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50-251 Turkey Point Plant, Unit 4, Florida Power and Light C 05000251
AUTH.NAME AUTHOR AFFILIATION
WILLIAMS,J.W. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
VARGA,S.A. Operating Reactors Branch 1

SUBJECT: Forwards data re Cycle 9 core octant time averaged relative power density,time averaged peripheral assembly axial power & peripheral assembly radial pin power per 831117 request for info on pressurized thermal shock issue.

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FLORIDA POWER & LIGHT COMPANY

April 2, 1984
L-84-91

Office of Nuclear Reactor Regulation
Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch #1
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: Turkey Point Units 3 & 4
Docket Nos. 50-250 & 50-251
Pressurized Thermal Shock -
Flux Reduction Program

Reference: "Turkey Point Unit 3 and 4 Neutron Source Data Schedule", Letter from Mr. J. W. Williams to Mr. S. A. Varga, December 21, 1983, L-83-597

Dear Mr. Varga:

Your letter dated November 17, 1983, requested integral neutron source data for the purpose of evaluating and verifying flux reduction. The data in Attachment A to this letter is submitted for Turkey Point Unit 3, Cycle 9 in accordance with our schedule in the Reference and consists of:

1. Cycle 9 core octant time averaged relative power density.

2. Time averaged peripheral assembly axial power.

3. Peripheral assembly radial pin power.

The time averaged core octant relative power densities provided are based on predicted assembly powers from the FPL PDQ-7 model, assuming an expected core average burnup of 12,700 MWD/MTU.

The peripheral assembly axial powers are based on predicted data from the FPL EPRI-NODE model. Comparisons of measured and predicted axial power data show good correlation and make the predicted value applicable for the purpose of the flux reduction evaluation.

A001
1/1

The peripheral assembly radial pin powers provided are based on predicted values from the FPL PDQ-7 model and are representative of the cycle average. These pin powers form the basis of the azimuthal flux variation to be used at the core periphery. The pin powers of all other assemblies are assumed to be flat.

Additional data, as requested by Mr. Lambros Lois of your office by telephone on March 20, 1984, has been provided in Attachment B. This data consists of the location of the critical weld for Turkey Point Units 3 and 4 and the time averaged peripheral assembly axial powers for Unit 4 Cycle 9. Should you have any questions, please contact Dr. Finis Southworth at 305-552-3468.

Very truly yours,

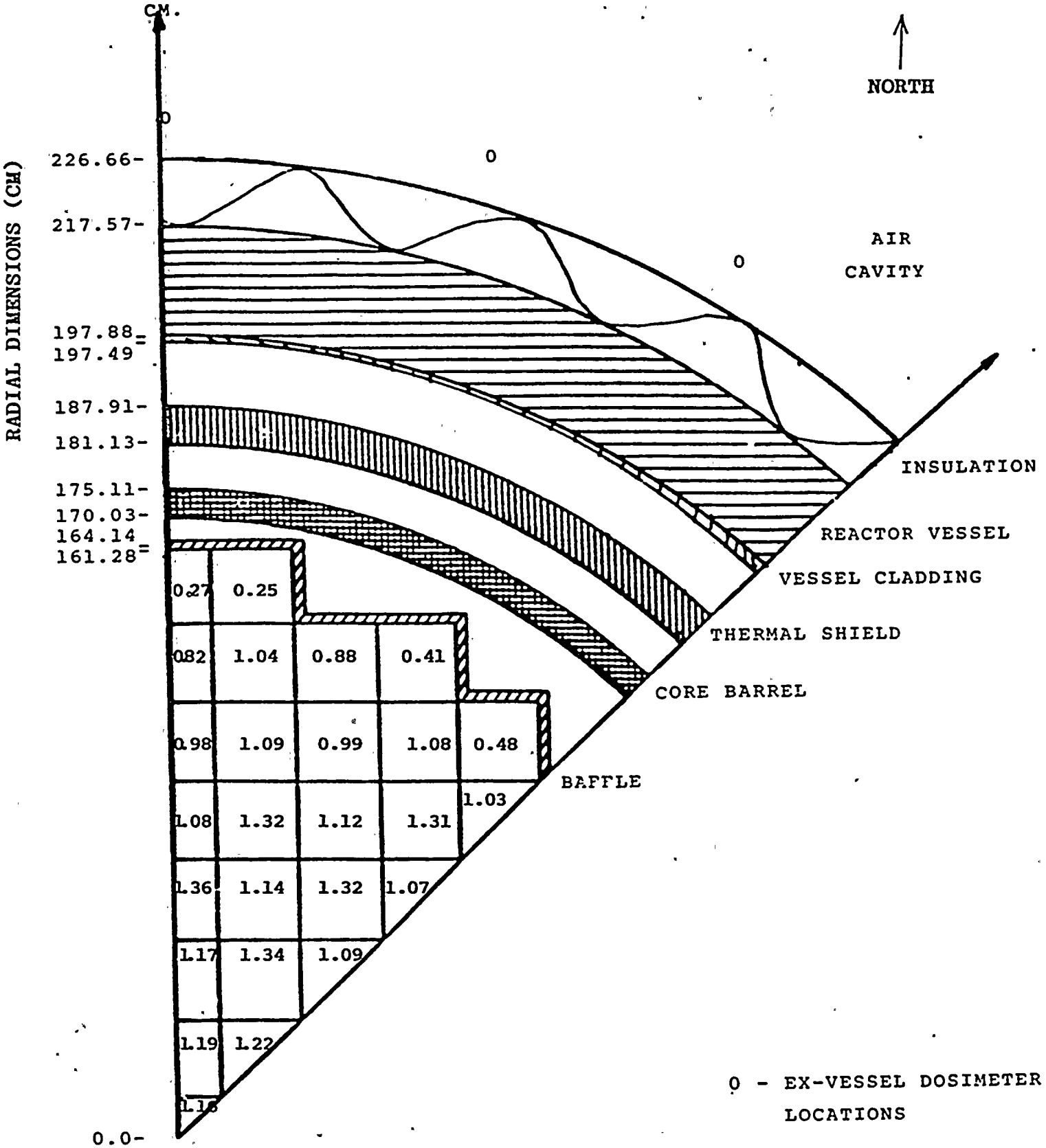
J. W. Williams, Jr.
Vice President
Nuclear Energy

