FPL

October 23, 2003
L-2003-277
EA-03-009 (IV)(F)(2)

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Re: Turkey Point Unit 4
Docket No. 50-251
Order (EA-03-009) Relaxation Request
Examination Coverage of Reactor Pressure
Vessel Head Penetration Nozzles
Response to Request for Additional Information

On February 11, 2003 the NRC issued Order EA-03-009 requiring specific inspections of the reactor pressure vessel head and associated penetration nozzles at pressurized water reactors. By letter L-2003-272, pursuant to the procedure specified in Section IV, paragraph F of the Order, Florida Power & Light (FPL) requested relaxation from the requirements specified in Section IV, paragraph C.(1)(b)(i) for Turkey Point Unit 4 for the reactor vessel head penetration nozzles for which ultrasonic testing requirements could not be completed as required.

The attachment to this letter provides FPL's response to the request for additional information as discussed with your staff on October 23, 2003.

Please contact Walter Parker at (305) 246-6632 if there are any questions.

Very truly yours,

Terry Jones

Terry O. Jones
Vice President
Turkey Point Nuclear Plant

Attachment

cc: Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant
Florida Department of Health and Rehabilitative Services

A101

Turkey Point Unit 4 Relaxation Request From US NRC Order EA-03-009 – Response to Request for Additional Information

On October 21, 2003, Florida Power and Light Company (FPL) submitted requests for relaxation[1] from NRC Order EA-03-009[2] for Turkey Point Unit 4. During a teleconference with the NRC staff on October 23, 2003 to discuss the relaxation requests, the NRC requested additional information on the relaxation pertaining to the inspection area obtained. FPL hereby supplies the response to the requested information.

NRC Question 1: *For nozzle #11, provide clarification concerning the configuration issue as identified in the cover letter, specifically address the configuration issue.*

FPL Response to NRC Question 1: The "configuration issue" that caused liftoff of the UT probe upon entry into the nozzle is likely due to a localized blending of material during manufacture of the nozzle or the result of a minor distortion during the welding fabrication.

NRC Question 2: *For nozzle #11, clarify the area of missed coverage. Discuss whether the 32° arc at 0.76 inches is the most limiting distance of the ultrasonic testing (UT) coverage or a localized area and the rest of the nozzle was inspected to the bottom.*

FPL Response to NRC Question 2: As shown in Figure 1 of the relaxation request,[1] the area of missed coverage is a localized area. The area of missed coverage corresponded to the lower hillside of the nozzle and is the most limiting distance of UT coverage below the weld. The nozzle extended to approximately 0.86 inches, or 0.1 inch farther at the localized area of missed coverage had the UT probe not lost contact. The rest of the nozzle (328°) was inspected to the bottom of the nozzle to the maximum extent of the UT technology.

NRC Question 3: *Table 1 of Attachment 1 identifies "Min. Distance below weld toe to nozzle bottom (inches)". Discuss whether this is meant to be the minimum distance below the weld toe that can be UT. Clarify.*

FPL Response to NRC Question 3: Yes, this is the minimum distance below the weld toe that can be examined by UT. In all cases, the measurement is taken at the low hillside part of the nozzle. Table 1 is provided below with a note added to the column heading to indicate that the UT distance examined below the weld nozzle bottom is to the maximum extent of the UT technology. Also the data for nozzle # 11 was clarified to

---

[1] FPL letter L-2003-272, "Turkey Point Unit 4, Docket No. 50-251, Order (EA-03-009) Relaxation Request, Examination Coverage of Reactor Pressure Vessel Head Penetration Nozzles," T. O. Jones to NRC, October 21, 2003.

[2] US NRC Letter EA-03-009, "Issuance of Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors," from Samuel J. Collins (NRC) to all Pressurized Water Reactor Licensees, Dated February 11, 2003.

indicate that the coverage was 360° below the weld toe to a horizontal plane 0.76 inches below the weld before the missed coverage area began.

NRC Question 4: *Attachment 1 page 6 of 11, the last bullet of the licensee's conclusion, discusses circumferential cracks in the portion of the penetration present no safety significance. Discuss why circumferential cracks would be identified by the full ID inspection before a loose part could develop.*

FPL Response to NRC Question 4: A complete UT was performed on all nozzles from the ID for a distance from greater than 2 inches above the weld to the end of the nozzle (except the 0.1" localized area in nozzle #11) when the UT probe exits the nozzle. Any ID initiated circumferential flaw would be detected by this full UT examination. If an OD initiated circumferential flaw existed, it would have to propagate through wall to the ID and into the area that was examined by UT. Therefore, an OD initiated flaw would be detected before a loose part could be developed. Both Turkey Point Units 3 and 4 have the same material supplier and many identical heats. Both plants have completed UT examinations of all nozzles and have not identified any circumferential or axial cracking. This includes the high stressed region adjacent to the weld. Therefore, it is unlikely that any flaws would initiate in this lower stressed bottom portion of the nozzle, without also having other corresponding flaws present in the higher stressed areas closer to the weld.

