	3 5 7 8	4
4	2 4 5 6 13 17	6
6	2 4 6 8 9 15 17 19	8
8	4 5 9 10 13 14 15 20 21	9
10	4 6 8 11 17 19 21 23	8
12	4 5 6 8 10 11 13 14 16 19 22 23 25	13
14	6 7 8 9 12 13 15 16 24	9
16	4 5 9 11 12 13 14 16 17 18 20 21 22 24 25 27	16
18	2 4 6 9 11 12 13 14 15 16 17 18 19 20 21 22	24
20	24 27 28 29 30 32 34 35	14
22	2 6 9 14 15 16 21 25 26 28 30 31 32 34	22
24	4 6 8 9 10 11 12 13 15 16 18 19 20 23 24 25	24
26	26 27 28 29 32 36	20
28	5 10 11 12 13 14 15 20 21 24 26 28 29 30 31 32	17
30	33 34 35 36	22
32	4 5 6 8 9 11 13 14 16 18 20 22 24 25 33 34	22
34	36	26
36	6 7 8 10 12 13 14 18 20 21 22 23 24 25 27 28	20
38	29 31 32 33 35 37	22
40	2 4 5 6 7 8 9 10 12 14 16 19 21 22 24 25	26
42	26 27 29 31 32 33 35 38 39 40	20
44	2 5 6 8 9 10 13 14 18 20 21 23 27 28 30 32	22
46	34 39 40 41	20
48	2 6 9 10 11 12 15 16 17 20 23 25 27 30 32 33	22
50	35 36 38 39 40 41	20
52	5 7 9 10 12 14 15 17 18 20 21 23 25 26 28 31	20
54	33 34 39 40	20
56	6 7 8 11 14 17 18 20 21 23 25 26 28 29 34 36	20
58	37 39 41 44	14
60	5 6 7 8 9 12 14 15 19 23 24 25 27 28 29 30 34 35	21
	37 38 39 43 45	18
	5 6 7 17 18 19 20 22 23 25 26 28 29 30 31 34	13
	35 38	18
	2 10 17 20 23 28 29 31 34 35 39 40 41	15
	2 4 12 13 14 15 16 17 20 22 26 28 29 31 35 38	18
	43 45	15
	2 6 7 13 14 15 20 23 24 30 31 34 36 37 38	19
	7 11 12 13 16 19 21 22 23 25 27 28 30 31 34 37	11
	38 39 40	16
	5 6 7 10 14 15 16 18 21 22 26	19
	11 13 17 18 19 21 25 27 31 32 34 35 36 38 39 17	18
	5 7 11 12 13 14 15 16 17 18 22 23 24 26 32 33	15
	35 38 44	18
	2 4 5 9 11 17 18 19 22 27 29 30 31 33 37 38	18
	39 40	18

Table 1 [continued]

62	2 4 6 7 9 11 14 16 17 18 20 22 24 25 28 32	
	33 34 36 37 38 39 42	23
64	2 6 9 10 15 17 18 20 21 22 25 26 27 28 30 31	
	32 34 35 36 37 39	22
66	4 5 8 11 12 13 18 20 24 25 28 30 31 33 35 36	
	38 39	18
68	4 5 7 9 13 19 20 22 23 25 26 29 30 31 34 37	16
70	9 10 11 12 13 15 16 17 19 20 22 21 22 23 26 28	
	29 34	18
72	4 6 8 9 11 12 14 15 17 19 21 22 23 24 25 26	
	27 29 30 31 34 35 36	23
74	4 5 9 11 13 15 16 17 20 24 26 27 28 29 30 31	
	32 33	18
76	2 4 7 8 10 11 12 14 15 17 18 20 22 23 25 27	16
78	4 5 6 7 9 10 11 13 14 15 17 22 24 25 26 30	
	33	17
80	2 5 7 8 10 11 12 13 14 19 20 22 24 26 27	15
82	6 9 16 18 21 22	6
84	7 11 12 13 14 18 19 20 21 22	10
86	5 6 7 9 15 16 17 18	8
88	2 5 6 8 11 12 15 17 19	9
90	2 6	2
92	2 4 6 8	4

