REQUESTED ADDL INFO RELATIVE TO THE
LOOSE PARTS MONITORING DATA & FLUX MAP
ANOMALIES DISCUSS AT THE 10/31/77 MEETING
RECEIVED WITH LTR DTD 1/11/78
DOCKET NO. 50-247

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P PDR

Request No. 1

"Is any kind of special fuel inspection planned because of the flux map anomalies? If so, describe this inspection."

Response:

Although irregularities were indicated in the first flux map of Cycle 2, 27 subsequents maps have shown no core power tilt outside technical specification limits and there is no evidence that a presumed loose part influences flux distribution. Six fuel assemblies will be inspected during the 1978 refueling as required by the technical specifications but not because of flux map anomalies.

Up to the present time, 28 full core moveable incore detector flux maps have been taken during Cycle 2. During the January 19, 1977 meeting with the NRC, Maps 1 through 8 (which included maps of 35%, 70%, 90% and 100% power taken during startup testing) were discussed and the results distributed. These results are included as Attachment A. At the June 2, 1977, meeting Maps 1 through 16 (taken at or near full power during steady state Cycle 2 operation) were discussed and the results of these maps were distributed. These results are included as Attachment B. In response to an NRC request at that meeting, a second hot zero power (HZP) map (Map 19) was taken on August 6, 1977. The results of this map were transmitted to the NRC by our September 29, 1977 letter. The results of this second HZP map were discussed with the NRC at our October 31, 1977 meeting. In addition, the results of Map 17, 18, 20 and 24 were distributed. These results are included as Attachment C. Since that time, three additional maps were taken and the results are included as Attachment D.

As was presented at the above meetings, except for the first hot zero power map, all full core maps taken during Cycle 2 from startup to a cycle burnup of 8662 MWD/T showed that hot channel factors were within Technical Specification limits and there was no evidence of any core power tilt. For the first HZP map, hot channel factors were within Technical Specification limits. There were, however, differences between the reaction rates of 11 assemblies in 4 sets of symmetric thimbles near the core periphery resulting in an indicated core quadrant tilt of 3% at zero power. As was explained to the NRC during the meeting, problems were encountered during the taking of this map (including steam dump and dilution during the record mode of some traces) that cast doubt on the accuracy of the recorded data. As was discussed during the October 31, 1977 meeting, these problems were avoided during the second HZP map and the results showed excellent agreement between the reaction rates of all of the symmetric thimbles. As a result of all maps taken, including the second hot zero power map, it is our conclusion that there is no core power tilt and no flux

anomalies and that the loose part has no effect on core power distributions. A safety evaluation was also presented at the October 31, 1977 NRC meeting to demonstrate that there was no safety problem in operating the plant. Additionally, we have reviewed core loading documentation and videotapes and verified that there was no misloading. This was documented in our response to the NRC question dated March 9, 1977.

With regard to fuel inspection, we are planning to perform a visual inspection of 6 assemblies during the next refueling outage of Indian Point 2 as required by Section 6.9.2.c of the Facility Technical Specifications. These assemblies will include the two lead burnup assemblies of regions 2, 3 and 4.

ATTACHMENT A

INFORMATION SUPPLIED TO NRC AT JANUARY 19, 1977 MEETING

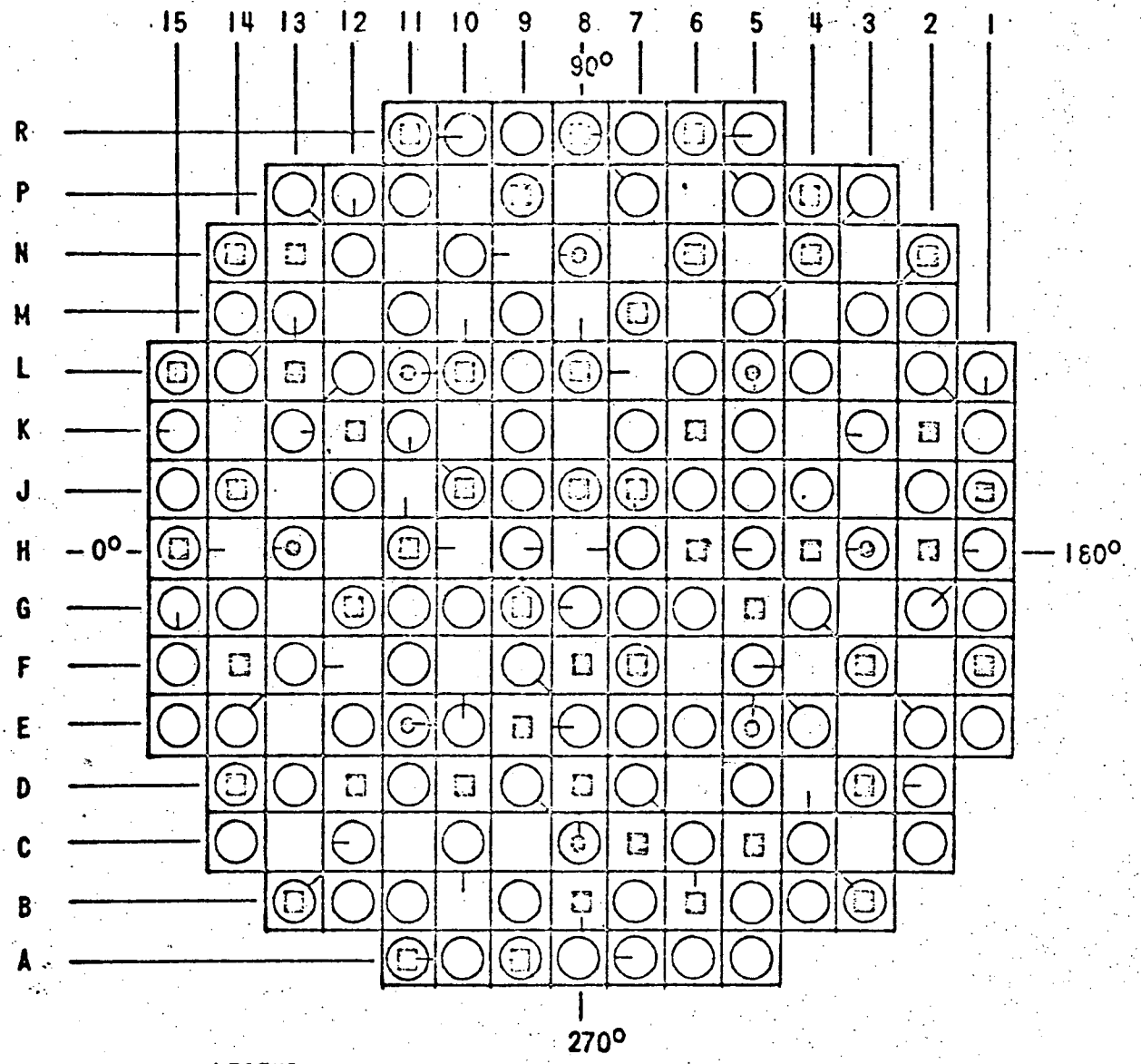
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					D-06 4 43	D-30 4 39	D-35 4 40	D-53 4 A6P1(9	D-55 4 41	D-03 4 42	D-67 4 35				
P			D-13 4 36	D-46 4 123	D-48 4 A6P7(8)	B-27 2 R-19(CD)	D-40 4 12P26(20)	B-56 2 R-24(SC)	D-44 4 12P33(20)	B-18 2 R-38(CD)	D-29 4 B6P7(8)	D-32 4 31	D-01 4 32		
N		D-52 4 33	D-27 4 R-21(CC)	C-44 3 103	B-20 2 R-48(CA	D-15 4 12P20(20)	B-26 2 R-51(SB)	C-29 3 B6P10(7)	B-08 2 R-12(SB)	D-61 4 12P37(20	B-05 2 R-09(CA)	C-48 3 78	D-59 4 34(CC)	D-50 4 28	
M		D-72 4 29	C-52 3 83	B-17 2 R-44(SA)	C-25 3 57	C-03 3 RS-4(PL)	C-47 3 72	B-32 2 R-23(CB)	C-57 3 77	C-11 3 RS-5(PL)	C-22 3 54	B-40 2 R-49(SA)	C-39 3 84	D-49 4 30	
L	D-45 4 24	D-57 4 A6P6(8)	B-25 2 R-26(CA)	C-36 3 58	B-15 2 44	C-13 3 66	B-41 2 110	C-19 3 126	B-58 2 R-27(SA)	C-20 3 129	B-36 2 59	C-30 3 49	B-30 2 R-13(CA)	D-14 4 B6P5(8)	D-63 4 25
K	D-12 4 26	B-60 2 R-16(CD)	D-31 4 12P34(20	C-08 3 RS-3(PL)	C-15 3 65	B-31 2 R-(01-SD)	C-40 3 109	B-59 2 R-52(CC)	C-42 3 99	B-43 2 R-42(SD)	C-18 3 104	C-07 3 RS-6(PL)	D-56 4 12P31(20)	B-54 2 R-03(CD)	D-38 4 27
J	D-60 4 19	D-62 4 12P27(20)	B-03 2 R-17(SB)	C-62 3 130	B-53 2 R-20(SA)	C-60 3 107	C-06 3 100	C-31 3 51	C-05 3 96	C-54 3 111	B-62 2 112	C-58 3 114	B-37 2 R-36(SB)	D-71 4 12P21(20)	D-07 4 20
H	D-70 4 B6P2(9)	B-63 2 R-30(SC)	C-41 3 SS2(7)	B-02 2 R-47(CB)	C-32 3 34	B-55 2 R-41(CC)	C-09 3 45	B-06 2 R-37(CD)	C-37 3 113	B-50 2 R-05(CC)	C-33 3 62	B-24 2 R-32(CB)	C-46 3 SS1(7)	B-39 2 R-53(SC)	D-08 4 B6P3(9)
G	D-22 4 22	D-11 4 12P23(20)	B-10 2 R-31(SB)	C-63 3 101	B-43 2 87	C-59 3 98	C-01 3 106	C-14 3 55	C-23 3 105	C-55 3 38	B-52 2 R-39(SA)	C-61 3 88	B-13 2 R-10(SB)	D-23 4 12P17(20)	D-37 4 23
F	D-36 4 15	B-57 2 AR-48(CD	D-10 4 2P24(20)	C-02 3 RS-8(PL)	C-16 3 63	B-61 2 R-14(SD)	C-51 3 56	B-45 2 R-09(CC)	C-45 3 21	B-51 2 R-15(SD)	C-24 3 67	C-04 3 RS-1(PL)	D-54 4 12P28(20)	B-64 2 R-43(CD)	D-42 4 16
E	D-64 4 17	D-39 4 B6P6(8)	B-29 2 R-35(CA)	C-38 3 52	B-47 2 118	C-21 3 76	B-46 2 R-46(SA)	C-27 3 64	B-48 2 68	C-17 3 61	B-35R 2 48	C-34 3 46	B-33 2 R-07(CA)	D-17 4 A6P9(8)	D-28 4 18
D		D-10 4 12	C-49 3 119	B-12 2 R-33(SA)	C-28 3 47	C-12 3 RS-7(PL)	C-50 3 102	B-21 2 R-04(CB	C-43 3 80	C-10 3 RS-2(PL)	C-26 3 50	B-16 2 AR-19(SA)	C-56 3 120	D-09 4 13	
C		D-19 4 14	D-51 4 R-28(CC)	C-54 3 95	B-11 2 R-06(CA)	D-65 4 12P10(20)	B-19 2 R-29(SB)	C-35 3 B6P9(7)	B-04 2 AR-11(SB)	D-20 4 12P 25(20)	B-34 2 R-02(CA)	C-53 3 86	D-04 4 R-45(CC)	D-02 4 9	
B			D-26 4 10	D-69 4 11	D-66 4 B6P8(8)	B-23 2 R-50(CD)	D-68 4 12P18 (20)	B-42 2 R-40(SC)	D-25 4 12P35(20)	B-01 2 R-22(CD)	D-24 4 A6P5(8)	D-47 4 5	D-43 4 6		
A					D-34 4 7	D-18 4 8	D-05 4 1	D-58 4 A6P4(9)	D-41 4 2	D-33 4 3	D-21 4 4				

