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 FACIL: 50-389 St. Lucie Plant, Unit 2, Florida Power & Light Co.      05000389  
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 MIRAGLIA, F. J.      Division of Pressurized Water Reactor Licensing - B (post B)

SUBJECT: Notifies that max RT (pressurized: thermal shock) of 171 F will be experienced by intermediate plate matl at end of QL, per 10CFR. 61(b)(1). Value well below 270 F screening criterion for plate matl. Supporting documentation encl.

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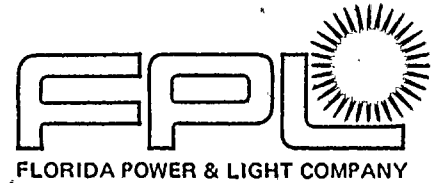
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JAN 23 1988

L-86-25

Mr. Frank J. Miraglia, Director  
Division of PWR Licensing - B  
U.S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Dear Mr. Miraglia:

Re: St. Lucie Unit 2  
Docket No. 50-389  
10 CFR 50.61 (b)(1) Report

10 CFR 50.61 (b)(1) requires the submittal of projected values of RT (PTS) for the end of the operating license for St. Lucie Unit 2. The requirement arises from the concern over reactor vessel embrittlement and pressurized thermal shock.

FPL has recently removed a surveillance capsule from St. Lucie Unit 2 which well defines vessel fluence. The results of the analysis of this capsule was utilized in the plant specific fluence projections. Beltline properties are well defined for reactor vessels in new plants such as St. Lucie Unit 2. St. Lucie Unit 2 reflects the industry's increased understanding of vessel embrittlement as evidenced by the low concentrations of copper and nickel in the materials of fabrication.

The highest RT (PTS) expected at St. Lucie Unit 2 is 171°F at end of license. This will be experienced by the intermediate plate material and is well below the 270°F screening criterion for plate material.

Should you or your staff have any questions on this information, please contact us.

Very truly yours,

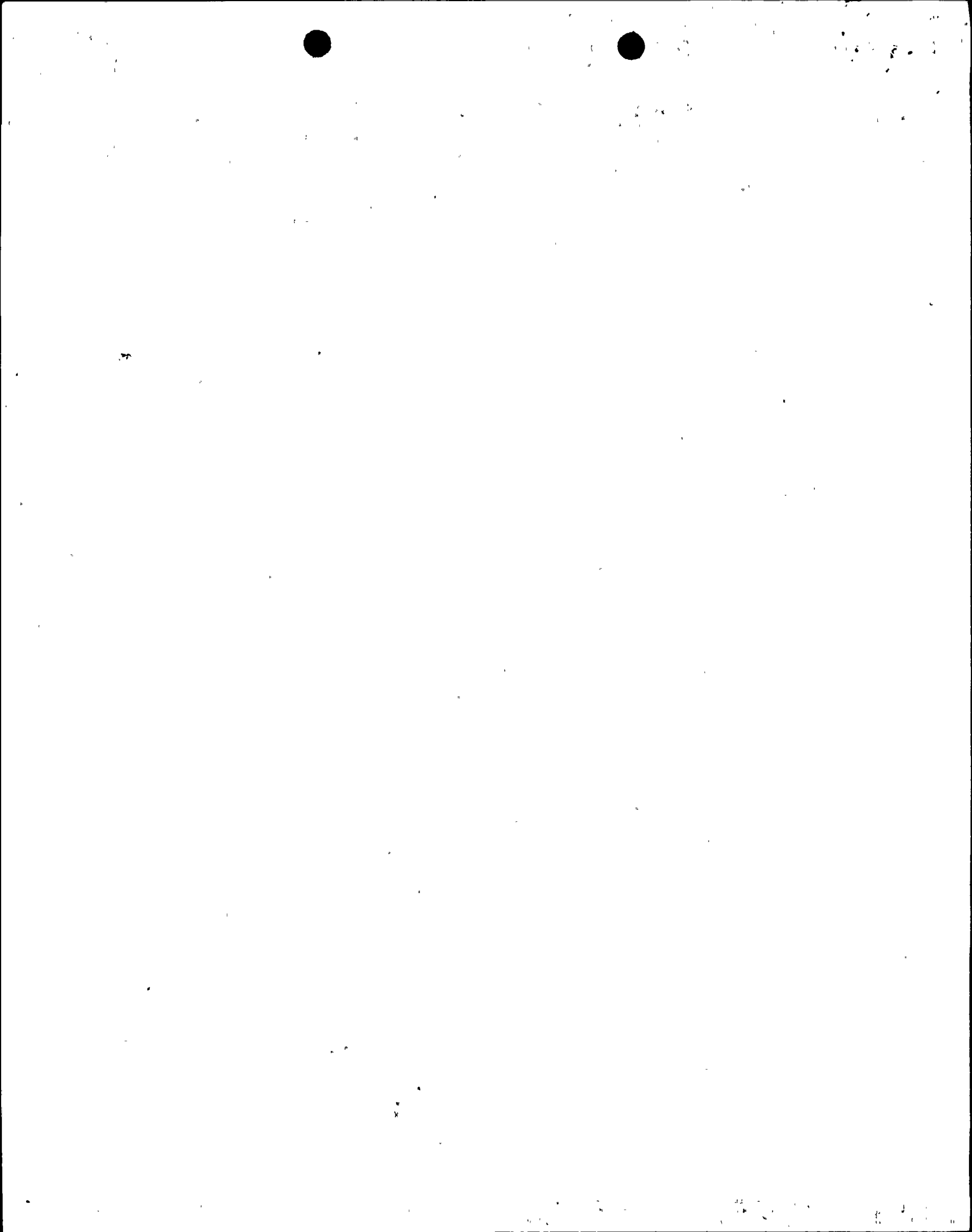
*C. O. Woody*  
C. O. Woody  
Group Vice President  
Nuclear Energy Department

