NRC FORM 195 (2-76)

U.S. NUCLEAR REGULATORY COMMISSION

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

DOCKET NUMBER: 50-335

FILE NUMBER:

TO: Mr. Victor Stello

FROM: Florida Power & Light Company, Miami, Florida, Robert E. Uhrig

DATE OF DOCUMENT: 3/17/77

DATE RECEIVED: 3/21/77

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PROP

INPUT FORM

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DESCRIPTION

Ltr. re our 2/15/77 ltr....trans the following:

ACKNOWLEDGED, DO NOT REMOVE

PLANT NAME:

St. Lucie Unit No. 1 (2-P)

RJL

ENCLOSURE

Amdt. to ol/notorized 3/17/77...change to tech specs...to revise pressure-temperature limits for the first two effective years of full power operation....

(40 cys encl rec'd)

(9-P)

FOR ACTION/INFORMATION

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NRC FORM 195 (2-76)

P. O. BOX 013100, MIAMI, FL 33101

FLORIDA POWER & LIGHT COMPANY

March 17, 1977
L-77-82

Director of Nuclear Reactor Regulation
Attention: Mr. Victor Stello, Director
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Stello:

Re: St. Lucie Unit 1
Docket No. 50-335
Proposed Amendment to
Facility Operating License DPR-67

A letter from your staff dated February 15, 1977 requested that we revise our pressure-temperature limits for the first 2 effective years of full power operation (Technical Specification Figure 3.4-2a) to provide additional margin to assure compliance with Appendix G to 10 CFR Part 50. We have studied several references (SRP 5.3.2, BTP MTEB No. 5-2, and Appendix G to 10 CFR Part 50) dealing with fracture toughness requirements and have developed a new curve with which to replace Figure 3.4-2a. Our new curve conservatively depicts operating conditions for up to 5 effective years of full power operation. We propose that our new curve be approved for use in place of the current Figure 3.4-2a.

In accordance with 10 CFR 50.30, we hereby submit three (3) signed originals and forty (40) copies of our request to amend Appendix A of Facility Operating License DPR-67. The changes are described below and shown on the accompanying Technical Specification pages bearing the date of this letter in the lower right hand corner.

Page 3/4 4-23a

A new Figure 3.4-2a is provided entitled "Reactor Coolant System Pressure Temperature Limitations for up to 5 years of Full Power Operation".

Page 3/4 4-23b

The title of Figure 3.4-2b is revised to read "Reactor Coolant System Pressure Temperature Limitations for up to 10 Years of Full Power Operation".

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Page 3/4 4-23c

The title of Figure 3.4-2c is revised to read "Reactor Coolant System Pressure Temperature Limitations for up to 40 Years of Full Power Operation".

The proposed changes have been reviewed by the St. Lucie Facility Review Group and the Florida Power & Light Company Nuclear Review Board. They have concluded that it does not involve an unreviewed safety question. A safety evaluation is attached.