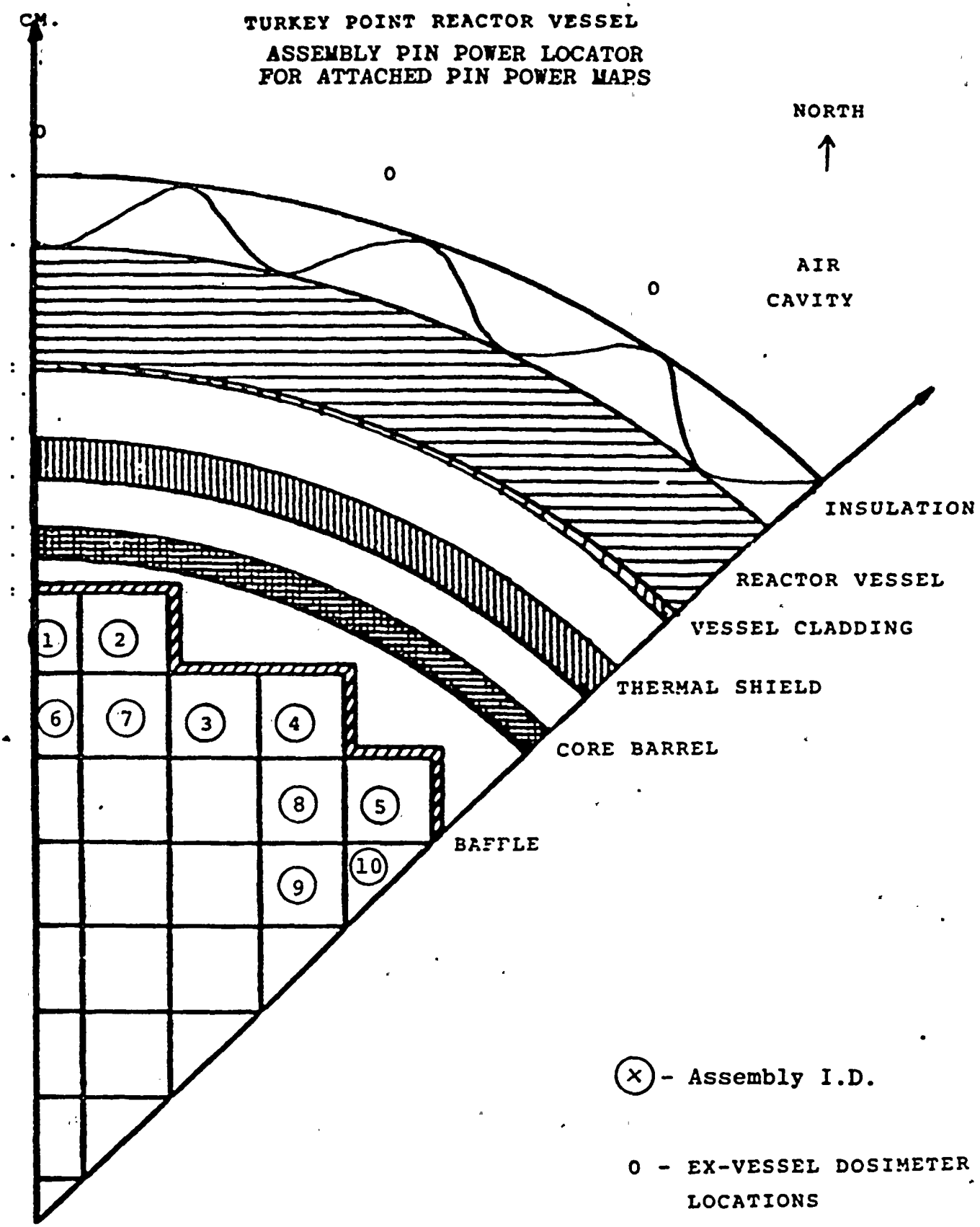
JWW/ERK/daj

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

ATTACHMENT A

TURKEY POINT UNIT 3 CYCLE 9
CYCLE AVERAGE
RELATIVE POWER DENSITY




CM.
TURKEY POINT REACTOR VESSEL
ASSEMBLY PIN POWER LOCATOR
FOR ATTACHED PIN POWER MAPS
NORTH
AIR
CAVITY
INSULATION
REACTOR VESSEL
VESSEL CLADDING
THERMAL SHIELD
CORE BARREL
BAFFLE
1
2
6
7
3
4
8
5
9
10
⊗ - Assembly I.D.
0 - EX-VESSEL DOSIMETER
LOCATIONS

TURKEY POINT
UNIT 3 CYCLE 9

Normalized Assembly Axial Power Profiles (Normalized to Unity)

Assembly No.	1	2	3	4	5	
	0.92	0.83	0.61	0.70	0.74	Top
	1.18	1.12	0.92	0.96	0.99	
	1.22	1.19	1.03	1.05	1.05	
	1.24	1.23	1.07	1.08	1.08	
	1.20	1.20	1.09	1.08	1.07	
	1.16	1.17	1.11	1.09	1.08	
	0.84	0.88	1.11	1.08	1.07	