SAC/cac

cc: Dr. J. Nelson Grace, Region II USNRC  
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*A-049*  
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05000389  
PDR



## ATTACHMENT 1

### Reactor Vessel Beltline Materials Description

The St. Lucie Unit 2 reactor pressure vessel was designed and fabricated by Combustion Engineering, Inc. The reactor vessel beltline, as defined by 10 CFR 50, Appendix H, consists of the six plates used to form the lower and intermediate shell courses in the vessel, the included longitudinal seam welds and the lower to intermediate shell girth seam weld. The plates were manufactured from SA533 Grade B Class 1 quenched and tempered plate. The longitudinal and girth seam welds were fabricated using E8018-C3 manual arc electrodes and Mil B-4 submerged arc weld wire with Linde 124 & 0091 flux.

The beltline materials are listed in Table 1.

Calculations for present and end of license RT (PTS) are based on equation 1 of 10 CFR 50.61 (b)(2). All materials data for these calculations are listed in Table 1. Fluence data is listed in Table 2 with the required calculated values of RT (PTS).

Since actual values for all materials were available, the "M" value of 480F was used for all calculations. Bases for all materials data can be found in the references.

Fluences are projected to end of license based on previous cycle-specific computer modeling predictions reported by Babcock and Wilcox (1) and extrapolated to the end of license based on calculated power distributions.