Very truly yours,

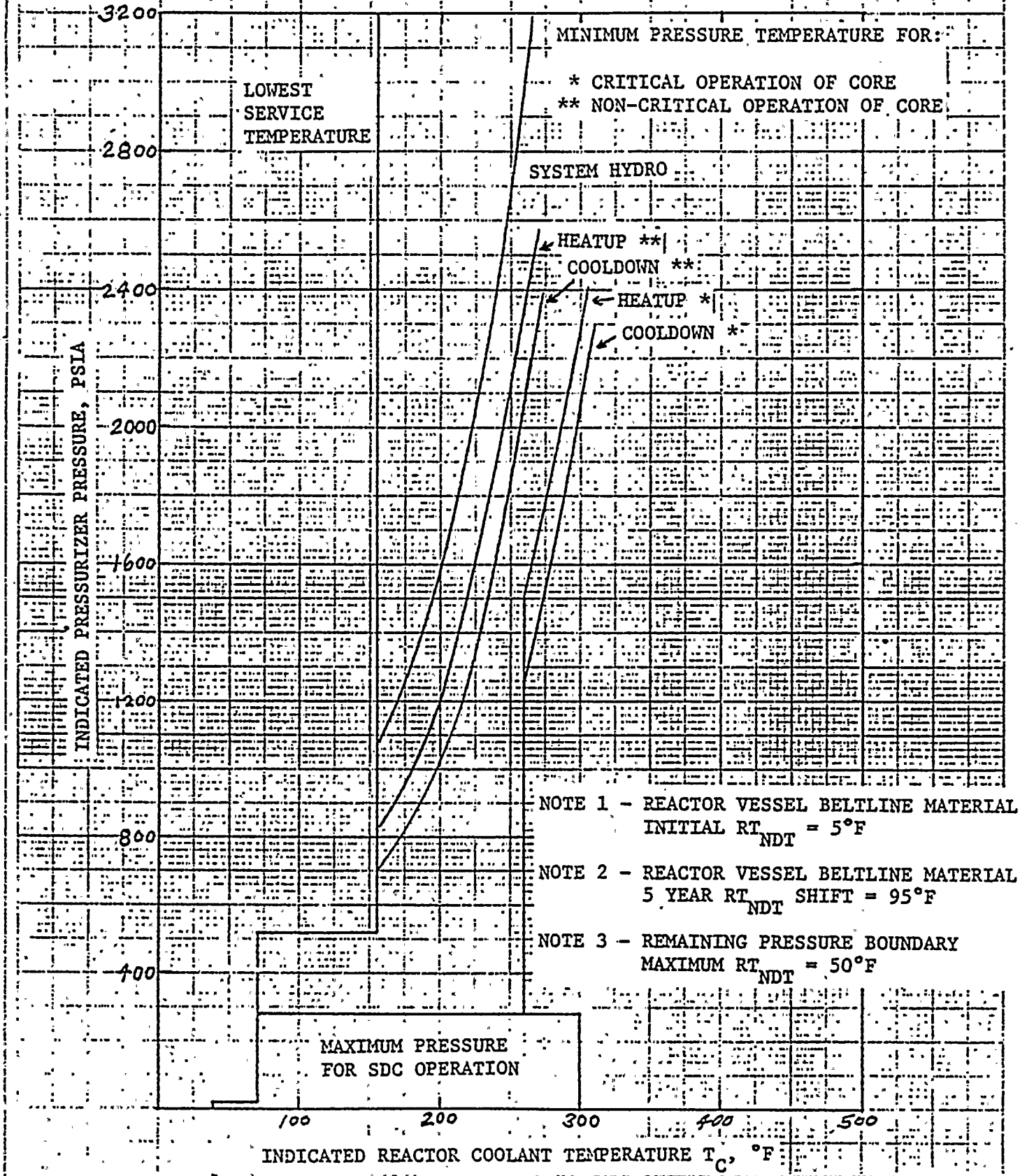
E. L. Edomat

for Robert E. Uhrig
Vice President

REU/MAS/cpc

Attachment

cc: Mr. Norman C. Moseley, Region II
Robert Lowenstein, Esquire



ST. LUCIE UNIT 1

FIGURE 3.4-2a