EXAMPLE, ASSEMBLY G-11

B-49 87 — 2 REGION, ASSEMBLY #, PLUG DEVICE #

INDIAN POINT 2 · CYCLE 2 LOADING PATTERN

9/1/76



LEGEND:

- THERMOCOUPLE
- MOVABLE DETECTOR
- FLOW-MIXING DEVICE
- FIXED DETECTOR

. In-Core Instrumentation, Thermocouples and Movable Detectors

PERCENT. DIFF. OF EXPECT. AND MEAS. FOHN IP2 CY-II , MAP1,9-22-76,0.0 B,224C/D,HZP,D78P. R2NPDQ

R MAP 1

HZP

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					-1.9			-8.0		-1.3					
P							-7.6					-4.5			
N		8.6	7.2							-3.9		-4.9		4.8	
M									-4.4						
L	3.3		1.2			2.3		-4.7							
K				1.4						3.5				-5.4	
J		-1.3				4.9		3.5	3.3						-7.1
H	-1.0				4.5					8.3		-1.3		-9.1	
G				3.1			4.1				-.1				
F		-2.2						2.9	3.8						1.3
E							2.1								
D		7.1		2.0		.8		.2					-7.3		
C									-1.0		-4.1				
B			12.0					-1.4		-4.7			12.9		
A					12.1		.5								

MEASURED AND PERCENT. DIFF. OF FDHN IP2 CY-II , MAPI,9-22-75,0.0 B,224C/D,HZP,078P. R2NPDQ

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
R						.646.	.635.	.878.	.807.	.897.	.355.	.548.				R MAPI
						-1.9.	-3.6.	-7.8.	-8.0.	-5.8.	-1.3.	-1.5.				
P				.734.	1.020.	1.151.	.972.	1.198.	.946.	1.231.	1.004.	1.133.	.969.	.668.		P HZP
				8.1.	.5.	-2.0.	-3.6.	-7.6.	-7.8.	-5.0.	-2.4.	-3.5.	-4.5.	-1.5.		
N		.737.	1.318.	1.173.	1.025.	1.258.	1.003.	1.040.	1.019.	1.287.	1.000.	1.083.	1.202.	.712.		N
		3.6.	7.9.	3.0.	-2.0.	-5.4.	-5.4.	-4.9.	-4.0.	-3.9.	-4.3.	-4.9.	-1.5.	4.8.		
M		1.079.	1.205.	.949.	1.233.	1.126.	1.129.	.888.	1.096.	1.059.	1.139.	.855.	1.128.	1.064.		M
		5.3.	5.4.	1.5.	2.2.	2.2.	-1.4.	-4.7.	-4.4.	-4.0.	-5.6.	-7.6.	-1.4.	4.9.		
L	.713.	1.223.	1.053.	1.222.	.929.	.959.	.871.	.951.	.861.	.929.	.927.	1.115.	1.015.	1.139.	.639.	L
	8.3.	4.2.	1.2.	1.3.	2.5.	2.3.	-1.4.	-4.7.	-2.5.	-1.0.	2.2.	-7.6.	-2.9.	-3.0.	-3.0.	
K	.891.	1.048.	1.340.	1.119.	.971.	.805.	.884.	.767.	.883.	.302.	.959.	1.072.	1.301.	.973.	.818.	K
	2.9.	1.9.	-.0.	1.4.	3.5.	4.0.	1.2.	.6.	1.2.	3.5.	2.2.	-2.3.	-2.9.	-5.4.	-5.6.	
J	.942.	1.290.	1.059.	1.134.	.920.	.916.	.858.	.916.	.853.	.905.	.902.	1.152.	1.018.	1.205.	.835.	J
	-1.1.	-1.3.	-.2.	3.5.	4.2.	4.9.	3.9.	3.5.	3.3.	3.7.	2.1.	.6.	-4.1.	-7.0.	-7.1.	
H	.359.	1.015.	1.100.	.971.	1.045.	.803.	.927.	.795.	.917.	.775.	1.001.	.920.	1.043.	.933.	.799.	H
	-1.0.	-1.2.	.5.	4.1.	4.5.	5.3.	4.7.	4.2.	3.6.	1.8.	.2.	-1.3.	-4.6.	-9.1.	-9.0.	
G	.945.	1.287.	1.073.	1.193.	.920.	.919.	.850.	.925.	.855.	.889.	.833.	1.123.	1.012.	1.239.	.913.	G
	-.7.	-.7.	1.2.	4.1.	4.1.	5.2.	4.1.	4.5.	3.7.	1.9.	-.1.	-1.5.	-4.6.	-4.4.	-4.1.	
F	.348.	1.006.	1.353.	1.149.	.977.	.791.	.890.	.784.	.905.	.784.	.904.	1.054.	1.358.	1.042.	.878.	F
	-2.1.	-2.2.	1.0.	4.2.	4.2.	2.2.	2.0.	2.9.	3.8.	1.3.	-3.6.	-3.6.	1.3.	1.3.	1.3.	
E	.675.	1.274.	1.071.	1.240.	.930.	.944.	.902.	1.029.	.925.	.994.	.871.	1.118.	.970.	1.140.	.657.	E
	2.5.	2.6.	2.4.	2.0.	2.5.	.6.	2.1.	3.0.	4.7.	5.9.	-3.9.	-7.3.	-7.2.	-2.9.	1.3.	
D		1.086.	1.195.	.954.	1.237.	1.112.	1.176.	.934.	1.152.	1.051.	1.159.	.883.	1.060.	.941.		D
		7.1.	4.5.	2.0.	2.5.	.8.	2.5.	.2.	.6.	-4.7.	-3.9.	-5.7.	-7.3.	-7.2.		
C		.743.	1.308.	1.222.	1.073.	1.382.	1.097.	1.099.	1.051.	1.278.	1.003.	1.149.	1.255.	.698.		C
		9.5.	7.1.	6.9.	2.6.	3.1.	3.4.	.5.	-1.0.	-4.6.	-4.1.	.5.	2.8.	2.8.		
B			.750.	1.137.	1.315.	1.095.	1.303.	1.012.	1.255.	.981.	1.125.	1.053.	.767.			B
			12.0.	12.1.	12.1.	6.5.	.5.	-1.4.	-3.2.	-4.7.	-4.1.	4.7.	12.9.			
A					.739.	.922.	.957.	.882.	.934.	.323.	.530.				MEAS	A
					12.1.	6.4.	.5.	.5.	-2.0.	-4.4.	-4.4.				DIFF	