Total ----- 707

TABLE 2

TUBES TO BE EDDY CURRENT EXAMINED OVER THEIR FULL LENGTH

STEAM GENERATOR 22

Columns	Rows	# of Tubes
1	3 5 7 8	4
4	2 7 12 13 17	5
6	2 8 11 15 17 19	6
8	8 9 11 12 15 16 18	7
12	2 6 7 8 9 12 16 21 23 24 27 30	12
14	6 9 11 13 15 19 21 22 24 26 27 29	12
16	7 8 11 14 15 16 18 21 22 23	10
18	2 4 5 6 7 9 11 12 13 14 15 16 17 18 21 24	19
	32 34 35	
20	3 6 8 9 10 13 14 17 18 19 20 21 23 26	14
22	10 11 12 15 16 17 20 22 23 25 26	11
24	9 11 14 19 23 24 25 26 27 32	10
26	9 14 15 16 22 24 28 31 32 33 37 38	12
28	1 14 15 22 27 30 31 32 33 34 41	11
30	3 6 7 25 26 28 29 30 31 35 36 37 40	13
32	4 5 7 13 14 22 24 26 29 30 31 32 33 34 35 36	17
	40	
34	2 3 5 7 9 10 11 14 19 20 22 24 25 29 30 31	18
	38 40	
36	10 12 13 15 22 23 24 25 26 29 30 32 38	13
38	11 13 15 18 19 20 22 23 25 26 27 29 31 32 34 35	20
	36 37 39 44	
40	9 12 13 16 17 25 31 43 45	9
42	6 7 8 9 10 11 20 22 23 28 30 31 35 37 38 39	19
	41 44 45	
44	4 5 6 7 8 10 11 12 14 16 19 22 23 24 28 29	22
	30 31 36 39 40 41	
46	4 5 11 12 14 19 22 23 24 25 27 28 35 37 40	15
48	2 3 6 7 9 10 11 12 13 14 15 17 18 19 21 22	27
	24 27 29 30 31 32 34 36 37 43 45	
50	3 9 12 21 22 26 44 45	8
52	9 10 12 14 15 17 18 23 25 30 31 34 35 36 37 43	17
	44	
53	16 18 19 20 21 43	6
54	9 10 13 16 17 18 20 29 43	9
55	18 19 20 21 23 43	6
56	9 11 13 15 16 17 19 21 22 25 27 29 30 31 32 33	18
	37 43	
58	9 14 15 16 17 21 22 23 24 29 33 34 36 37 43	15
60	3 9 19 20 22 25 26 28 30 31 35	11
62	2 10 14 16 17 22 25 28 35	9
64	2 4 5 9 12 13 14 15 19 21 25 27 28 32 33 34	19
	37 39 40	
66	9 12 14 15 17 18 20 22 23 26 30 32 33 34 37 39	16
68	10 12 14 15 18 24 25 28 29 30 31 32 33 35 38	15

TABLE 3

TUBES TO BE EDDY CURRENT EXAMINED OVER THEIR FULL LENGTH

STEAM GENERATOR 23

Columns	Rows	# of Tubes
1	3 5 7	3
4	3 5 7 11	4
6	9 17	2
8	9 13 14 17 20	5
10	8 10 11 12 13 14 16 17 18 19 21 25	12
12	6 7 9 10 11 14 16 21 22 25 26	11
14	3 7 8 9 10 14 15 19 21 23 24 25 26 27	14
16	3 5 9 11 12 15 17 18 19 20 21 23 24 26	14
18	3 5 6 10 11 12 15 17 18 20 24 25 30 31	14
20	3 5 6 11 13 15 16 17 18 19 20 21 22 24 25 26	20
21	27 28 29 31	3
22	36 37 38	13
24	8 9 11 16 17 19 25 27 29 31 32 33 34	14
26	11 12 14 16 17 18 19 20 27 28 29 32 33 34	15
28	13 14 15 19 20 22 24 25 27 29 30 33 34 35 37	18
30	5 7 8 10 13 15 18 21 29 30 32 33 34 35 36 37	20
32	38 39	22
34	4 5 6 9 10 14 15 17 18 19 23 26 27 30 31 33	18
36	35 37 38 39	15
38	5 7 8 9 10 11 13 14 15 16 18 19 22 23 24 25	12
40	28 29 30 33 36 37	10
42	5 6 9 13 14 15 17 18 19 20 23 30 32 33 34 35	16
44	36 37	16
46	12 13 18 19 23 27 28 29 30 31 33 34 35 36 37	23
48	14 17 23 25 26 29 30 31 33 35 37 40	25
50	9 13 15 16 17 19 27 28 29 30	21
52	4 5 6 14 15 16 20 24 25 27 28 37 39 40 41 42	14
54	3 4 6 9 15 16 17 24 30 34 35 36 37 38 39 42	20
56	3 5 7 9 10 12 13 15 16 18 19 20 21 24 26 27	24
58	29 30 34 38 40 41 42	21
60	3 5 6 7 8 9 12 13 14 15 17 18 19 21 22 28	25
62	29 31 34 37 38 39 40 41 42	21
	4 5 6 7 8 10 11 12 13 16 17 18 22 23 25 27	21
	28 31 35 36 40	21
	5 7 8 10 11 12 14 22 27 28 30 35 41 45	21
	7 9 10 11 12 13 14 15 18 19 21 22 23 25 26 28	21
	29 30 43 44	21
	6 7 8 9 10 11 12 13 14 17 18 19 20 22 27 29	21
	32 33 35 36 37 38 39 40	21
	4 5 7 8 14 15 16 17 18 19 21 24 25 26 29 30	21
	33 35 36 37 38	21
	2 3 4 5 6 7 10 12 13 14 15 22 23 24 27 28	21
	31 34 36 39 40 41	21
	3 5 6 9 12 13 14 16 18 19 20 21 22 23 25 27	21
	30 33 35 37 40	21