REACTOR COOLANT SYSTEM PRESSURE TEMPERATURE LIMITATIONS FOR UP TO 5 YEARS OF FULL POWER OPERATION

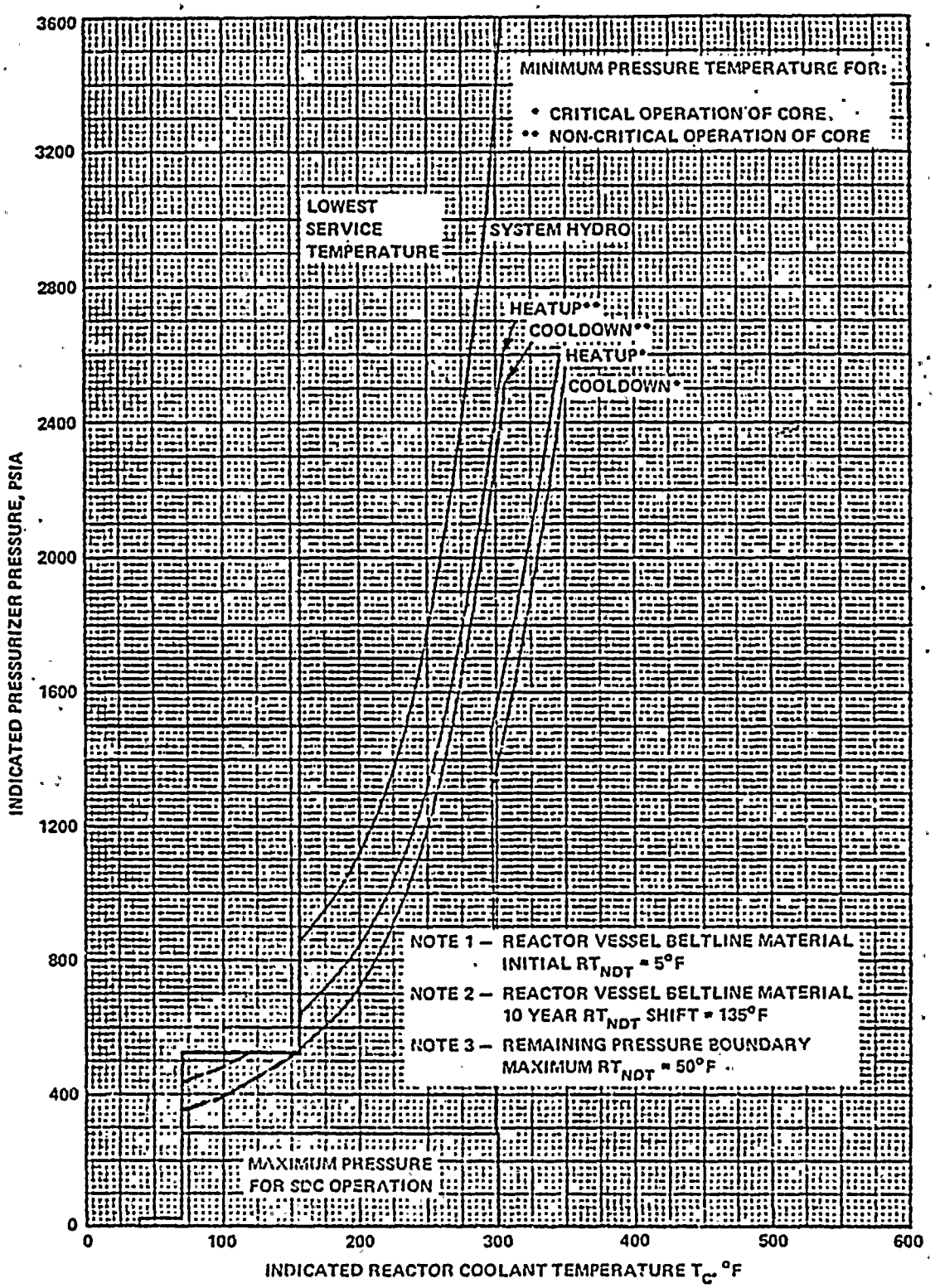


FIGURE 3.4-2b

Reactor Coolant System Pressure Temperature Limitations for up to 10 Years of Full Power Operation

