

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: B609100021 DOC. DATE: 86/09/04 NOTARIZED: NO DOCKET #
 FACIL: 50-389 St. Lucie Plant, Unit 2, Florida Power & Light Co. 05000389
 AUTH. NAME AUTHOR AFFILIATION
 WOODY, C. O. Florida Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION
 TOURIGNY, E. G. PWR Project Directorate B

SUBJECT: Forwards response to B60807 request for addl info re B60715 application to amend License NPF-16, revising pressure-temp limits for RCS.

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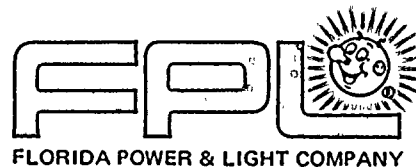
REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: B40910002 DOC. DATE: B409104 NOTARIZATION: NO
 FACILITY: 387 St. Luke Plaza, Unit 2, First Power & Light Co.
 AUTHOR AFFILIATION: First Power & Light Co.
 RECIPIENT NAME: WOODY, C. O.
 TOURIONY, E. O. PWR Project Director 8

SUBJECT: Forward response to B40897 request for addl info re B40910 application to amend license NRE-16, revising pressure-temp limits for RCS.

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SEP 4 1986
L-86-354

Office of Nuclear Reactor Regulation
Attention: Mr. E. G. Tourigny, Project Manager
PWR Project Directorate #8
Division of PWR Licensing - B
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Tourigny:

Re: St. Lucie Unit 2
Docket No. 50-389
Pressure - Temperature Limits

By letter L-86-281, dated July 15, 1986, Florida Power & Light Company submitted proposed Technical Specifications to incorporate revised pressure-temperature limits for the reactor coolant system. On August 7, 1986 you issued a request for additional information pursuant to NRC staff review of our proposal. The information you requested is attached.

Please contact us if you have any questions about this submittal.

Very truly yours,

C. O. Woody
C. O. Woody
Group Vice President
Nuclear Energy

COW/MAS/cvb

Attachment

cc: Dr. J. Nelson Grace, USNRC, Region II
Harold F. Reis, Esquire, Newman & Holtzinger

8609100021 860904
PDR ADDCK 05000389
P PDR

Asst
11

MAS2/035/1

ATTACHMENT

Re: St. Lucie Unit 2
Docket No. 50-389
Pressure-Temperature Limits

Question 1

For an EOL fluence of either 3.64×10^{19} n/cm² (capsule report submitted November 5, 1985, L-85-423) or 4.79×10^{19} n/cm² (PTS submittal dated January 23, 1986, L-86-25) the transition temperature shift is greater than 200° F (Figure B3/4.4-1, page B3/4 4-10). You committed to meet Appendix H of 10 CFR 50 Part 100, which references ASTM E185. Table 1 of ASTM E185-82 calls for 5 surveillance capsules with the following withdrawal sequence.

| <u>Capsule</u> | <u>Schedule in FPY</u> |
|----------------|------------------------|
| 1st | 1.5 |
| 2nd | 3 |
| 3rd | 6 |
| 4th | 15 |
| 5th | EOL |

Table 4.4-5 of the Technical Specifications does not reflect this withdrawal schedule (page 3/4 4-34). Please provide a justification for your withdrawal schedule or commit to the above schedule.

Response 1

Based on the response to Question 2 below, either the current Figure B3/4.4-1 or the revised Figure B3/4.4-1 (when it becomes available) will be compared with the appropriate version of ASTM E185 to derive a surveillance capsule withdrawal sequence. If the current sequence needs to be revised, a proposed Technical Specification Change will be submitted by December 1, 1986.

Question 2

Based on the information obtained from the first capsule withdrawn from the reactor pressure vessel, is the curve in Figure B3/4.4-1 still applicable?

Response 2

Based on information from the first surveillance capsule removed from the St. Lucie Unit 2 reactor pressure vessel, we have determined that the current Figure B3/4.4-1 is conservative. However, we also intend to use the capsule data to revise the Figure. If sufficient benefit can be derived from using the revised Figure B3/4.4-1, a proposed Technical Specification change will be submitted by December 1, 1986.

Question 3

Please provide the data used to calculate the P-T limits.
What is (are):

- a. Limiting (controlling) material and its Cu and Ni content?

Response 3a

The limiting material in the reactor vessel through End of Life (EOL) is the intermediate shell plate M605-2. Its copper and nickle content is 0.13 and 0.62 w/o, respectively.