Table 3 [continued]

64	2	3	4	6	8	9	10	12	15	17	18	19	21	22	23	24		
	25	27	30	31	32	34	36	38	39									25
66	4	5	6	13	14	19	20	21	22	23	24	28	29	31	33	34		
	35	36	37	38	39													21
68	6	9	10	11	12	13	15	16	17	19	21	22	23	25	26	32		
	33	35	36															19
70	7	10	12	13	14	15	17	18	19	20	21	22	24	25	26	28		
	29	30	31	34	35	36												22
72	4	5	6	9	13	14	16	17	19	23	24	25	26	27	28	29		
	31	32	33															19
74	2	4	5	6	9	10	13	14	17	20	22	23	27	31	34			15
76	2	5	8	10	12	20	21	22	23	24	25	35						12
78	3	4	8	10	11	13	14	16	18	22	23	24	25	31	33			15
80	4	5	7	10	11	13	14	18	19	29	30							11
82	4	6	7	9	11	14	15	16	17	25								10
84	5	6	7	9	10	11	13	17	18	20	21	22						12
86	5	7	9	15	17	19	20											7
88	4	7	8	16	17	20												6
90	9	11	13															3

Total 679

TABLE 4

TUBES TO BE EDDY CURRENT EXAMINED OVER THEIR FULL LENGTH

STEAM GENERATOR 24

Columns	Rows	# of Tubes
1	2 3 5 7	4
4	2 4 5	3
6	6 16	3
8	7 8 9 16 18 20	6
10	5 6 7 8 10 15 16 18 19 20 21 22 24 26	14
12	4 7 9 11 12 14 15 16 17 18 19 20 21 22 23 26	18
14	27 30	13
14	2 4 8 10 11 12 13 14 20 21 22 24 28	16
16	2 5 8 9 10 11 12 13 14 15 16 18 19 20 23 27	19
18	2 4 6 7 10 13 14 15 16 19 20 21 22 23 25 26	20
20	27 28 32	19
20	5 6 8 10 11 12 13 15 17 18 20 21 22 23 24 28	20
22	29 30 35 37	19
22	5 7 8 9 10 12 17 18 20 21 22 23 24 28 29 30	16
24	32 33 35	17
24	12 14 15 18 19 20 21 22 25 26 27 30 31 33 34 35	25
26	5 9 12 16 17 19 21 23 24 27 28 29 31 32 34 36	22
28	38	24
28	2 4 5 6 7 8 9 11 12 13 16 18 20 21 22 24	21
30	25 27 28 29 31 32 33 34 38	24
30	2 4 5 9 10 11 15 16 18 19 22 23 24 26 27 30	22
32	31 33 34 35 37 38	21
32	2 7 8 10 11 13 14 16 19 20 21 22 27 29 31 33	24
34	34 35 36 37 39	22
34	3 4 5 6 9 11 12 13 14 16 17 18 21 23 24 25	21
36	28 29 30 32 33 34 37 38	24
36	3 7 10 11 13 15 16 17 18 19 20 21 23 24 25 27	22
38	28 31 32 35 37 43	21
38	8 9 10 11 12 13 14 15 17 19 20 22 26 27 28 29	12
40	32 33 37 38 42	16
40	7 9 14 17 18 20 23 25 27 29 30 44	22
42	3 5 7 9 10 13 18 19 23 25 27 35 38 41 42 43	13
44	5 5 7 9 10 12 13 17 18 19 20 24 27 28 29 30	22
46	34 35 36 37 38 39	13
46	3 4 6 16 18 19 21 27 29 31 36 41 42	17
48	2 8 12 14 17 18 20 21 24 25 31 36 37 39 40 41	21
50	42	19
50	6 8 9 10 14 16 19 20 21 23 26 28 31 34 35 37	21
52	40 41 42	13
52	9 10 13 15 16 17 18 20 21 22 24 27 28 31 34 35	2
54	36 37 42 43 45	20
54	9 11 13 14 15 16 17 20 21 23 25 27 30	
55	40 44	
56	7 10 13 14 15 16 19 20 21 23 24 28 29 30 31 32	
	33 34 38 44	