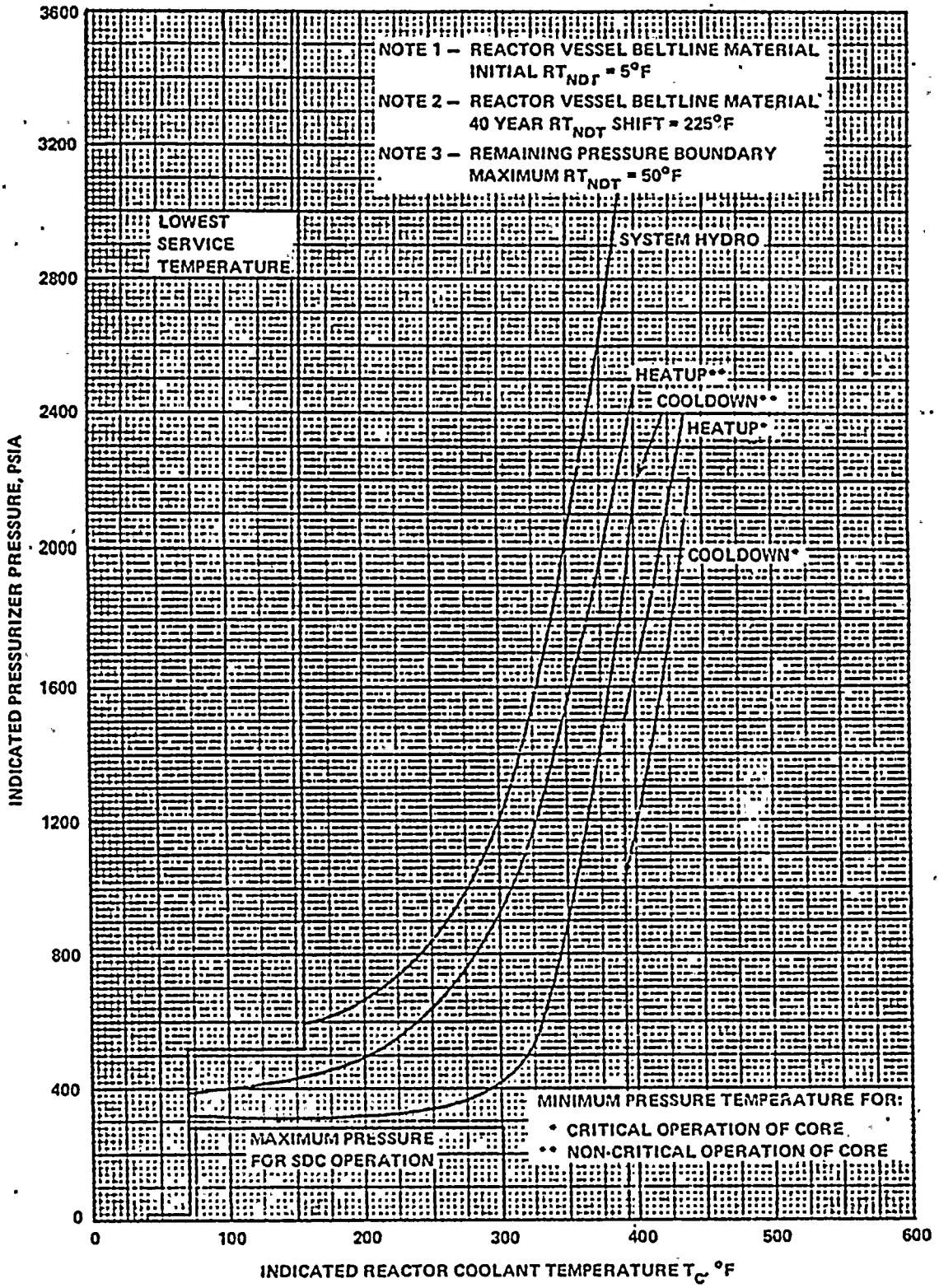


FIGURE 3.4-2c

Reactor Coolant System Pressure Temperature Limitations for up to 40 Years of Full Power Operation

SAFETY EVALUATION

1.0 Introduction

This evaluation supports proposed changes to the St. Lucie Unit 1 Pressure-Temperature curves (Figures 3.4-2a, 3.4-2b, and 3.4-2c).