	0.80	0.86	1.12	1.09	1.08	critical weld
	0.78	0.84	1.12	1.08	1.07	
	0.81	0.87	1.12	1.07	1.06	
	1.03	1.03	1.02	0.99	0.98	
	0.82	0.78	0.69	0.71	0.73	Bottom
	0.27	0.25	0.88	0.41	0.48	Assembly Average (RPD)

Assembly No.	6	7	8	9	10	
	0.73	0.63	0.63	0.63	0.66	Top
	1.00	0.93	0.91	0.90	0.93	
	1.06	1.03	1.01	1.01	1.02	
	1.10	1.08	1.06	1.05	1.06	
	1.09	1.09	1.07	1.07	1.07	
	1.09	1.10	1.10	1.09	1.09	
	1.05	1.09	1.10	1.10	1.09	
	1.06	1.10	1.13	1.12	1.11	critical weld
	1.04	1.11	1.13	1.13	1.11	
	1.05	1.10	1.12	1.12	1.10	
	1.00	1.03	1.03	1.04	1.02	
	0.73	0.71	0.72	0.73	0.73	Bottom
	0.82	1.04	1.08	1.31	1.03	Assembly Average (RPD)

Note: To obtain assembly axial relative power density (RPD), multiply normalized assembly axial power by assembly average relative power density.