Table 4 [continued]

58	2 5 6 7 10 12 13 14 15 16 18 19 21 22 23 24	
	25 26 30 32 33 37 38 39	24
60	2 7 10 11 13 14 15 20 21 27 28 30 31 32 34 35	
	36 38 39	19
62	2 5 6 7 9 13 14 15 16 19 22 23 24 26 27 28	
	29 31 32 33 34 36 37 38 39 42	26
64	2 5 7 8 10 12 16 17 18 20 23 24 25 28 30 35	
	38	17
66	5 7 8 10 13 14 16 18 19 20 24 28 29 30 31 32	
	33 35 36 37 38 39 41	23
68	5 8 12 15 16 17 19 20 21 26 27 28 29 30 31 33	
	34 35 36	19
70	5 11 15 16 18 19 20 22 24 27 30 31 33 34 35 36	16
72	5 6 7 8 9 14 15 16 17 19 20 21 22 23 27 28	
	29 30 31 32 33 36	22
74	5 6 9 10 18 20 21 22 23 26 27 31 33	13
76	7 8 10 13 15 19 21 27	8
78	6 7 8 10 11 14 17 18 20 22	10
80	4 5 6 7 9 11 14 15 20 22 23 24 25	13
82	6 7 9 10 12 16 17 18 19 24 25 26	12
84	8 9 10 11 14 15 17 20 21 22 23	11
86	7 8 12 13 14 20	6
88	2 6	2
90	2 4	2
92	2 4 6 8	4

Total 705

TABLE 5

TUBES TO BE EXAMINED BY THE ROTATING PANCAKE COIL [RPC] PROBE
STEAM GENERATOR 21

Columns	Rows	Regions of Exam *
1	3	1H
1	4	2H 6H
2	3	U Bend
2	4	3H
3	2	U Bend
3	7	1H
3	13	TSH-TEH
3	14	1H
4	7	1H
5	19	1H
5	20	1H
6	18	1H
6	20	1H
7	23	1H
8	22	1H
8	23	1H
8	24	1H
15	30	4H
20	5	TSH-TEH
20	8	1H
22	13	1H
23	21	TSH-TEH
24	12	2H
26	8	3H
26	16	TSH-TEH
28	14	TSH-TEH
28	16	3H
30	19	TSH-TEH
30	20	TSH-TEH
30	22	6H TSH-TEH
31	12	4H
31	22	TSH-TEH
32	6	5H
32	10	5H
32	12	6H
33	10	6H
33	12	1H
33	43	6H
35	9	2H
35	12	2H
35	18	3H
36	7	2H
36	14	3H
36	44	6H
37	8	3H
37	11	4H
37	15	4H

Table 5 [continued]

37	21	4H
37	29	4H
37	30	5H
38	26	TSH-TEH
39	11	5H
39	15	TSH-TEH
40	14	6H
41	10	6H
41	12	6H
42	10	2H
42	12	2H
42	27	2H
43	8	3H
43	13	3H
43	15	3H
43	19	4H
44	10	4H
46	18	TSH-TEH
46	25	4H
48	3	U Bend
48	4	4H
48	6	TSH-TEH
48	18	TSH-TEH
49	3	U Bend
49	4	5H
50	3	6H
50	4	1H
50	29	TSH-TEH
51	3	2H
51	4	3H
51	15	5H
51	20	5H
52	10	5H
53	9	6H
53	13	6H
53	15	6H
53	17	1H
53	20	1H
53	45	6H TSH-TEH
54	19	TSH-TEH
54	20	1H
54	45	6H TSH-TEH
55	6	2H
56	3	4H
56	7	2H
58	6	3H
58	44	6H TSH-TEH
66	15	TSH-TEH
76	15	1H
81	18	TSH-TEH
89	3	5H
90	3	6H

Table 5 [continued]

91	4	1H
92	2	U Bend
92	3	U Bend
92	4	2H

Total: 103 tubes

* Westinghouse terminology:

1H = 1st (lowest) tube support plate on hot leg side

U Bend = Between uppermost support plate of hot and cold legs

TSH-TEH = Top of tubesheet on hot leg to tube end on hot leg