2.0 Discussion

2.1 Figure 3.4-2a

Criteria presented in paragraph 2.2.2 of Branch Technical Position 5-2 (Fracture Toughness Requirements) lead to the following equation:

$$RT_{NDT} \text{ (initial)} + RT_{NDT} \text{ (shift due to service)}$$

$$\geq RT_{NDT} \text{ (maximum from remaining pressure boundaries)} + 50°F \qquad (1)$$

This relationship has been used to develop a new Technical Specification Figure 3.4-2a. The new curve is applicable for up to 5 years of full power operation.

A minimum RT_{NDT} shift of 95°F is necessary to satisfy Equation (1). A 95°F shift is midway between the 55°F shift of the current Figure 3.4-2a and the 135°F shift of Figure 3.4-2b. To develop a new Figure 3.4-2a that will satisfy Equation (1), the 10-year curves of Figure 3.4-2b were shifted 40°F to the left. This technique is justified based on paragraph 3c of section III to Standard Review Plan 5.3.2 (Pressure-Temperature Limits).

Information from Chapter 5 of the FSAR was used to determine the service time for which a 95°F shift will be applicable.

a) The pertinent chemical composition of the weld in the beltline region was obtained from Table 5.2-4A on page 5.2-14:

.23 weight % Cu
.013 weight % P

b) The end-of-life RT_{NDT} shift and the end-of-life fluence were obtained from Sections 5.2.3.5.5 (page 5.2-18) and 5.4.4 (page 5.4-8):

end-of-life RT_{NDT} shift = 225°F
end-of-life fluence = 1.91×10^{19} n/cm^2

SAFETY EVALUATION (Continued)

c) An equation relating RT_{NDT}, chemical composition, and fluence was obtained from Regulatory Guide 1.99 (Effects of Residual Elements on Predicted Radiation Damage to Reactor Vessel Materials):

$$RT_{NDT}(\text{shift}) = [40 + 1000\ (\%\ Cu - 0.08) + 5000\ (\%P - 0.008)]\ [\frac{f}{10^{19}}]^{1/2}$$

$$\text{or, } (\frac{RT_{NDT}}{215}) \times 10^{19} = f\ (n/cm^2)$$

RT_{NDT} (°F)	f (n/cm^2)	time (yrs.)
225	1.91×10^{19}	40
135	3.94×10^{18}	10
95	1.95×10^{18}	--
55	0.65×10^{18}	2

The attached figures show the pressure-temperature curves for RT_{NDT}=95°F and a semi-logarithmic plot of fluence vs. service life. The service life plot shows that, after 5-1/2 years of full power operation, the vessel surface has been exposed to a fluence of 1.95×10^{18} n/cm^2. Thus, the new pressure-temperature curves conservatively depict operating conditions for up to 5 years of full power operation.