BY E L Kmetz DATE 3/22/84 FPL SHEET NO. 1 OF 5

CHKD. BY TAB DATE 3/22/84 FLORIDA POWER & LIGHT COMPANY PROJECT NO. Unit 3 Cycle 7

RELATIVE PIN POWERS (x100)
ASSEMBLY 1

NORTH

J \ H	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
15								11	11	11	11	11	11	11	11
14								13	13	13	13	13	13	13	14
13								15	15	[illegible]	15	15	0	15	16
12								0	16	16	16	17	17	17	18
11								17	19	19	0	18	19	19	20
10								22	22	21	21	20	0	21	22
9								25	25	24	23	23	23	24	25
8								0	27	27	26	0	25	26	27
7								30	29	29	28	27	27	29	30
6								32	31	31	30	30	0	31	32
5								33	33	32	0	32	33	34	35
4								0	35	34	35	35	36	37	38
3								38	37	0	38	38	0	40	41
2								42	41	41	42	42	42	43	45
1								46	46	46	46	46	47	48	49

BY E R Lindsey DATE 3/22/84

CHKD. BY [illegible] DATE 3/22/84

FPL FLORIDA POWER & LIGHT COMPANY

SHEET NO. 2 OF 5

PROJECT NO. Unit 3 Cycle 4

RELATIVE PIN POWERS (x100)
ASSEMBLY 2

NORTH

J \ H	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
15	11	10	10	10	10	10	9	9	9	8	8	7	7	6	6
14	14	13	13	12	12	12	12	11	11	10	10	9	9	8	7
13	16	15	0	14	14	0	13	13	12	0	11	11	0	9	8
12	18	17	17	17	16	16	15	0	14	14	13	13	12	11	9
11	21	20	19	19	0	18	18	17	17	16	0	14	13	12	11
10	23	22	0	21	21	21	21	20	20	19	18	16	0	14	12
9	25	24	23	23	24	24	24	24	23	21	20	18	17	16	14
8	28	27	26	0	26	26	27	0	25	24	22	0	19	18	16
7	31	30	29	28	29	29	29	29	28	27	25	23	22	20	18
6	33	32	0	32	32	32	32	31	31	30	28	26	0	23	20
5	37	36	35	35	0	35	34	34	33	32	0	30	28	26	23
4	40	39	38	38	38	38	37	0	36	35	34	33	31	29	25
3	43	42	0	41	41	0	40	40	39	0	38	37	0	33	28
2	47	46	46	46	46	45	45	45	44	43	43	42	40	37	32
1	51	51	51	51	51	51	51	51	50	49	49	48	46	44	39

BY E.R. Kennedy DATE 3/22/84

CHKD. BY TTB DATE 3/22/84

FPL FLORIDA POWER & LIGHT COMPANY

SHEET NO. 3 OF 5

PROJECT NO. Unit 3 Cycle 9

RELATIVE PIN POWERS (x100)
ASSEMBLY 3

NORTH

J \ I	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
15	54	51	50	49	48	48	46	45	43	42	40	39	37	35	33
14	66	66	66	64	63	63	60	57	57	56	53	51	49	45	42
13	74	76	0	77	75	0	73	70	69	0	64	61	0	54	49
12	81	83	85	85	85	83	80	0	76	75	73	69	65	60	55
11	86	87	92	93	0	87	83	81	79	78	0	76	72	65	60
10	91	95	0	99	94	89	85	83	81	81	82	82	0	72	65
9	95	98	103	103	97	92	91	90	87	84	85	86	83	75	69
8	99	101	106	0	102	96	96	0	93	88	90	0	86	78	73
7	103	106	112	112	105	100	99	98	95	92	93	95	92	84	78
6	106	111	0	116	111	106	101	100	98	98	100	100	0	89	82
5	108	112	116	118	0	113	108	107	105	105	0	103	98	91	85
4	110	113	118	118	119	118	116	0	112	111	107	105	100	94	88
3	111	116	0	118	118	0	112	114	113	0	108	105	0	97	91
2	111	114	116	115	114	115	111	108	109	109	105	103	102	97	92
1	110	111	112	111	111	110	108	107	106	105	103	101	99	97	94