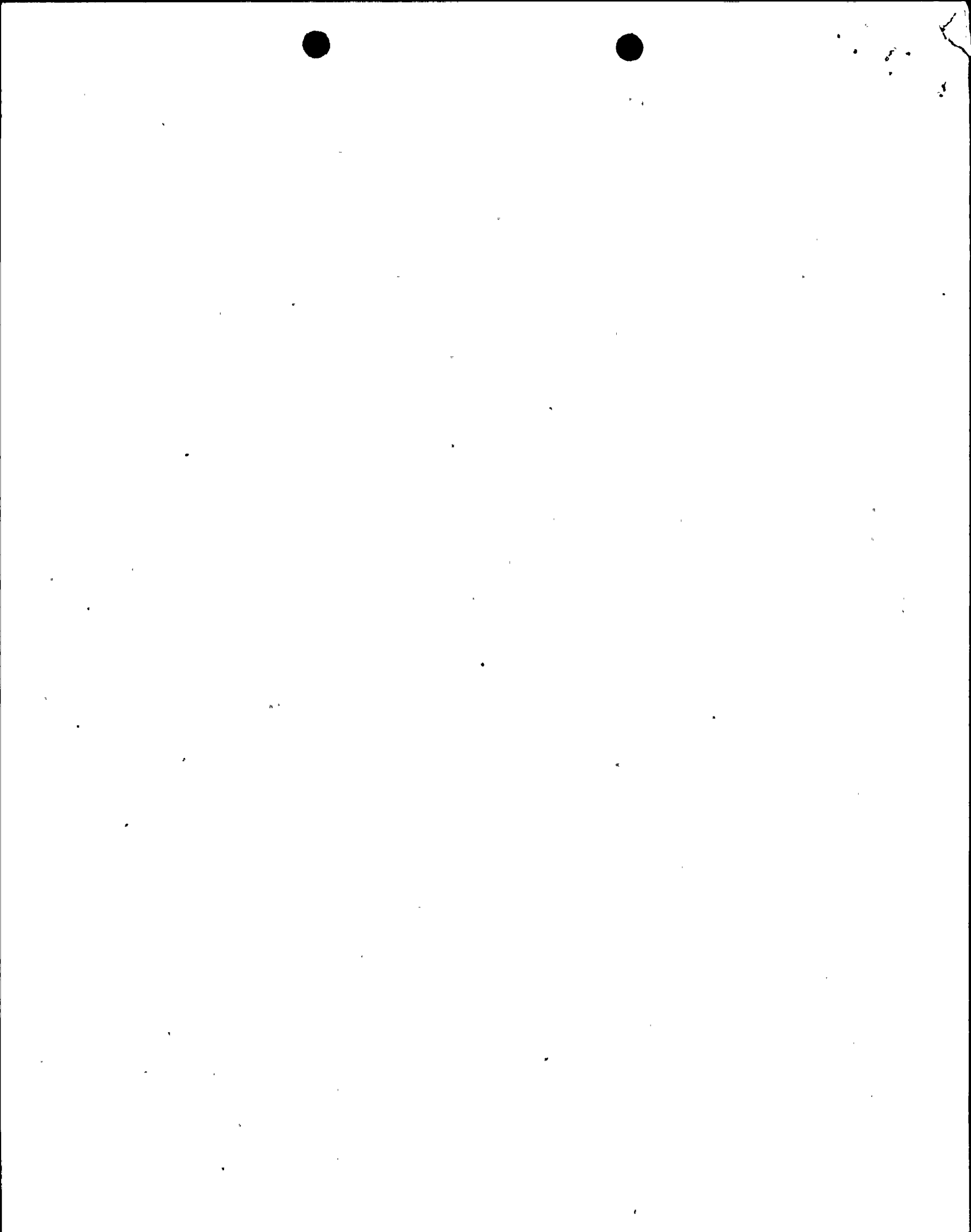


TABLE 1  
ST. LUCIE 2  
REACTOR VESSEL BELTLINE MATERIAL PROPERTIES

<u>Location</u>	<u>Code Number</u>	<u>Residual<sup>(2)</sup> Cu%</u>	<u>Chemistry<sup>(2)</sup> Ni%</u>	<u>RT(NDT)<sub>o</sub><sup>(2)</sup></u>
Lower shell Plate	M-4116-1	0.06	0.57	+20
Lower Shell Plate	M-4116-2	0.07	0.60	+20
Lower Shell Plate	M-4116-3	0.07	0.60	+20
Intermediate Shell Plate	M-605-1	0.11	0.61	+30
Intermediate Shell Plate	M-605-2	0.13	0.62	+10
Intermediate Shell Plate	M-605-3	0.11	0.61	0
Girth Weld	101-171	0.07	0.08	-70
Lower Shell Long Seam Welds	101-142A	0.04	0.10	-50
	101-142B	0.05	0.09	-50
	101-142C	0.04	0.09	-50
Intermediate Shell Long Seam Weld	101-124A	0.04	0.06	-50
	101-124B	0.03	0.06	-50
	101-124C	0.04	0.07	-50