2.2 Figures 3.4-2b and 3.4-2c

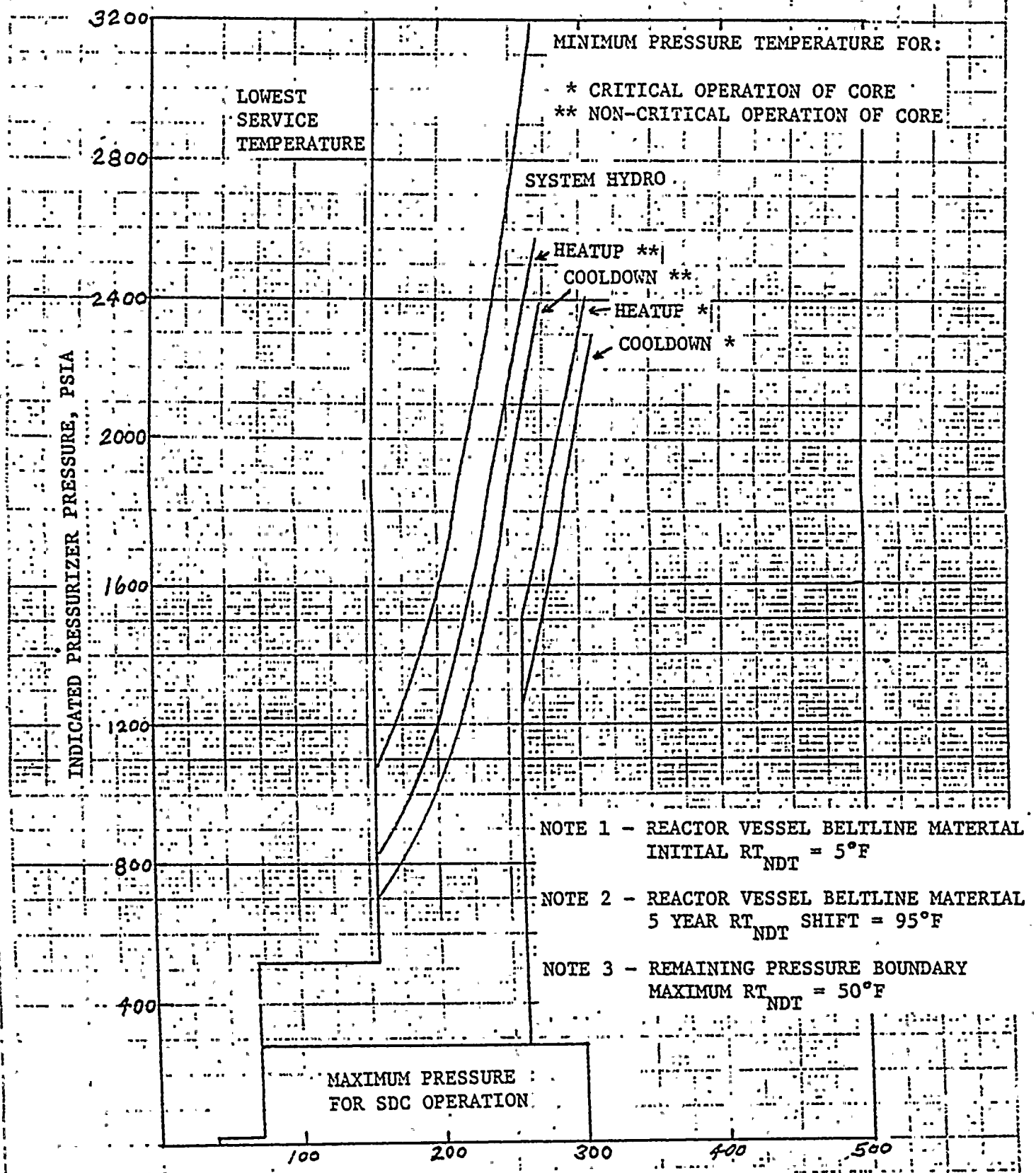
Since the pressure temperature curves represent an upper boundary on service life, the titles are revised to read "up to 10 Years" and "up to 40 Years" instead of "2 to 10 Years" and "10 to 40 Years", respectively.

3.0 Conclusions

Based on these considerations, (1) the proposed change does not increase the probability or consequences of accidents or malfunctions of equipment important to safety and does not