BY. E. [illegible] DATE 3/22/84

CHKD. BY FHS DATE 3/22/84

FPL FLORIDA POWER & LIGHT COMPANY

SHEET NO. 4 OF 5

PROJECT NO. Unit 3 Cycle

RELATIVE PIN POWERS (x100)
ASSEMBLY 4

NORTH

J \ H	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
15	25	24	23	22	21	20	19	17	16	15	14	13	12	10	8
14	32	31	30	28	27	26	24	22	21	20	18	17	15	13	10
13	37	36	0	33	32	0	28	27	25	0	22	20	0	15	12
12	41	40	39	38	37	35	32	0	28	27	26	23	20	17	14
11	45	44	43	43	0	38	35	33	31	30	0	26	23	19	15
10	49	48	0	46	44	41	37	35	33	32	31	28	0	22	17
9	52	51	50	49	46	43	40	38	36	34	32	30	27	24	19
8	55	54	53	0	50	46	44	0	39	37	35	0	30	26	21
7	59	58	57	55	53	49	47	45	42	40	38	36	33	28	23
6	62	61	0	60	58	54	50	48	46	44	43	40	0	31	25
5	64	64	64	64	0	59	55	52	50	49	0	44	39	33	27
4	67	67	66	66	65	62	59	0	54	52	50	46	41	36	29
3	70	69	0	67	66	0	61	58	56	0	51	48	0	39	31
2	71	71	70	68	67	65	62	60	58	56	53	50	46	41	33
1	73	72	71	69	68	66	64	62	60	57	55	52	49	44	37