NRC Question 5: *The analysis used in WCAP-16027-P Rev.0 uses the crack growth formula in industry report MRP-55. The NRC staff has not made a determination on the subject industry report. Therefore, if using MRP-55 the licensee is requested to agree to and document the following conditions:*

- *If the NRC staff finds that the crack-growth formula in industry report MRP-55 is unacceptable, the licensee shall revise its analysis that justifies relaxation of the Order within 30 days after the NRC informs the licensee of an NRC-approved crack growth formula.*
- *If the licensee's revised analysis shows that the crack growth acceptance criteria are exceeded prior to the end of the current operating cycle, this relaxation is rescinded and the licensee shall, within 72 hours, submit to the NRC written justification for continued operation.*
- *If the revised analysis shows that the crack growth acceptance criteria are exceeded during the subsequent operating cycle, that licensee shall, within 30 days, submit the revised analysis for NRC review.*
- *If the revised analysis shows that the crack growth acceptance criteria are not exceeded during either the current operating cycle or the subsequent operating cycle, the licensee shall, within 30 days, submit a letter to the NRC confirming that its analysis has been revised. Any future crack-growth analyses performed for this and future cycles for RPV head penetrations must be based on an acceptable crack growth rate formula.*

FPL Response to NRC Question 5: FPL agrees to these conditions.

Table 1: Turkey Point Unit 4 Cycle 21 UT Data Coverage Matrix for RPV Nozzles

ID	Turkey Point Unit 4 Cycle 21 UT Examination Data								Leak Path Data	
Nozzle #	Min. Distance Above Weld Root (In)	Coverage Above Weld Root (Theta)	Coverage @ Weld Root (Theta)	Weld Region Coverage (Theta)	Below Weld Coverage (Theta)	Min UT distance below weld toe to nozzle bottom - See Note 4 (Inches)	Exam Results	Probe Used	Determination Possible?	Leak Path Results
1	5.43"	360°	360°	360°	360°	1.22	NRI	Blade	Yes	NLP
2	3.41"	360°	360°	360°	360°	1.21	NRI	Rotating	Yes	NLP
3	3.68"	360°	360°	360°	360°	1.45	NRI	Rotating	Yes	NLP
4	5.23"	360°	360°	360°	360°	1.39	NRI	Rotating	Yes	NLP
5	4.70"	360°	360°	360°	360°	1.22	NRI	Rotating	Yes	NLP
6	4.87"	360°	360°	360°	360°	0.62	NRI	Blade	Yes	NLP
7	5.45"	360°	360°	360°	360°	0.86	NRI	Blade	Yes	NLP
8	2.94"	360°	360°	360°	360°	1.02	NRI	Blade	Yes	NLP
9	2.33"	360°	360°	360°	360°	0.97	NRI	Blade	Yes	NLP
10	5.76"	360°	360°	360°	360°	0.65	NRI	Blade	Yes	NLP
11	3.67"	360°	360°	360°	360° to a horizontal plane 0.76" below weld toe, then 328.19° to bottom	0.76" (see "exam results" column)	NRI Incomplete coverage 0.76" below the weld for 31.81°	Blade	Yes	NLP
12	5.05"	360°	360°	360°	360°	0.93	NRI	Blade	Yes	NLP
13	5.66"	360°	360°	360°	360°	0.65	NRI	Blade	Yes	NLP
14	6.27"	360°	360°	360°	360°	0.79	NRI	Blade	Yes	NLP
15	4.82"	360°	360°	360°	360°	0.83	NRI	Blade	Yes	NLP
16	2.85"	360°	360°	360°	360°	0.75	NRI	Blade	Yes	NLP
17	5.90"	360°	360°	360°	360°	1.13	NRI	Blade	Yes	NLP
18	2.84"	360°	360°	360°	360°	0.95	NRI	Blade	Yes	NLP
19	5.44"	360°	360°	360°	360°	1.08	NRI	Blade	Yes	NLP
20	5.98"	360°	360°	360°	360°	0.99	NRI	Blade	Yes	NLP
21	5.15"	360°	360°	360°	360°	0.78	NRI	Blade	Yes	NLP
22	4.52"	360°	360°	360°	360°	0.85	NRI	Blade	Yes	NLP
23	5.37"	360°	360°	360°	360°	0.77	NRI	Blade	Yes	NLP
24	5.00"	360°	360°	360°	360°	1.28	NRI	Blade	Yes	NLP
25	5.34"	360°	360°	360°	360°	1.02	NRI	Blade	Yes	NLP
26	6.44"	360°	360°	360°	360°	1.06	NRI	Blade	Yes	NLP
27	2.63"	360°	360°	360°	360°	1.01	NRI	Blade	Yes	NLP
28	5.07"	360°	360°	360°	360°	1.11	NRI	Blade	Yes	NLP
29	5.37"	360°	360°	360°	360°	0.71	NRI	Blade	Yes	NLP
30	4.67"	360°	360°	360°	360°	0.74	NRI	Blade	Yes	NLP
31	5.54"	360°	360°	360°	360°	1.22	NRI	Blade	Yes	NLP
32	2.81"	360°	360°	360°	360°	0.95	NRI	Blade	Yes	NLP

33	4.85"	360°	360°	360°	360°	1.39	NRI	Blade	Yes	NLP
34	4.93"	360°	360°	360°	360°	1.25	NRI	Blade	Yes	NLP
35	4.71"	360°	360°	360°	360°	1.13	NRI	Blade	Yes	NLP
36	5.61"	360°	360°	360°	360°	0.74	NRI	Blade	Yes	NLP
37	5.41"	360°	360°	360°	360°	0.68	NRI	Blade	Yes	NLP
38	2.75"	360°	360°	360°	360°	0.77	NRI	Blade	Yes	NLP
39	4.65"	360°	360°	360°	360°	1.41	NRI	Blade	Yes	NLP
40	3.29"	360°	360°	360°	360°	1.07	NRI	Blade	Yes	NLP
41	4.56"	360°	360°	360°	360°	1.39	NRI	Blade	Yes	NLP
42	4.68"	360°	360°	360°	360°	1.10	NRI	Blade	Yes	NLP
43	4.10"	360°	360°	360°	360°	1.46	NRI	Blade	Yes	NLP
44	4.31"	360°	360°	360°	360°	1.09	NRI	Blade	Yes	NLP
45	3.51"	360°	360°	360°	360°	0.76	NRI	Blade	Yes	NLP
46	4.92"	360°	360°	360°	360°	2.56	NRI	Rotating	Yes	NLP
47	5.20"	360°	360°	360°	360°	2.09	NRI	Rotating	Yes	NLP
48	4.92"	360°	360°	360°	360°	2.26	NRI	Rotating	Yes	NLP
49	5.65"	360°	360°	360°	360°	2.43	NRI	Rotating	Yes	NLP
51	4.61"	360°	360°	360°	360°	2.53	NRI	Rotating	Yes	NLP
53	4.73"	360°	360°	360°	360°	2.02	NRI	Rotating	Yes	NLP
55	4.71"	360°	360°	360°	360°	2.36	NRI	Rotating	Yes	NLP
57	5.31"	360°	360°	360°	360°	1.31	NRI	Rotating	Yes	NLP
58	3.22"	360°	360°	360°	360°	0.93	NRI	Blade	Yes	NLP
59	3.27"	360°	360°	360°	360°	1.85	NRI - RVLIS	Blade	Yes	NLP
60	3.42"	360°	360°	360°	360°	1.90	NRI - RVLIS	Blade	Yes	NLP
61	2.25"	360°	360°	360°	360°	1.30	NRI	Blade	Yes	NLP
62	3.49"	360°	360°	360°	360°	1.36	NRI	Blade	Yes	NLP
63	2.01"	360°	360°	360°	360°	2.54	NRI	Blade	Yes	NLP
64	2.78"	360°	360°	360°	360°	1.60	NRI	Blade	Yes	NLP
65	2.52"	360°	360°	360°	360°	2.16	NRI	Blade	Yes	NLP
66	2.48"	360°	360°	360°	360°	2.03	NRI	Blade	Yes	NLP
67	2.95"	360°	360°	360°	360°	1.98	NRI	Blade	Yes	NLP
68	2.96"	360°	360°	360°	360°	1.30	NRI	Blade	Yes	NLP
69	3.29"	360°	360°	360°	360°	1.16	NRI	Blade	Yes	NLP
Vent	2.00"	360°	360°	360°	N/A	N/A	NRI	Rotating	N/A	N/A

Notes: 1) NRI - no recordable indications.

2) NLP – no leak path identified

3) Leak path determination is not applicable to the vent line, because it has a clearance fit. Leak path for the vent was determined by a surface ECT of the vent weld.

4) Minimum distance examined below the weld is measured on the low hillside of the nozzle and is the distance inspected below the weld to the maximum extent of the UT inspection technology.