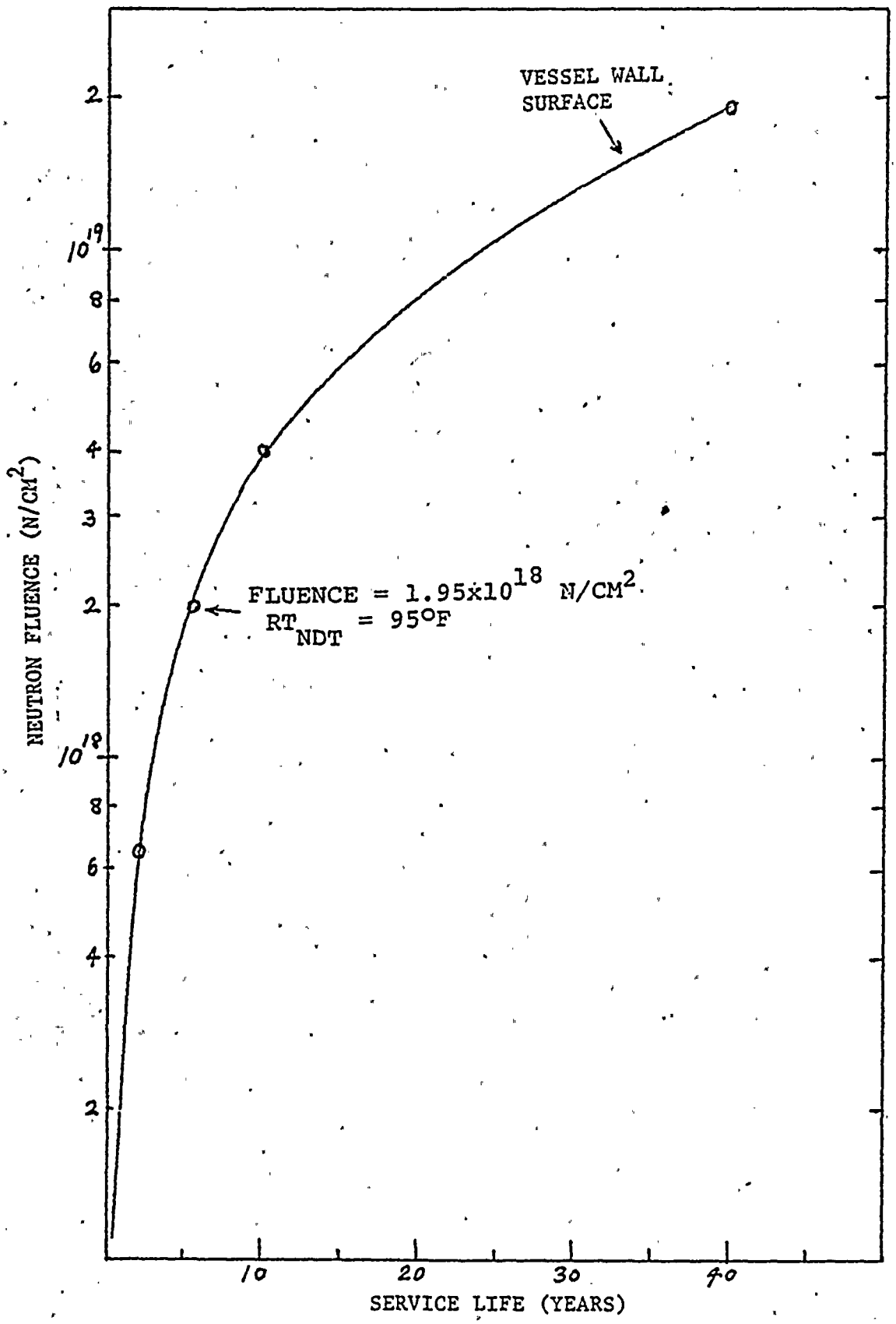
SAFETY EVALUATION (Continued)

reduce the margin of safety as defined in the basis for any technical specification, therefore, the change does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.



ST. LUCIE UNIT 1

REACTOR COOLANT SYSTEM PRESSURE TEMPERATURE LIMITATIONS FOR UP TO 5 YEARS OF FULL POWER OPERATION



FAST NEUTRON FLUENCE (E>1MEV) AS A FUNCTION OF SERVICE LIFE

STATE OF FLORIDA)
) ss.
COUNTY OF DADE)

E. A. ADOMAT, being first duly sworn, deposes and says:

That he is Executive Vice President of Florida Power & Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this said document are true and correct to the best of his knowledge, information, and belief, and that he is authorized to execute the document on behalf of said Licensee.

E. A. Adomat

E. A. Adomat

Subscribed and sworn to before me this 17th day of March, 1977

Helen L. Carson

NOTARY PUBLIC, in and for the County of Dade, State of Florida

NOTARY PUBLIC STATE OF FLORIDA AT LARGE
MY COMMISSION EXPIRES NOV. 30 1979
BONDED THRU GENERAL INS. UNDERWRITERS

My commission expires: