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SUBJECT: FORWARDS RESPONSES TO QUESTIONS RE RELOAD SAFETY EVALUATION.

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FLORIDA POWER & LIGHT COMPANY

May 22, 1979
L-79-134

Office of Nuclear Reactor Regulation
Attention: Mr. R. W. Reid, Director
Operating Reactors Branch #4
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Reid:

Re: St. Lucie Unit #1
Docket No. 50-335
RSE Questions

We recently received several sets of questions from the NRC Staff on the St. Lucie 1, Cycle 3 Reload Safety Evaluation (RSE) which we forwarded to the Division of Operating Reactors on February 22, 1979. In order to facilitate NRC review and minimize any impact on our restart schedule, we are submitting responses to your questions as these responses become available. Attached are responses to questions 2.10 through 2.14, 2.16, 2.17 and 2.20.

Very truly yours,

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/DKJ/cph

Attachment

cc: Mr. James P. O'Reilly, Region II
Harold F. Reis, Esquire

TABLE 7.2-1

KEY PARAMETERS ASSUMED IN THE RCS DEPRESSURIZATION EVENT

PARAMETER	UNITS	REFERENCE CYCLE	CYCLE 3
Initial Core Power Level	MWt	102% of 2560	102% of 2560
Core Inlet Coolant Temperature	°F	544	544
Reactor Coolant System Pressure	psia	2250	2300
Moderator Temperature Coefficient	$10^{-4} \Delta\rho/°F$	-2.5	-2.5
Doppler Coefficient Multiplier		.85	.85
CEA Worth at Trip - FP	$10^{-2} \Delta\rho$	-4.60	-4.32
Holding Coil Delay Time	sec	.5	.5
CEA Time to 90 Percent Insertion (Including Holding Coil Delay)	sec	3.0	3.1
Area for 2 Relief Valves	ft^2	.016	.018*

*includes a 10% uncertainty on valve area

Question 2.10

(RCS Depressurization Analysis, Section 7.2) There are no input parameters listed here. Are the inputs assumed to be the same as those listed for CEA withdrawal? If not, please supply a list of the values of pertinent RCS Depressurization parameters.

Response 2.10

A list of the values of pertinent RCS Depressurization parameters are given in the attached table.

Question 2.11

(Cycle 3 Application Page 12) It is here stated "The limiting parameters of dropped CEA reactivity worth and maximum increase in radial peaking factor have been calculated for Cycle 3. The results indicate that there are no changes in either of these parameters when compared to the reference cycle results." It would seem a phenomenal coincidence if these numbers were identical to three figures. Were the numbers really identical, or simply bounding? If the numbers were not identical, what were the cycle 3 values?

Response 2.11

The values calculated for cycle 3 were less limiting than the calculated cycle 2 values as shown below.

St. Lucie Unit 1 Cycle 3
Full Length CEA Drop Data

	Limiting Values	
	Reference Cycle	Cycle 3
Minimum Worth, $\%\Delta\rho$	.04	.04
Max. Percent Increase in Pin Peak	14.5	14.0

Furthermore, a set of input more limiting than any of the above sets was used in the reference cycle analysis as discussed in Section 7.4 of the Cycle 2 application.

Question 2.12

(Cycle 2 Application Pages 19 & 46) The Bank 7 Inserted Maximum Post-Drop Planar Radial Pin Peak is 1.82 on page 19 and 2.05 on page 46. Is one of these incorrect?

Response 2.12

The 1.82 values listed in Table 5-5 of the Cycle 2 Reload Application are incorrect. They should be as follows:

BOC	Max. Post-Drop Planar Radial Peak	Max. % Increase
All Rods Out	1.72	14.5
Bank 7 Inserted	2.00	13.5

However, the values used in the Cycle 2 safety analysis were more limiting than the above, as indicated in Table 7.4-3 of the cycle 2 application (1.82 and 2.05 for All Rods Out and Bank 7 Inserted respectively).

Question 2.13 (Cycle 2 Application Pages 19, 23, 45)

One would think that the 1.79 on page 46 should be the 1.50 of page 23 times the (100 + 14.5)% of page 19. However 1.50 x 1.145 = 1.72, not 1.79. Explain how the 1.79 is determined.

Response 2.13

The 1.50 of page 23 is a planar radial peaking factor. The 1.79 on page 46 represents the Post-Drop integrated radial peaking factors used in the Safety Analysis for the unrodded region. It was obtained by multiplying the unrodded integrated radial peaking factor listed in Table 7.2 (1.53) by a conservative distortion factor of 1.17 for the CEA drop, as listed in Table 7.4-1. (1.79 = 1.53 x 1.17)

Question 2.14 (Cycle 2 Application Pages 19, 26, 45)

One would think that the 1.99 on page 45 should be the 1.76 of page 26 times the (100 x 13.5)% of page 19. However 1.76 x 1.135 = 2.00, not 1.99. Explain how the 1.99 is determined.

Response 2.14

The 1.76 on page 26 is a planar radial peaking factor and not an integrated radial peaking factor. The 1.99 value listed on page 46 represents the post drop integrated radial peaking factor with Bank 7 inserted. It can be obtained by multiplying the pre-drop integrated radial peak with Bank 7 inserted. (1.70, as listed in Table 7-2) by 1.17 which is the radial peaking distortion factor listed in Table 7.4-1. (1.99 = 1.70 x 1.17).

Question 2.16 (Cycle 2 Application Pages 26 & 35)

On page 26 the F_r for Bank 7 Inserted is 1.76. The Safety Analysis value should be this large or larger, yet on page 35 the value is only 1.70. Explain this apparent anomaly.

Response 2.16

The value on page 26 is not an integrated radial F_r, but a planar radial peaking factor, F_{xy}. The F_r, as stated on page 35, is correct.

Question 2.17 (Cycle 3 Application Page 35)

The maximum reactivity insertion rate has dropped from 2.0 E-4 Δρ/sec in Cycle 2 to 1.3 E-4 in Cycle 3. Explain this large change. Is the 1.3 E-4 a best estimate value, or is it conservative relative to the best estimate value. If it is conservative, what is the best estimate value?

Response 2.17

The Cycle 2 maximum reactivity insertion rate (2.0×10^{-4} Δρ/sec) was based on a conservative maximum differential rod worth of 3.0×10^{-4} Δρ/in and a maximum rod group withdrawal speed of 40 in/min. For Cycle 3 some conservatism was removed from the differential rod worth and a value of 2.6×10^{-4} Δρ/in was used. The maximum rod group withdrawal speed was determined to be 30 in/min. rather than 40 in/min previously assumed, based on plant data. These two changes resulted in a reactivity insertion rate of 1.3×10^{-4} Δρ/sec. The best estimate for the maximum reactivity insertion rate is less than one-half of the value used in the Cycle 3 analyses.

Question 2.20 (Cycle 3 Application Page 27)

Why has the pressure drop across the core and vessel increased?

Response 2.20

The small increase in pressure drop across the core and vessel is due to an increase in the number of assemblies which have stainless steel sleeves installed in the guide tubes.