- b. Fluence used at 5 EFPY and EOL?

Response 3b

| <u>EFPY</u> | <u>ID</u> | <u>1/4 t</u> | <u>3/4 t</u> |
|-------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 5 | $0.91 \times 10^{19} \text{n/cm}^2$ | $0.49 \times 10^{19} \text{n/cm}^2$ | $0.11 \times 10^{19} \text{n/cm}^2$ |
| 32 | $5.8 \times 10^{19} \text{n/cm}^2$ | $3.1 \times 10^{19} \text{n/cm}^2$ | $0.70 \times 10^{19} \text{n/cm}^2$ |

This data was calculated based on a detailed octant symmetric DOT model of the core-to-vessel configuration. The core power distribution was modeled in a detailed manner using pinwise power distribution data. The core power distribution was provided by Florida Power & Light Company and was chosen to bound future fuel management strategies with respect to the fluence accumulated in the reactor vessel. Ordinary out-in and (low leakage) in-out fuel management strategies will be bounded.

Both the 5 EFPY and 32 EFPY fluence values were based on the same bounding fuel management strategy. The fluence values were quoted for the peak fluences at a given vessel radius.

The DOT model did not include a representation of the concrete cavity wall but the 3/4T fluence values were adjusted to account for the backscatter due to the wall and cavity structures. The values are based upon 2700 Mwt power operation and on 8.625" vessel thickness.

- c. ID, OD, and thickness of reactor pressure vessel?

Response 3c

| | | |
|-----------------------|---|---------|
| Inside Diameter (ID) | = | 172.44" |
| Outside Diameter (OD) | = | 189.69" |
| Wall Thickness (t) | = | 8.625" |

- d. Initial RT_{NDT} for flange, girth weld, longitudinal weld, and base metal?

Response 3d

| Initial RT_{NDT} For: | | Initial RT_{NDT} (°F) |
|-------------------------------|----------|----------------------------|
| Flange | | -10° |
| Girth Weld | | -70° |
| Intermediate Shell Plate | M605-1 | 30° |
| Intermediate Shell Plate | M605-2 | 10° |
| Intermediate Shell Plate | M605-3 | -10° |
| Lower Shell Plate | M4116-1 | 20° |
| Lower Shell Plate | M4116-2 | 20° |
| Lower Shell Plate | M4116-3 | 20° |
| Intermediate Shell Long. Weld | 101-124A | -80° |
| Intermediate Shell Long. Weld | 101-124B | -80° |
| Intermediate Shell Long. Weld | 101-124C | -50° |
| Lower Shell Long. Weld | 101-142A | -50° |
| Lower Shell Long. Weld | 101-142B | -50° |
| Lower Shell Long. Weld | 101-142C | -50° |

- e. Standard deviation of initial RT_{NDT} (σ_i) for girth weld, longitudinal weld, and base metal?

Response 3e

All of the initial RT_{NDT} values from above are single reported values. As such, the standard deviations are equal to zero.

- f. Standard deviation of ΔRT_{NDT} σ_{Δ} for girth weld, longitudinal weld, and base metal?

Response 3f

The shift in RT_{NDT} was calculated using the proposed Revision 02 to Regulatory Guide 1.99. Accordingly, the standard deviation for the welds are 28°F, and for the base metal is 17°F.

- g. Temperature measurement error?

Response 3g

The temperature measurement error was calculated to be 8.0°F.

- h. Design pressure and operating pressure?

Response 3h

The design pressure of the reactor coolant system is 2500 psia.
The operating pressure of the reactor coolant system is 2250 psia.

- i. Hydrostatic head?

Response 3i

The hydrostatic head is calculated to be 19.1 psia from the pressurizer to RV beltline.

- j. Pressure measurement error?

Response 3j

The pressure measurement error is calculated to be as follows:

23.9 psia for digital display P-1103, P-1105 for pressures less than or equal to 750 psia.

64.5 psia for displays P-1107, P-1108 for pressures greater than 750 psia.

- k. What are the calculated values of the adjusted reference temperature for the limiting material?

Response 3k

The predicted adjusted RT_{NDT} for plate M605-2 is 117°F for the 1/4t location and 84°F for the 3/4t location at 5 EFPY. The predicted adjusted RT_{NDT} for plate M605-2 is 163°F for the 1/4t location and 126°F for the 3/4t location at 32 EFPY.