BY E R Kmnke DATE 3/22/84

CHKD. BY FTH DATE 3/22/84

FPL FLORIDA POWER & LIGHT COMPANY

SHEET NO. 5 OF 5

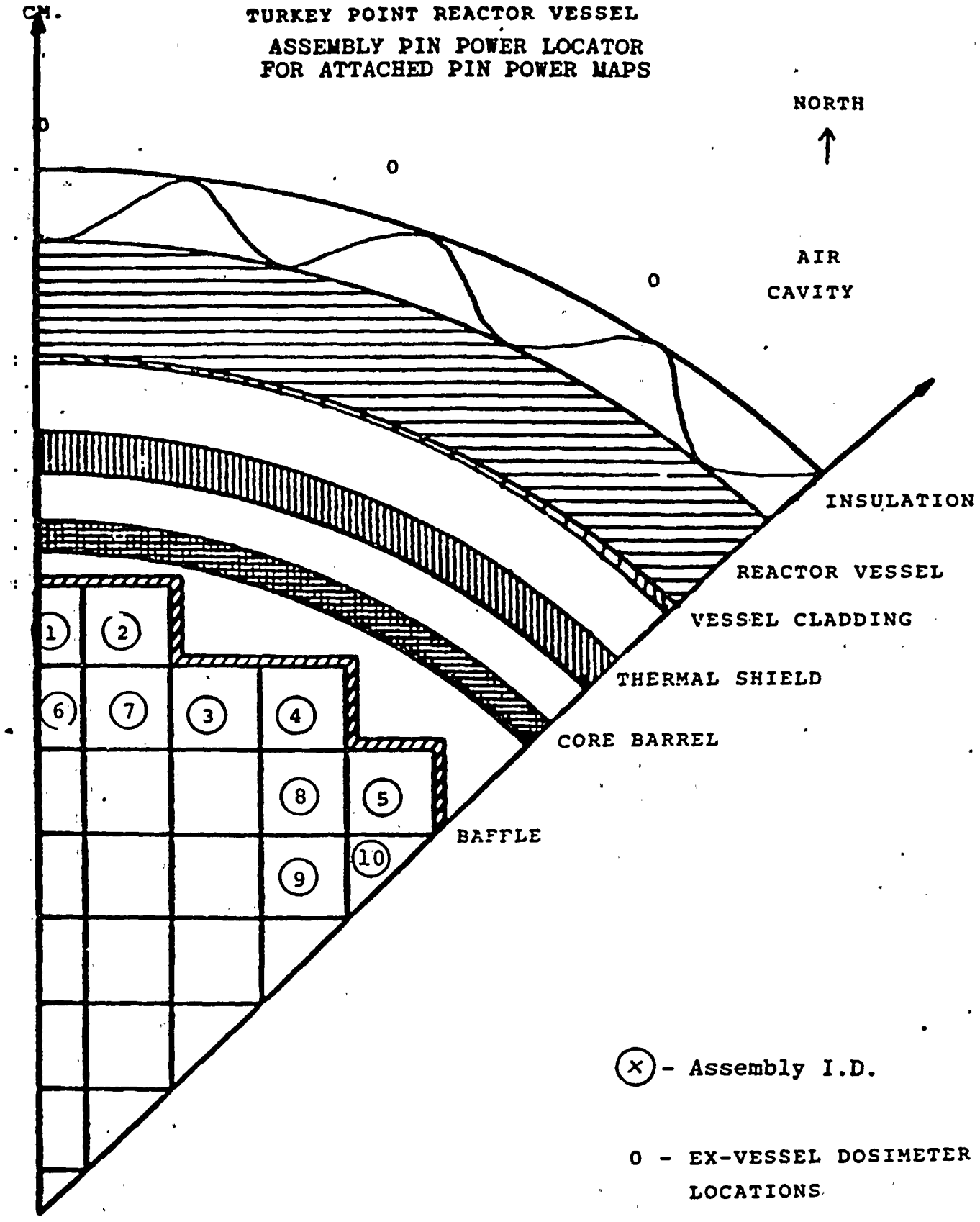
PROJECT NO. Unit 3 Cycle 9

RELATIVE PIN POWERS (x100)
ASSEMBLY 5

NORTH

J \ H	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
15	39	34	32	30	28	26	24	22	21	19	17	15	14	12	10
14	46	43	40	38	35	33	30	28	26	24	22	19	17	15	12
13	51	48	0	43	41	0	35	32	30	0	25	23	0	17	14
12	55	53	50	48	46	42	39	0	33	31	29	26	23	20	15
11	60	57	55	53	0	46	42	39	36	34	0	29	25	22	17
10	63	61	0	56	53	49	45	41	39	36	34	31	0	24	19
9	66	64	62	59	55	51	48	45	42	39	36	34	30	26	21
8	70	67	65	0	59	55	51	0	45	42	39	0	33	28	23
7	73	71	70	67	63	58	54	51	48	45	42	39	36	31	25
6	77	75	0	71	68	63	58	55	51	49	46	43	0	34	27
5	80	78	77	75	0	68	63	59	56	53	0	46	44	36	29
4	83	82	80	78	75	71	67	0	60	57	54	49	44	38	31
3	87	85	0	80	77	0	70	66	63	0	56	51	0	41	33
2	90	87	85	81	78	75	71	67	64	61	57	53	49	44	35
1	94	90	86	83	77	76	73	69	66	63	59	56	52	46	36

ATTACHMENT B


CM.
TURKEY POINT REACTOR VESSEL
ASSEMBLY PIN POWER LOCATOR
FOR ATTACHED PIN POWER MAPS
NORTH
0
0
0
AIR
CAVITY
INSULATION
REACTOR VESSEL
VESSEL CLADDING
THERMAL SHIELD
CORE BARREL
BAFFLE
1
2
6
7
3
4
8
5
10
9
(X) - Assembly I.D.
0 - EX-VESSEL DOSIMETER
LOCATIONS

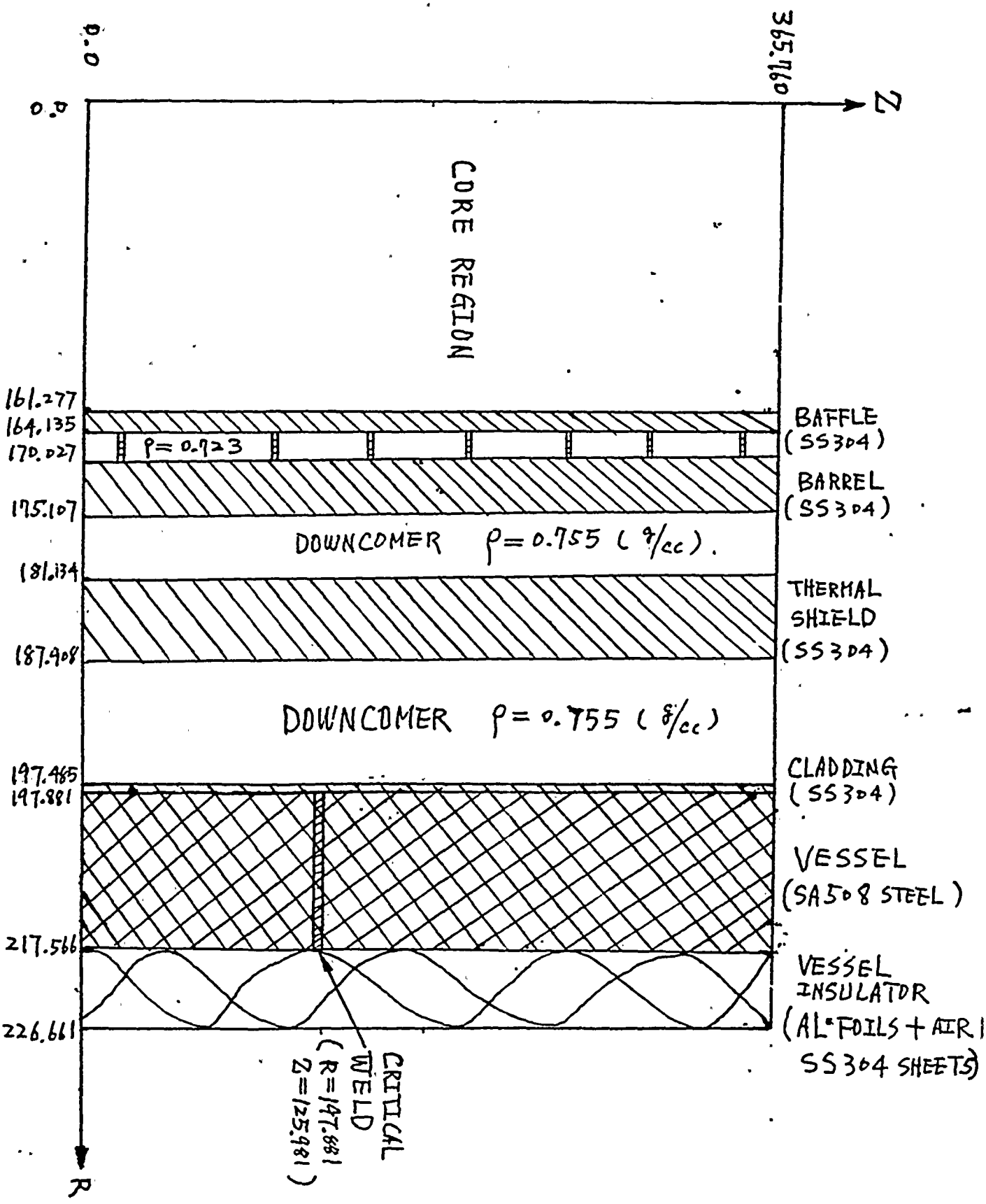
TURKEY POINT
UNIT 4 CYCLE 9

Normalized Assembly Axial Power Profiles
(Normalized to Unity)

Assembly No.	1	2	3	4	5	
	0.82	0.76	0.56	0.66	0.68	Top
	1.02	0.99	0.87	0.93	0.95	
	1.04	1.03	0.99	1.02	1.03	
	1.07	1.07	1.06	1.08	1.08	
	1.05	1.06	1.09	1.08	1.08	
	1.08	1.09	1.12	1.11	1.11	
	1.05	1.07	1.14	1.11	1.10	
	1.07	1.09	1.16	1.13	1.11	critical weld
	1.04	1.06	1.17	1.11	1.09	
	1.04	1.06	1.15	1.09	1.08	
	0.97	0.97	1.03	0.98	0.98	
	0.77	0.73	0.66	0.69	0.70	Bottom
	0.31	0.29	1.02	0.44	0.47	Assembly Average (RPD)

Assembly No.	6	7	8	9	10	
	0.72	0.58	0.57	0.64	0.59	Top
	0.96	0.88	0.87	0.91	0.89	
	1.02	0.99	1.00	1.01	1.01	
	1.06	1.05	1.06	1.06	1.06	
	1.06	1.08	1.09	1.08	1.09	
	1.09	1.11	1.12	1.10	1.11	
	1.08	1.13	1.13	1.10	1.13	
	1.10	1.15	1.16	1.13	1.15	critical weld
	1.08	1.16	1.16	1.12	1.15	
	1.08	1.15	1.14	1.11	1.13	
	1.00	1.04	1.03	1.02	1.02	
	0.74	0.69	0.68	0.72	0.68	Bottom
	0.73	1.12	1.16	1.19	1.13	Assembly Average (RPD)

Note: To obtain assembly axial relative power density (RPD), multiply normalized assembly axial power by assembly average relative power density.


0.0
365.160
Z
0.0
CORE REGION
161.277
164.135
170.027
ρ = 0.723
BAFFLE (SS304)
BARREL (SS304)
175.107
DOWNCOMER ρ = 0.755 (g/cc).
181.134
THERMAL SHIELD (SS304)
187.908
DOWNCOMER ρ = 0.755 (g/cc)
197.485
197.881
CLADDING (SS304)
VESSEL (SA508 STEEL)
217.566
VESSEL INSULATOR (AL FOILS + AIR SS304 SHEETS)
226.661
CRITICAL WELD (R=147.681 Z=125.981)
R