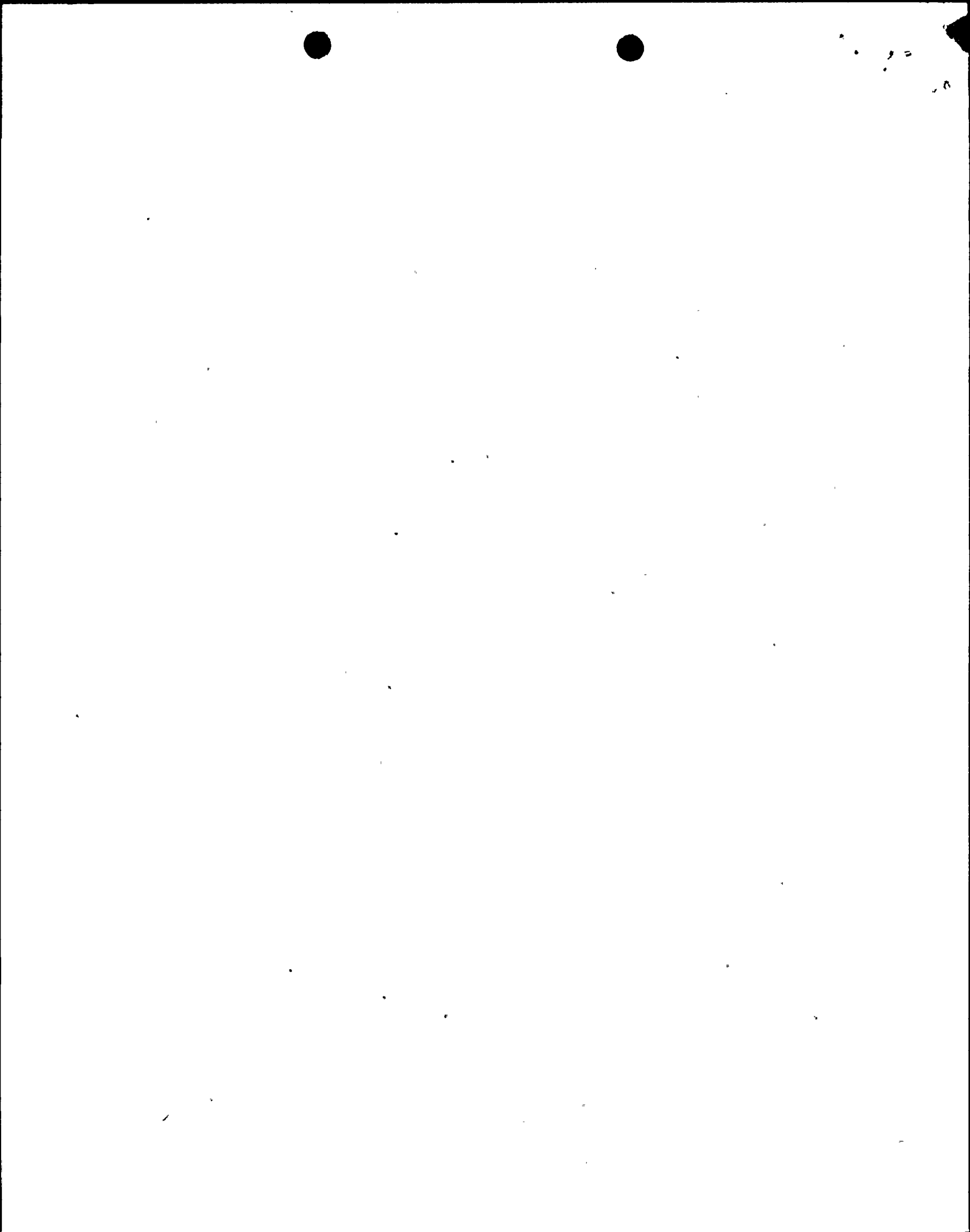




TABLE 2  
 FLUENCE AND RTPTS  
 1986 and 2023  
 ST. LUCIE UNIT 2

<u>Location</u>	<u>Code Number</u>	<u>Fluence n/cm<sup>2</sup> Jan 1986</u>	<u>RT PTS OF Jan 1986</u>	<u>Fluence n/cm<sup>2</sup> Apr 2023</u>	<u>RT PTS OF Apr 2023</u>
Intermediate Shell	M-605-1	3.06 x 10 <sup>18</sup>	125	4.79 x 10 <sup>19</sup>	177
Intermediate Shell	M-605-2	3.06 x 10 <sup>18</sup>	116	4.79 x 10 <sup>19</sup>	179
Intermediate Shell	M-605-3	3.06 x 10 <sup>18</sup>	95	4.79 x 10 <sup>19</sup>	147
Lower Shell	M-4116-1	3.06 x 10 <sup>18</sup>	90	4.79 x 10 <sup>19</sup>	114
Lower Shell	M-4116-2	3.06 x 10 <sup>18</sup>	95	4.79 x 10 <sup>19</sup>	125
Lower Shell	M-4116-2	3.06 x 10 <sup>18</sup>	95	4.79 x 10 <sup>19</sup>	125
Intermediate Shell Longitudinal Seam	101-124A	3.06 x 10 <sup>18</sup>	5	4.79 x 10 <sup>19</sup>	13
Intermediate Shell Longitudinal Seam	101-124B	3.06 x 10 <sup>18</sup>	1	4.79 x 10 <sup>19</sup>	5
Intermediate Shell Longitudinal Seam	101-124C	3.06 x 10 <sup>18</sup>	5	4.79 x 10 <sup>19</sup>	13
Lower shell Longitudinal Seam	101-142A	3.06 x 10 <sup>18</sup>	5	4.79 x 10 <sup>19</sup>	14
Lower Shell Longitudinal Seam	101-142B	3.06 x 10 <sup>18</sup>	9	4.79 x 10 <sup>19</sup>	21
Lower Shell Longitudinal Seam	101-142C	3.06 x 10 <sup>18</sup>	5	4.79 x 10 <sup>19</sup>	13
Intermediate to Lower Girth Seam	101-171	3.06 x 10 <sup>18</sup>	4	4.79 x 10 <sup>19</sup>	16

## REFERENCES

1. A. Lowe Jr. et al "Analysis of Capsule W-83, Florida Power and Light Co., St. Lucie Unit No. 2", BAW-1880 September 1985.
2. FPL Company, St. Lucie Plant Unit 2, Updated Final Safety Analysis Report, Vol. 6.

