

ATTACHMENT

SOUTH TEXAS PROJECT
UNIT 2 CYCLE 4
STARTUP TESTING SUMMARY REPORT

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P PDR

I. CRITICAL BORON CONCENTRATIONS (PPM):

Design Review Criteria (DRC): ± 50 ppm
 $\pm 15\%$ of Delta (19 ppm)
 Acceptance Criteria (AC): ± 1000 pcm (140 ppm)

	Predicted (P)	Measured (M)	(M-P) ppm	Pass/Fail DRC	Pass/Fail AC
ARO	1805	1766.1	-38.9	P	P
CBC-in	1675	1646.4	-28.6	-	P
Delta (ARO - CBC-in)	130	119.7	-10.3	P	-

II. ROD WORTH MEASUREMENTS (Rod Swap Method Used):

Design Review Criteria (DRC): Reference Bank (CBC) within 10% of predicted
 Other banks within 15% or 100 pcm (whichever is greater)
 Total $\leq 110\%$ of predicted
 Acceptance Criteria (AC): Reference Bank (CBC) within 15% of predicted
 Other banks within 30% or 200 pcm (whichever is greater)
 Total $\geq 90\%$ of Predicted

RCCA Bank	Predicted Worth (pcm)	Measured Worth (pcm)	Delta (M-P) (pcm)	Percent Difference (%)	Pass/Fail DRC	Pass/Fail AC
Control A	757	709.1	-47.9	-6.3	P	P
Control B	758	733.9	25.9	3.4	P	P
Control C	871	855.3	-15.7	-1.8	P	P
Control D	498	477.2	-20.8	-4.2	P	P
Shutdown A	324	342.9	18.9	5.8	P	P
Shutdown B	714	679.1	-34.9	-4.9	P	P
Shutdown C	418	425.5	7.5	1.8	P	P
Shutdown D	419	422.9	3.9	0.9	P	P
Shutdown E	336	299.0	-37.0	-11.0	P	P
Total	5095	4994.9	-100.1	-2.0	P	P

ARO: All Rods Out

CBC: Control Bank C

Percent Difference = $100 \times (M - P) / P$

III. DIFFERENTIAL BORON WORTH (PCM/PPM):

Design Review Criteria (DRC): $\pm 15\%$

Acceptance Criteria (AC): none

Predicted	Measured	Percent Difference	Pass/Fail DRC	Pass/Fail AC
-7.15	-7.15	0.0%	P	-

IV. ARO ISOTHERMAL TEMPERATURE COEFFICIENT (ITC) (PCM/°F):

Design Review Criteria (DRC): ± 3 pcm/°F

Acceptance Criteria (AC): none

Predicted	Measured	Error (M-P)	Pass/Fail DRC	Pass/Fail AC
-3.3	-3.34	-0.04	P	-

V. INFERRED ARO MODERATOR TEMPERATURE COEFFICIENT (PCM/°F)*:

Design Review Criteria(DRC): none

Acceptance Criteria (AC): < 0 pcm/°F, or rod withdrawal limits established

Predicted	Measured	Adjusted	Pass/Fail DRC	Pass/Fail AC
-1.4	-1.44	-0.64**	-	P

* Inferred MTC is obtained by subtracting the Doppler Temperature Coefficient (-1.9 pcm/°F) from the Isothermal Temperature Coefficient.

** Adjusted MTC includes measurement uncertainty and IFBA correction.

VI. POWER DISTRIBUTION MEASUREMENTS:

Design Review Criteria (DRC): Incore Tilt (based on F-Delta-H) ≤ 1.02
Reaction Rate Errors $< \pm 10\%$

Acceptance Criteria (AC): FDHN $<$ Technical Specification (TS) 3.2.3 Limit
 $F_{xy} \leq$ TS 3.2.2 Limit

Reactor Power	Incore Quadrant Power Tilts		Highest FDHN	FDHN Limit	Limiting F_{xy}	F_{xy} Limit	Largest Unrodded Reaction Rate Error (%)
Low Power (29.2%)	1.0037	0.9990	1.5023	1.7700	1.7051	1.9315	12.0*
	1.0024	0.9949					
Intermediate Power (46.7%)	1.0050	0.9986	1.4792	1.693	1.6755	1.8724	11.4*
	1.0029	.9935					
Intermediate Power (77.7%)	1.0076	0.9938	1.4371	1.557	1.6280	1.7673	6.5
	1.0002	0.9985					
Full Power (100.0%)	1.0050	0.9976	1.4051	1.4600	1.5881	1.6921	6.7
	1.0025	0.9950					

FDHN: Nuclear Enthalpy Rise Hot Channel Factor

* Core periphery location

VII. REACTOR COOLANT SYSTEM FLOW MEASUREMENT (GPM):

Design Review Criteria (DRC): none
Acceptance Criteria (AC): > 395,000 gpm

Reactor Power	Measured Flow	Pass/Fail DRC	Pass/Fail AC
70.8%	406,658	-	P
99.3%	404,955	-	P

VIII. FULL POWER CRITICAL BORON (PPM):

Design Review Criteria (DRC): ± 50 ppm
Acceptance Criteria (AC): ± 1000 pcm (145 ppm)

Burnup (EFPD)	Predicted	Measured	(M-P)	Pass/Fail DRC	Pass/Fail AC
17.1	1210.5	1168.8	-41.7 ppm	P	P