[illegible] FOR SYMMETRIC TRIPLES

MAP1
HZP

TRIPLE	VALID. STATUS	NORMALIZED REACT. RATE-INTEGRAL	RATIO-TO-FIRST	FZ	[illegible] OFFSET
1 J10 0 P	0	.9197E+00		1.950	43.0
14 F 7-1 2 6	0	.9221E+00	1.003	1.941	42.9
2 H15 1 1 10	0	.9170E+00		1.657	31.5
19 R 8 0 3 10	1	.8101E+00	.892	1.671	29.6
3 C 21 1 3	0	.1118E+01		1.659	33.3
8 3 50 1 8	0	.1102E+01	.986	1.631	33.1
36 F141 5 10	0	.1128E+01	1.009	1.626	33.2
5 P 41 1 5	0	.1030E+01		1.645	32.9
32 D14-1 4 7	1	.1123E+01	1.091	1.642	33.5
6 H 50 1 6	0	.3743E+00		1.954	43.5
42 F 80 5 9	0	.3562E+00	.979	1.937	41.7
9 E 90 1 9	0	.3545E+00		1.868	41.0
33 S 5-2 4 8	0	.3430E+00	.983	1.903	41.2
10 D10 0 2 1	0	.1176E+01		1.754	37.2
35 K120 5 1	0	.1170E+01	.995	1.735	36.1
11 H110 2 3	0	.7567E+00		1.655	30.6
28 H11-1 4 0	1	.5705E+00	.874	1.653	32.5
46 L150 6 4	0	.7407E+00	.966	1.634	32.3
13 F 10 2 5	0	.3155E+00		1.549	32.3
15 R 50 2 7	0	.3319E+00	.974	1.637	31.7
16 H140 2 8	0	.7397E+00		1.637	32.3
17 R 20 2 1	1	.7385E+00	.924	1.628	32.5
21 H130 3 5	0	.7392E+00	.987	1.548	30.3
45 R 30 6 3	0	.7355E+00	.995	1.639	30.7
18 S 90 3 1	0	.3308E+00		1.983	43.5
27 I 7-1 4 1	0	.3307E+00	.999	2.035	45.0
20 C 50 3 4	0	.1133E+01		1.661	33.7
30 L13-2 4 5	1	.1179E+01	1.041	1.655	32.3
22 H110 3 6	0	.1002E+01		1.830	40.9
25 L 90 3 7	1	.9137E+00	.912	1.871	40.7
23 J140 3 7	0	.1339E+01		1.640	30.0
50 P 3-1 6 9	0	.1304E+01	.974	1.653	31.0
24 J 1 0 3 8	0	.9044E+00		1.651	31.2
49 R 9-1 6 8	1	.9904E+00	1.095	1.643	30.6
29 S 8-2 4 3	0	.1182E+01		1.655	30.9
44 T 20 6 0	1	.1177E+01	.998	1.637	31.3
31 V 4-2 4 5	0	.1051E+01		1.652	32.8
34 D 3-2 4 7	0	.1054E+01	1.003	1.646	32.8
37 H40 5 3	0	.1035E+01		1.798	37.9
43 D 80 5 1	1	.1099E+01	1.061	1.777	33.7
38 H 71 5 4	0	.1175E+01		1.790	39.8

PERCENT. DIFF. OF EXPECT. AND MEAS. FDHN 1P2 CY-2,MAP2,9-30-76,0.0 B,179C/D,50?BP,RUN 6(NEW PDQ HZP DECKS)

MAP 2

35% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					2.8			-.6		-.9					
P							-.7					-1.9			
N		5.6	5.1							-4.1		-2.6		7.0	
M									-2.5						
L	6.2		-4.6			1.2		-1.4							
K				-4.0						3.1				-1.1	
J		-.8				4.6		4.3	4.7						-2.1
H	-.2				3.4					3.4		.6		-3.2	
G				2.1			4.2				2.6				
F		-5.9						3.4	4.4						1.1
E							.7								
D		2.3		-.7		-1.6							-5.4		
C									-4.2		-4.1				
B			9.2					-2.2		-4.5			9.8		
A					9.9		-.1								

MEASURED AND PERCENT DIFF OF FDHN IP2 CY-2,MAP2,9-30-76,0.0 B,179C/D,50?8P,RUN 6(NEW PDQ HZP DECKS)

R MAP2

P 35% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	MEAS DIFF
R					.656	.836	.916	.851	.917	.820	.642					
					2.8	1.0	.6	.6	.4	.9	.6					
P			.729	1.044	1.179	.971	1.250	1.001	1.241	.940	1.128	1.002	.697			
			5.3	2.2	2.6	1.2	.7	.7	1.4	2.0	1.9	1.9	.8			
N		.731	1.310	1.186	1.069	1.307	1.040	1.056	1.009	1.268	1.019	1.131	1.256	.741		
		5.6	5.1	2.2	2.2	1.2	1.2	3.2	4.2	4.1	2.6	2.6	.7	7.0		
M		1.056	1.186	.944	1.241	1.130	1.178	.933	1.136	1.073	1.170	.895	1.167	1.095		
		3.4	2.2	1.0	1.0	1.0	1.2	1.8	2.5	4.1	4.7	6.1	.5	7.2		
L	.678	1.164	.993	1.170	.912	.977	.922	1.015	.909	.959	.960	1.153	1.046	1.147	.636	
	6.2	1.2	4.6	4.7	2.0	1.2	1.3	1.4	.1	.7	3.1	6.1	.0	.3	.4	
K	.839	.957	1.264	1.066	.969	.828	.934	.813	.933	.826	.996	1.122	1.321	.949	.819	
	1.4	.2	4.5	4.8	.3	3.4	3.5	3.5	3.4	3.1	3.1	.2	.1	1.1	1.1	
J	.917	1.248	1.002	1.152	.922	.943	.891	.932	.884	.943	.948	1.185	1.043	1.232	.902	
	.5	.8	4.8	1.2	1.3	4.6	5.5	4.3	4.7	4.5	4.1	1.8	1.0	2.1	2.1	
H	.855	1.002	1.072	.970	1.064	.820	.936	.752	.939	.813	1.059	.955	1.076	.976	.831	
	.2	.6	1.8	2.2	3.4	4.3	4.8	3.3	5.2	3.4	2.8	.6	1.4	3.2	3.0	
G	.909	1.238	1.025	1.189	.931	.936	.879	.929	.888	.934	.934	1.170	1.038	1.237	.907	
	1.4	1.6	2.6	2.1	2.3	3.8	4.2	4.0	5.2	3.6	2.6	.5	1.4	1.6	1.5	
F	.778	.902	1.285	1.129	.975	.819	.929	.812	.941	.815	.958	1.110	1.338	.970	.837	
	6.0	5.9	2.8	.9	1.0	2.3	3.1	3.4	4.4	1.7	.8	.9	1.1	1.1	1.1	
E	.629	1.131	1.031	1.220	.913	.953	.916	1.061	.950	1.005	.891	1.161	.992	1.127	.646	
	1.5	1.6	1.5	.7	1.9	1.3	.7	3.0	4.3	4.1	4.3	5.4	5.2	1.9	1.1	
D		1.044	1.169	.947	1.204	1.102	1.148	.923	1.096	1.062	1.175	.907	1.098	.967		
		2.3	.7	.7	1.9	1.6	1.4	2.8	5.9	5.1	4.3	4.9	5.4	5.3		
C		.730	1.291	1.209	1.025	1.277	1.022	1.046	1.009	1.261	1.003	1.160	1.273	.707		
		5.5	3.6	4.2	2.0	3.4	2.9	4.1	4.2	4.7	4.1	.0	2.2	2.2		
B			.755	1.120	1.263	1.019	1.254	.985	1.207	.916	1.103	1.053	.760			
			9.2	9.6	9.9	6.2	.3	2.2	4.1	4.5	4.1	3.1	9.8			
A					.702	.877	.920	.853	.892	.795	.613					
					9.9	6.0	.1	.3	3.2	3.9	3.9					

EDIT FOR SYMMETRIC THIMBLES

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE-INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10 D6	0	.9494E+00		1.238	6.7
14 F 7 26	0	.9375E+00	.987	1.215	5.7
2 H15 1 11	0	.9173E+00		1.368	-3.5
19 R 8 3 11	0	.8991E+00	.969	1.352	-5.8
3 K 2 1 0	0	.1070E+01		1.366	-6.8
8 B 6 1 8	0	.1037E+01	.970	1.393	-10.5
36 F14 5 11	1	.1015E+01	.949	1.386	-11.8
5 P 4 1 5	0	.1074E+01		1.298	-1.5
32 D14 4 7	0	.1081E+01	1.007	1.309	-4.3
6 H 6 1 6	0	.9354E+00		1.223	5.3
42 F 8 5 9	0	.9116E+00	.975	1.207	4.8
9 E 9 1 9	0	.1020E+01		1.198	5.4
33 G 5 4 8	0	.1007E+01	.987	1.212	3.8
10 D10 2 10	0	.1121E+01		1.185	2.4
35 K12 5 10	0	.1096E+01	.977	1.189	.5
11 A11 2 3	0	.7298E+00	De 126	1.330	3.6
28 R11 4 11	1	.6923E+00	De 179 .935	1.369	-7.9
46 L15 6 13	0	.7053E+00	.966	1.374	-4.6
13 F 1 2 5	0	.8643E+00		1.371	-6.0
15 R 6 1 8	0	.8473E+00	.980	1.372	-6.4
16 N14 2 8	0	.7816E+00		1.290	-1.2
17 N 2 2 9	0	.7696E+00	.985	1.293	.3
21 B13 3 5	0	.7850E+00	1.004	1.290	-2.4
45 B 3 6 0	0	.7992E+00	1.010	1.294	1.1
18 G 9 3 10	0	.9004E+00		1.185	4.8
27 J 7 4 10	0	.8922E+00	.991	1.196	3.3
20 C 5 3 13	0	.1131E+01		1.258	-2.1
30 L13 4 5	0	.1135E+01	1.003	1.269	-3.8
22 H11 3 3	0	.1030E+01		1.202	5.1
25 L 8 3 9	0	.1008E+01	.979	1.199	5.0
23 J14 3 7	0	.1265E+01		1.352	-7.1
50 P 9 6 9	0	.1324E+01	1.030	1.337	-4.8
24 J 1 3 8	0	.9377E+00		1.353	-6.7
49 A 9 6 10	1	.9713E+00	1.036	1.369	-7.3
29 B 8 4 0	0	.1081E+01		1.303	-2.1
44 H 2 6 11	0	.1061E+01	.981	1.305	-4.5
31 N 4 4 6	0	.1085E+01		1.251	-1.8
34 O 3 4 9	0	.1093E+01	1.007	1.258	-1.1

MAP 2
3590 P 12

4 low

G 12 6 7
M 7 5 13

PERCENT. DIFF. OF EXPECT. AND MEAS. FOHN IP2 CY-2,MAP3,10-3-76,0 MWD/MTU,C/D=214,70%BP,BASE,NEW PDQ,IN/EX-CAL.,R2

MAP 3

70% Power

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					4.2			2.5		-.4					
P							2.4						.1		
N		5.9	5.7							-.5		-.3		5.7	
M									-.2						
L	2.5		-1.9			-2.8		-.1							
K				-2.1						-3.7				-.0	
J		3.2				.6		-1.8	-2.2						-.2
H	3.3				1.0					-2.1		-1.0		.1	
G				1.6			-2.3				-1.1				
F		.8						-2.9	-3.8						.5
E							-2.6								
D		5.9		-.6		-3.8		-1.9					-2.4		
C									-1.8		-1.7				
B			-10.1					-1.4		-2.7			7.6		
A					3.9		-.5								

EASURED AND PERCENT. DIFF. OF FDHN IP2 CY-2,MAP3,10-3-76,0 MWD/MTU,C/D=214,70%BP,BASE,NEW PDQ,1N/EX CAL.,R2

R I 1

MAP 3

70% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
R					.666	.854	.922	.856	.912	.825	.647					
					4.2	3.1	2.5	2.5	1.4	.4	1.1					
P			.702	1.014	1.158	1.009	1.240	1.008	1.223	.979	1.113	.973	.676			
			5.8	4.3	4.1	3.3	2.4	2.4	1.1	.2	.1	.1	1.8			
N		.703	1.231	1.159	1.061	1.294	1.056	1.079	1.033	1.267	1.020	1.105	1.185	.702		
		5.9	5.7	4.6	4.0	1.7	1.6	.1	-.6	-.5	.0	-.3	1.8	5.7		
M		1.003	1.145	.953	1.167	1.077	1.156	.968	1.166	1.102	1.187	.914	1.125	1.028		
		3.2	3.4	1.6	-2.8	-2.9	-1.0	-.3	-.2	-.6	-1.2	-2.6	-1.6	5.8		
L	.656	1.119	1.001	1.177	.920	.971	.948	1.079	.943	.970	.905	1.170	1.005	1.095	.630	
	2.5	.6	-1.9	-2.0	-2.7	-2.8	-1.0	-.1	-1.5	-2.8	-4.3	-2.6	-1.5	-1.6	-1.6	
K	.850	.992	1.266	1.086	.978	.848	.976	.863	.967	.832	.955	1.093	1.254	.977	.830	
	2.6	1.5	-.5	-2.1	-2.1	-1.8	-.8	-.8	-1.7	-3.7	-4.3	-1.4	-1.5	.0	-.2	
J	.929	1.249	1.039	1.166	.954	.990	.945	1.004	.931	.958	.943	1.175	1.031	1.206	.898	
	3.3	3.2	.0	-.2	-.5	.6	-.7	-1.8	-2.2	-2.7	-1.5	.6	.8	-.4	-.2	
H	.862	1.016	1.096	.987	1.091	.873	1.014	.870	1.006	.852	1.070	.961	1.073	.985	.837	
	3.3	3.2	1.7	1.7	1.0	.3	.8	2.0	-1.6	-2.1	-1.0	-1.0	.4	.1	.2	
G	.923	1.241	1.050	1.187	.974	.992	.930	.992	.924	.961	.947	1.155	1.034	1.204	.895	
	2.6	2.5	1.0	1.6	1.7	.8	-2.3	-2.9	-2.9	-2.4	-1.1	-1.1	.5	.5	.5	
F	.836	.985	1.286	1.120	1.010	.847	.958	.845	.947	.836	.970	1.077	1.279	.982	.832	
	.9	.8	1.0	1.1	1.1	1.9	-2.6	-2.9	-3.8	-3.2	-2.9	-2.9	.4	.5	.5	
E	.663	1.152	1.042	1.194	.923	.961	.932	1.054	.936	.963	.931	1.172	.996	1.102	.643	
	3.6	3.6	2.1	.6	-2.5	-3.7	-2.6	-2.4	-2.2	-3.6	-1.6	-2.5	-2.4	.9	.5	
D		1.029	1.137	.932	1.172	1.066	1.143	.951	1.149	1.075	1.182	.919	1.081	.949		
		5.9	2.6	.6	-2.5	-3.8	-2.1	-1.9	-1.6	-3.0	-1.6	-2.0	-2.4	-2.4		
C		.716	1.224	1.159	.995	1.217	1.023	1.061	1.021	1.239	1.003	1.121	1.194	.681		
		7.9	5.2	4.6	-2.5	-4.4	-1.6	-1.6	-1.8	-2.6	-1.7	-1.1	2.6	2.6		
B			.731	1.041	1.156	1.008	1.214	.971	1.179	.951	1.093	1.003	.714			
			10.1	7.1	3.9	3.1	.3	-1.4	-2.6	-2.7	-1.7	-3.1	7.6			
A					.665	.853	.904	.837	.885	.813	.629					MEAS
					3.9	3.0	.5	.2	-1.6	-1.8	-1.8					DIFF

EDIT FOR SYMMETRIC THIMBLES

MAP 3

70% Power

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE-INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9674E+00		1.428	14.9
14 F 7	0	.9409E+00	.973	1.415	15.5
2 H15	0	.8968E+00		1.320	4.8
19 R 8	0	.8892E+00	.991	1.314	6.4
3 K 2	0	.1076E+01		1.291	6.9
8 B 6	0	.1074E+01	.998	1.305	6.4
36 F14	0	.1104E+01	1.026	1.283	5.9
5 P 4	0	.1023E+01		1.297	5.5
32 D14	0	.1058E+01	1.034	1.284	5.0
6 H 6	0	.9530E+00		1.428	16.2
42 F 8	0	.9212E+00	.967	1.416	15.5
9 E 9	0	.1029E+01		1.377	13.9
33 G 5	0	.1032E+01	1.003	1.388	13.4
10 D10	0	.1090E+01		1.304	11.7
35 K12	0	.1110E+01	1.018	1.306	9.3
11 A11	0	.6914E+00		1.306	7.3
28 R11	0	.6931E+00	1.002	1.314	5.8
46 L15	0	.6822E+00	.987	1.307	4.8
13 F 3	0	.8558E+00		1.313	6.2
15 R 6	0	.8487E+00	.992	1.302	5.0
16 N14	0	.7386E+00		1.294	7.6
17 N 2	0	.7292E+00	.987	1.289	7.9
21 B13	0	.7595E+00	1.028	1.310	7.2
45 B 3	0	.7424E+00	1.005	1.308	8.6
18 G 9	0	.9649E+00		1.432	16.0
27 J 7	0	.9426E+00	.977	1.440	16.3
20 C 5	0	.1129E+01		1.249	8.1
30 L13	0	.1132E+01	1.003	1.256	8.0
22 H11	0	.1056E+01		1.371	13.8
25 L 8	0	.1041E+01	.985	1.366	13.8
23 J14	0	.1302E+01		1.278	4.5
50 P 9	0	.1293E+01	.994	1.303	4.0
24 J 1	0	.9449E+00		1.307	5.8
49 A 9	0	.9456E+00	1.001	1.311	4.6
29 B 8	0	.1062E+01		1.272	5.6
44 H 2	0	.1069E+01	1.001	1.266	8.5
31 N 4	0	.1066E+01		1.262	6.5
34 D 3	0	.1068E+01	1.002	1.260	7.2
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
43 D 8	0	.1080E+01	1.005	1.347	11.5
38 M 7	0	.1120E+01		1.315	12.2

PERCENT. DIFF. OF EXPECT. AND MEAS. FDHN IP2 Y-2,MAP4,10-3-76,0 MWD/MTU,C/D=180,70 PCT P, IN/EX-CAL.,R3,NEW PDQ

R I I

MAP 4

70 % POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
R					4.8			3.6		3.0						R
P							3.8					.3				P
N		7.8	7.4									-.1		8.7		N
M									-1.3							M
L	2.6		-.3			-4.5		-1.2								L
K				-.1						-5.0				1.0		K
J		4.0				-1.7		-5.5	-4.8						1.3	J
H	4.2				-.8					-3.5		-1.0				H
G				-.2			-6.0				-1.8					G
F		.8						-5.3	-6.0				1.6		3.0	F
E							-5.1									E
D		7.0		-.7		-3.9							-1.6			D
C									-2.7		-1.9					C
B			10.1					-1.1		-2.8			7.2			B
A					7.2		1.7									A

MEASURED AND PERCENT. DIFF. OF FDHN IP2 CY-2, AP4,10-3-76,0 MWD/MTU,C/D=180,70 PCT P, IN/EX-CAL.,R3,NEW PDQ

MAP 4
70% Power

	R	I	1															
R					.658	.842	.916	.853	.910	.829	.646							R
					4.8	4.7	3.8	3.6	3.1	3.0	2.9							
P				.722	1.021	1.149	.978	.235	1.010	1.227	.960	1.111	.978	.690				P
				7.6	4.7	4.8	5.0	3.8	3.6	3.1	3.0	1.3	.3	2.9				
N			.724	1.265	1.171	1.067	1.315	.077	1.094	1.023	1.247	1.021	1.116	1.212	.729			N
			7.8	7.4	4.8	4.6	4.1	4.0	1.4	-1.2	-1.2	.1	-.1	2.9	8.7			
M			1.016	1.168	.964	1.159	1.067	.144	.969	1.165	1.107	1.186	.926	1.153	1.061			M
			4.2	4.5	1.6	-4.6	-4.6	-3.1	-1.3	-1.3	-1.1	-2.4	-2.4	3.2	8.8			
L	.643	1.104	1.018	1.212	.944	.970	.945	1.086	.948	.982	.906	1.186	1.009	1.084	.620			L
	2.6	.6	-.3	-.2	-1.7	-4.5	-3.0	-1.2	-2.6	-3.4	-5.7	-2.4	-1.1	-1.2	-1.2			
K	.828	.949	1.273	1.118	.996	.849	.965	.850	.958	.836	.958	1.107	1.249	.941	.814			K
	2.9	1.9	.8	-.1	-2.0	-3.6	-3.6	-3.9	-4.3	-5.0	-5.7	-1.0	-1.2	1.0	1.2			
J	.919	1.237	1.056	1.185	.967	.985	.918	.966	.915	.960	.952	1.196	1.036	1.203	.894			J
	4.1	4.0	1.9	.4	-.7	-1.7	-4.5	-5.5	-4.8	-4.2	-2.2	1.4	.1	1.1	1.3			
H	.858	1.014	1.096	.983	1.091	.862	.975	.803	.976	.853	1.082	.972	1.092	1.007	.851			H
	4.2	4.0	1.6	.1	-.8	-2.5	-4.7	-6.1	-4.6	-3.5	-1.6	-1.0	1.3	3.3	3.4			
G	.911	1.226	1.044	1.182	.976	.978	.903	.963	.913	.966	.957	1.176	1.050	1.218	.909			G
	3.2	3.1	.8	.2	.7	-2.4	-6.0	-5.8	-5.0	-3.5	-1.8	-.4	1.4	2.4	3.0			
F	.812	.939	1.273	1.126	1.023	.843	.947	.837	.942	.845	.977	1.106	1.284	.956	.829			F
	.9	.8	.8	.7	.7	-4.2	-5.4	-5.3	-6.0	-4.1	-3.8	-1.1	1.6	2.5	3.0			
E	.654	1.144	1.046	1.206	.941	.977	.924	1.039	.915	.971	.928	1.214	1.021	1.110	.646			E
	4.3	4.3	2.5	-.7	-2.1	-3.9	-5.1	-5.5	-6.0	-4.4	-3.4	-.1	.0	1.1	3.0			
D		1.044	1.152	.943	1.189	1.075	.134	.932	1.112	1.068	1.173	.926	1.100	.961				D
	15	7.0	3.1	-.7	-2.1	-3.9	-4.0	-5.0	-5.8	-4.6	-3.4	-2.5	-1.6	-1.5	1			
C		.727	1.242	1.169	.998	1.215	.009	1.038	1.007	1.224	1.001	1.125	1.211	.690				C
		8.4	5.5	4.6	-2.2	-3.8	-2.6	-3.7	-2.7	-3.1	-1.9	.7	2.8	2.8				
B			.739	1.060	1.175	.989	.206	.964	1.160	.905	1.079	.997	.719					B
		14	10.1	8.7	7.1	6.1	1.4	-1.1	-2.5	-2.8	-1.6	2.2	7.2	2				
A				.672	.851	.897	.834	.876	.803	.626						MEAS		A
			13	12	7.2	5.8	1.7	1.3	-.7	-.1	-.1	4	3			DIFF		
					11	10	9	8	7	6	5							

EDIT FOR SYMMETRIC THIMBLES

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9687E+00		1.168	-3.4
14 F 7	0	.9528E+00	.984	1.180	-2.7
2 H15	0	.8984E+00		1.414	-12.5
19 R 8	0	.8807E+00	.980	1.418	-14.3
3 K 2	0	.1035E+01		1.432	-15.9
8 B 6	0	.1048E+01	1.013	1.440	-18.2
36 F14	0	.1058E+01	1.022	1.419	-17.7
5 P 4	0	.1031E+01		1.379	-10.8
32 D14	1	.1077E+01	1.044	1.364	-13.3
6 H 6	0	.9553E+00		1.167	-3.3
42 F 8	1	.9034E+00	.946	1.182	-5.7
9 E 9	0	.1039E+01		1.188	-4.8
33 G 5	0	.1044E+01	1.005	1.199	-6.2
10 D10	0	.1113E+01		1.240	-7.0
35 K12	1	.1169E+01	1.049	1.234	-8.6
11 A11	0	.7018E+00		1.415	-13.8
28 R11	0	.6865E+00	.978	1.411	-14.2
46 L15	1	.6717E+00	.957	1.433	-15.0
13 F 1	0	.8557E+00		1.417	-14.3
15 R 6	0	.8557E+00	1.000	1.412	-14.0
16 N14	0	.7742E+00		1.374	-10.5
17 N 2	0	.7509E+00	.983	1.359	-9.0
21 B13	0	.7707E+00	.996	1.358	-12.1
45 B 3	0	.7507E+00	.970	1.368	-11.8
18 G 9	0	.9413E+00		1.171	-5.1
27 J 7	0	.9405E+00	.999	1.182	-4.2
20 C 5	0	.1115E+01		1.303	-12.3
30 L13	0	.1136E+01	1.019	1.321	-12.9
22 H11	0	.1051E+01		1.192	-5.3
25 L 8	0	.1039E+01	.989	1.195	-5.2
23 J14	0	.1290E+01		1.389	-15.6
50 P 9	0	.1307E+01	1.013	1.395	-16.2
24 J 1	0	.9438E+00		1.414	-15.5
49 A 9	0	.9508E+00	1.007	1.424	-16.3
31 N 4	0	.1082E+01		1.300	-11.5
34 D 3	0	.1091E+01	1.008	1.315	-10.4
38 M 7	0	.1139E+01		1.225	-6.8
48 G12	0	.1159E+01	1.017	1.231	-6.9

MAP 4
70% POWER

**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

PERCENT. DIFF. OF EXPECT. AND MEAS. FDHN IP2 CY-2,MAP5,10-4-76,0 MWD/MTU,C/D=214,70 PCT P, IN/EX-CAL.,R2, NEW PDQ

R I I

MAP 5

70% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					3.1			1.9		-.2					
P												-.7			
N		5.2	4.9							-.7		-1.1		5.9	
M									-.3						
L	2.0		-2.5			-1.8		-.2							
K				-2.7						-2.4				-.4	
J		2.1				1.0		-1.3	-1.2						-.9
H	2.3				1.2					-1.1		-.5		-1.1	
G				1.7			-.3				-.3				
F		-.5						-.9	-.6						1.2
E							-.9								
D		5.6		-1.1		-2.6		-.6					-2.8		
C									-1.1		-2.0				
B			8.4					-1.4		-2.4			6.7		
A					4.7		-.3								

MEASURED AND PERCENT. DIFF. OF FDHX IP2 CY-2,MAP5,10-4-76,0 MWD/MTU,C/D=214,70 PCT P, IN/EX-CAL.,R2, NEW PDQ

R 1 1

MAP 5

70% Power

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
R					.659 3.1	.854 3.2	.917 1.9	.850 1.9	.907 .9	.826 -.2	.645 .9					R
P			.697 5.0	1.001 2.9	1.146 3.0	1.009 3.4	1.233 1.9	1.002 1.9	1.219 .7	.978 .2	1.109 -.3	.965 -.7	.673 1.3			P
N		.699 5.2	1.222 4.9	1.141 3.0	1.050 2.9	1.248 -1.9	1.019 -1.9	1.057 -2.0	1.031 -.8	1.264 -.7	1.015 -.5	1.096 -1.1	1.160 1.3	.703 5.9		N
M		.998 2.7	1.139 2.7	.944 .6	1.100 -1.8	1.089 -1.8	1.164 -.4	.966 -.4	1.165 -.3	1.100 -.8	1.182 -1.7	.905 -3.6	1.121 1.2	1.030 5.9		M
L	.652 2.0	1.114 .2	.995 -2.5	1.171 -2.6	.922 -2.6	.982 -1.8	.955 -.3	1.078 -.2	.947 -1.1	.977 -2.2	.922 -2.6	1.159 -3.6	1.009 -1.1	1.099 -1.2	.632 -1.2	L
K	.839 1.4	.981 .6	1.254 -1.5	1.079 -2.7	.981 -1.9	.855 -1.0	.982 -.3	.867 -.4	.975 -1.0	.844 -2.4	.974 -2.6	1.097 -1.1	1.258 -1.1	.972 -.4	.825 -.3	K
J	.919 2.2	1.235 2.1	1.026 -1.3	1.162 -.5	.955 -.3	.994 1.0	.949 -.3	1.008 -1.3	.941 -1.2	.972 -1.3	.955 -.3	1.179 .9	1.029 -.9	1.197 -1.0	.891 -.9	J
H	.853 2.3	1.005 2.2	1.088 1.0	.988 1.5	1.094 1.2	.876 .6	1.018 -.3	.873 -1.4	1.014 -.7	.862 -1.1	1.079 -.2	.966 -.5	1.069 -.8	.973 -1.1	.826 -1.0	H
G	.914 1.6	1.228 1.5	1.043 .4	1.189 1.7	.975 1.8	.997 1.3	.950 -.3	1.016 -.6	.950 -.2	.977 -.7	.955 -.3	1.161 -.7	1.030 -.8	1.201 -.7	.894 -.6	G
F	.823 -.5	.970 -.5	1.277 .3	1.121 1.1	1.010 1.1	.855 -1.1	.976 -.9	.863 -.9	.978 -.6	.852 -1.5	.977 -2.2	1.085 -2.2	1.288 1.2	.987 1.2	.837 1.2	F
E	.557 2.7	1.142 2.7	1.035 1.4	1.189 -1.1	.928 -2.0	.973 -2.6	.949 -.9	1.078 -.3	.961 .4	.991 -.8	.924 -2.3	1.169 -2.8	.993 -2.7	1.104 -.7	.647 1.2	E
D		1.027 5.6	1.133 2.2	.929 -1.1	1.178 -2.0	1.080 -2.6	1.157 -.9	.963 -.8	1.165 -.3	1.079 -2.7	1.174 -2.4	.915 -2.6	1.078 -2.8	.946 -2.7		D
C		.710 6.9	1.216 4.4	1.148 3.6	1.000 -2.0	1.234 -3.0	1.031 -.8	1.070 -.8	1.028 -1.1	1.243 -2.3	1.000 -2.0	1.114 .5	1.188 2.0	.677 2.0		C
B			.720 8.4	1.037 6.6	1.164 4.7	1.002 2.7	1.205 -.4	.971 -1.4	1.185 -2.1	.952 -2.4	1.090 -2.0	.995 2.3	.708 6.7			B
A					.669 4.7	.850 2.7	.897 -.3	.831 -.4	.886 -1.5	.814 -1.6	.530 -1.5				MEAS DIFF	A

OUT FOR SYMMETRIC THIMBLES

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE-INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9786E+00		1.555	22.0
14 F 7	0	.9739E+00	.995	1.528	22.0
2 H15	0	.8972E+00		1.411	14.2
19 R 8	0	.8927E+00	.984	1.397	12.2
3 K 2	0	.1085E+01		1.385	13.7
8 B 6	0	.1061E+01	.997	1.394	12.8
36 F14	0	.1093E+01	1.008	1.378	11.9
5 P 4	0	.1023E+01		1.389	14.2
32 D14	1	.1061E+01	1.037	1.367	12.0
6 H 6	0	.9742E+00		1.552	23.4
42 F 8	0	.9620E+00	.987	1.544	22.9
9 E 9	0	.1045E+01		1.506	20.6
33 G 5	0	.1045E+01	1.001	1.508	20.4
10 D10	0	.1113E+01		1.416	18.2
35 K12	0	.1107E+01	.995	1.411	18.6
11 A11	0	.7000E+00		1.393	14.6
28 R11	0	.6894E+00	.985	1.401	11.9
46 L15	0	.6818E+00	.974	1.381	12.9
13 F 1	0	.6660E+00		1.393	13.6
15 R 6	0	.6538E+00	.986	1.387	13.4
16 N14	0	.7437E+00		1.375	14.0
17 N 2	0	.7348E+00	.988	1.374	14.8
21 B13	0	.7526E+00	1.012	1.400	15.5
45 B 3	0	.7405E+00	.996	1.393	14.5
18 G 9	0	.9778E+00		1.546	22.5
27 J 7	0	.9564E+00	.978	1.560	23.1
20 C 5	0	.1127E+01		1.356	15.0
30 L13	0	.1135E+01	1.007	1.364	13.2
22 H11	0	.1065E+01		1.488	20.9
25 L 8	0	.1050E+01	.986	1.484	21.0
24 J 1	0	.9368E+00		1.396	12.0
49 A 9	0	.9377E+00	1.001	1.395	14.2
29 B 8	0	.1068E+01		1.360	12.7
44 H 2	0	.1057E+01	.990	1.351	13.6
31 N 4	0	.1061E+01		1.353	14.0
34 O 3	0	.1071E+01	1.009	1.351	14.7
37 H 4	0	.1083E+01		1.435	18.2
43 O 8	0	.1100E+01	1.015	1.450	19.5
38 M 7	0	.1120E+01		1.430	19.4
48 G12	0	.1154E+01	1.031	1.458	18.7

MAP 5

70 % POWER

PERCENT. DIFF. OF EXPECT. AND MEAS. FDHN FP2 CY-2,MAP6,10-5-76,0 MWD/MTU,C/D=214,70 PCT P, IN/EX-CAL.,R2,NEW PDQ

MAP 6

70% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					3.2			1.3		.5					
P							1.2					.4			
N		7.0	6.6									-.0		7.1	
M									-1.2						
L	1.1		-1.9			-2.4		-1.1							
K				-2.1						-2.9				-.4	
J		2.7				.3		-1.8	-1.8						-1.2
H	2.8				.6					-1.7		-.8		-1.4	
G							-1.0				-.8				
F		-.3						-1.5	-1.2				-.2		1.5
E							-1.4								
D		5.9		-.4		-2.6		-1.7					-1.8		
C									-1.5		-1.9				
B			9.0					-1.3		-2.2			6.3		
A					5.6		-.3								

MEASURED AND PERCENT. DIFF. OF FDHN IP2 CY-2,MAP6,10-5-76,0 MWD/MTU,C/D=214,70 PCT P, IN/EX-CAL.,R2,NEW PDQ

R 1 1

MAP 6

70% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
R					.661 3.2	.846 2.1	.912 1.3	.846 1.3	.911 1.2	.833 .5	.651 1.6					R
P			.709 6.7	1.007 3.6	1.147 3.1	1.000 2.2	1.226 1.2	.997 1.2	1.225 1.2	.983 .5	1.117 .4	.976 .4	.680 2.5			P
N		.710 7.0	1.241 6.5	1.155 4.3	1.051 3.0	1.261 .7	1.046 .6	1.071 -.7	1.019 -2.0	1.248 -2.0	1.022 .2	1.108 -.0	1.193 2.5	.711 7.1		N
M		1.006 3.5	1.152 4.0	.952 1.5	1.173 -2.4	1.082 -2.4	1.151 -1.4	.959 -1.2	1.153 -1.2	1.087 -1.9	1.173 -2.4	.916 -2.4	1.134 2.4	1.041 7.1		M
L	.647 1.1	1.113 -.0	1.001 -1.9	1.177 -2.0	.922 -2.5	.975 -2.4	.944 -1.4	1.068 -1.1	.941 -1.7	.974 -2.4	.918 -2.9	1.173 -2.4	1.003 -1.7	1.094 -1.7	.629 -1.7	L
K	.842 1.6	.986 .8	1.264 -.7	1.086 -2.1	.979 -2.0	.850 -1.6	.973 -1.1	.859 -1.3	.966 -1.8	.839 -2.9	.969 -2.9	1.090 -1.6	1.251 -1.7	.974 -.4	.826 -.3	K
J	.925 2.8	1.243 2.7	1.036 -.3	1.161 -.5	.952 -.5	.987 .3	.943 -.9	1.003 -1.8	.935 -1.8	.964 -2.0	.949 -.8	1.173 .5	1.023 -1.6	1.194 -1.4	.889 -1.2	J
H	.858 2.8	1.011 2.7	1.100 2.0	.986 1.7	1.086 .6	.868 -.2	1.009 -1.2	.869 -2.1	1.008 -1.4	.855 -1.7	1.072 -.7	.962 -.8	1.062 -1.5	.971 -1.4	.825 -1.2	H
G	.916 1.7	1.231 1.7	1.040 .1	1.187 1.7	.973 1.7	.984 .0	.942 -1.0	1.007 -1.4	.943 -.9	.968 -1.6	.949 -.8	1.159 -.8	1.028 -1.1	1.202 -.7	.892 -.9	G
F	.828 -.1	.976 -.3	1.274 .0	1.104 -.4	1.016 1.7	.846 -2.0	.970 -1.4	.857 -1.5	.972 -1.2	.843 -2.3	.974 -2.5	1.093 -1.3	1.271 -.2	.986 .8	.841 1.5	F
E	.660 3.0	1.146 3.0	1.040 1.9	1.197 -.4	.931 -1.5	.972 -2.6	.944 -1.4	1.067 -1.2	.949 -.8	.976 -2.3	.922 -2.5	1.188 -1.1	1.010 -1.0	1.112 -.1	.650 1.5	E
D		1.029 5.9	1.138 2.7	.935 -.4	1.183 -1.5	1.079 -2.6	1.147 -1.8	.953 -1.7	1.151 -1.5	1.079 -2.7	1.172 -2.5	.918 -2.2	1.087 -1.8	.955 -1.8		D
C		.712 7.3	1.221 4.9	1.154 4.2	1.004 -1.6	1.237 -2.8	1.023 -1.5	1.061 -1.6	1.023 -1.5	1.245 -2.2	1.001 -1.9	1.115 .6	1.190 2.2	.678 2.2		C
B			.723 9.0	1.043 7.3	1.175 5.6	1.010 3.2	1.206 -.4	.972 -1.3	1.188 -1.9	.957 -2.2	1.092 -1.9	.992 2.1	.705 6.3			B
A					.676 5.6	.855 3.2	.898 -.3	.831 -.4	.888 -1.4	.819 -1.2	.533 -1.2				MEAS DIFF	A

TEST FOR SYMMETRIC THIMBLES

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE-INTEGRAL	RATIO- T -FIRST	FZ	AXIAL OFFSET
1 J10	0	.9701E+00		1.304	8.0
14 F 7	0	.9561E+00	.986	1.305	9.2
2 H15	0	.8942E+00		1.271	.4
19 R 8	0	.8806E+00	.985	1.264	-1.5
3 K 2	0	.1079E+01		1.229	.1
8 B 6	0	.1066E+01	1.006	1.237	-1.3
36 F14	0	.1096E+01	1.016	1.234	.9
5 P 4	0	.1029E+01		1.232	.5
32 D14	0	.1061E+01	1.031	1.235	-1.5
6 H 6	0	.9615E+00		1.306	8.9
42 F 8	0	.9529E+00	1.001	1.286	7.3
9 E 9	0	.1039E+01		1.258	6.7
33 G 5	0	.1039E+01	1.000	1.273	5.0
10 D10	0	.1112E+01		1.200	4.8
35 K12	0	.1112E+01	1.001	1.186	3.5
11 A11	0	.7049E+00		1.250	1.5
28 R11	0	.6390E+00	.978	1.256	-1.8
46 L15	1	.6753E+00	.958	1.268	.6
13 F 1	0	.8679E+00		1.243	.4
15 R 6	0	.8591E+00	.990	1.248	.1
16 N14	0	.7563E+00		1.242	.4
17 N 2	0	.7408E+00	.980	1.229	1.5
21 B13	0	.7538E+00	.997	1.231	-1.0
45 B 3	0	.7353E+00	.972	1.245	-.4
18 G 9	0	.9580E+00		1.310	8.6
27 J 7	0	.9474E+00	.989	1.318	6.8
20 C 5	0	.1123E+01		1.184	1.4
30 L13	0	.1137E+01	1.013	1.189	.1
22 H11	0	.1053E+01		1.260	6.7
25 L 8	0	.1031E+01	.979	1.256	6.3
23 J14	0	.1301E+01		1.232	-.0
50 P 9	0	.1284E+01	.987	1.237	-.1
24 J 1	0	.9401E+00		1.254	-1.7
49 A 9	0	.9366E+00	.996	1.264	.6
29 B 8	0	.1065E+01		1.222	-.5
44 H 2	0	.1044E+01	.981	1.213	1.4
31 N 4	0	.1072E+01		1.190	.3
34 O 3	0	.1077E+01	1.005	1.191	1.2
37 H 4	0	.1076E+01		1.210	4.3
43 D 8	0	.1069E+01	.994	1.218	5.1

MAP 6

70% POWER

PERCEN. DIFF. OF EXPECT. AND MEAS. FDHN IP2 CY-2,MAP7,10-11-76, 0 BU,CD=212,90 PCT P R2

R 1 1

MAP 7

90% Power

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					3.1			1.3		.1					
P							1.2					-.8			
N		5.4	5.0							-.7		-1.1		5.6 ?	
M									-.7					?	
L	2.1		-2.6			-2.6		-.7							
K				-2.8						-1.8				-.7 ?	
J		1.5				.9		.9	.0						-1.0
H	1.7				1.3					.6		.1		-.9 ?	
G				1.7			-.2				.2			?	
F		-.1						-.8	-.6				-.3	?	.7
E							-1.0							?	
D		4.8		-.6		-2.6		-1.3					-2.4	?	
C									-2.3						
B			7.5					-1.5		-3.7			7.2		
A					4.3		-.3								

MEASURED AND EXPECTED FDHN IP2 CY-2,MAP7,10-11-76, 0 BU,CD=212,90 PCT P R2

R 1 1

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					.658	.843	.909	.844	.906	.826	.643				
P					.638	.825	.898	.833	.898	.825	.638				
N			.699	.999	1.144	.993	1.223	.995	1.214	.971	1.106	.965	.673		
M			.665	.972	1.111	.972	1.208	.983	1.208	.972	1.111	.972	.668		

MEASURED AND PERCENT. DIFF. OF FDHN IP2 CY-2,MAP7,10-11-76, [illegible]U,CD=212,90 PCT P R2

R 1 1

MAP 7

90% POWER

R						.658.	.843.	.909.	.844.	.906.	.826.	.643.					
						3.1.	2.1.	1.3.	1.3.	.9.	.1.	.8.					
P				.699.	.999.	1.144.	.993.	1.223.	.995.	1.214.	.971.	1.106.	.965.	.673.			
				5.1.	2.8.	3.0.	2.2.	1.2.	1.2.	.5.	-.2.	-.4.	-.9.	1.2.			
N			.700.	1.224.	1.138.	1.050.	1.283.	1.048.	1.077.	1.031.	1.263.	1.012.	1.097.	1.180.	.702?		
			5.4.	5.0.	2.6.	2.9.	.9.	.8.	-.1.	-.7.	-.7.	-.8.	-1.1.	1.2.	5.6.		
M		.999.	1.139.	.942.	1.172.	1.081.	1.151.	.964.	1.161.	1.102.	1.182.	.918.	1.123.	1.028?			
		2.7.	2.7.	.3.	-2.6.	-2.6.	-1.6.	-.8.	-.7.	-.7.	-1.8.	-3.1.	1.3.	5.7.			
L	.52.	1.111.	.994.	1.171.	.920.	.975.	.944.	1.075.	.947.	.985.	.927.	1.166.	1.005.	1.033?	.620.		
	2.1.	.1.	-2.6.	-2.7.	-2.9.	-2.6.	-1.6.	-.7.	-1.2.	-1.6.	-2.2.	-3.1.	-1.5.	-1.6.	-1.6.		
K	.837.	.976.	1.250.	1.079.	.982.	.856.	.987.	.876.	.984.	.850.	.979.	1.093.	1.252.	.965?	.820.		
	1.4.	.4.	-1.7.	-2.8.	-1.9.	-1.1.	.1.	.5.	-.2.	-1.8.	-2.2.	-1.5.	-1.5.	-.7.	-.7.		
J	.913.	1.227.	1.024.	1.158.	.955.	.995.	.970.	1.031.	.953.	.977.	.959.	1.185.	1.032.	1.196?	.889.		
	1.7.	1.5.	-1.4.	-.9.	-.4.	.9.	1.8.	.9.	.0.	-.9.	-.0.	1.4.	-.7.	-1.0.	-1.0.		
H	.848.	.999.	1.089.	.988.	1.097.	.877.	1.031.	.883.	1.029.	.867.	1.085.	.973.	1.076.	.975?	.827.		
	1.7.	1.6.	1.0.	1.7.	1.3.	.5.	.9.	-.1.	.7.	-.6.	.3.	.1.	-.2.	-.9?	4.8.		
G	.911.	1.226.	1.049.	1.189.	.976.	.992.	.951.	1.015.	.951.	.980.	.961.	1.168.	1.036.	1.203?	.894.		
	1.5.	1.4.	1.0.	1.7.	1.7.	.6.	-.2.	-.7.	-.2.	-.6.	.2.	-.1.	-.2.	-.4.	-.5.		
F	.826.	.971.	1.284.	1.130.	1.019.	.856.	.979.	.865.	.980.	.854.	.987.	1.108.	1.268.	.975?	.831.		
	.0.	-.1.	.9.	1.8.	1.9.	-1.2.	-.7.	-.8.	-.6.	-1.4.	-1.4.	-.9.	-.3.	.3.	.7.		
E	.55.	1.139.	1.036.	1.196.	.930.	.975.	.950.	1.077.	.959.	.987.	.935.	1.186.	1.007.	1.104.	.643.		
	2.6.	2.6.	1.5.	-.6.	-1.8.	-2.5.	-1.0.	-.5.	-.1.	-1.4.	-1.4.	-1.4.	-1.3.	-.6.	.7.		
D		1.019.	1.132.	.934.	1.181.	1.080.	1.153.	.929.	1.155.	1.012.	1.174.	.917.	1.082.	.949.			
		4.8.	2.1.	-.6.	-1.8.	-2.6.	-1.4.	-1.3.	-1.2.	-3.4.	-2.4.	-2.5.	-2.4.	-2.4.			
C		.705.	1.212.	1.147.	1.001.	1.231.	1.023.	1.061.	1.015.	1.225.	.981.	1.135.	1.193.	.680.			
		6.1.	3.9.	3.4.	-1.9.	-3.2.	-1.6.	-1.6.	-2.3.	-1.6.	-3.9.	2.4.	2.4.	2.4.			
B		.715.	1.031.	1.158.	1.006.	1.20[illegible].	.968.	1.070.	.9[illegible].	1.068.	1.043.	.712.					
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-1.0.	-3.2.	-3.7.	-3.8.	4.3.	6.2.					
A				.666.	.849.	.895.	.829.	.871.	.794.	.614.							
				4.3.	2.8.	-.3.	-.5.	-3.0.	-3.8.	-3.8.							

MEAS
DIFF

15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

EDIT FOR SYMMETRIC THIMBLES

MAP 7

90% POWER

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9776E+00		1.333	10.0
14 E 7	0	.9602E+00	.982	1.329	10.0
2 H15	0	.8811E+00		1.259	2.5
19 R 8	0	.8710E+00	.989	1.249	.4
3 K 2	0	.1067E+01		1.237	.2
8 B 6	0	.1044E+01	.978	1.271	-1.6
36 F14	0	.1084E+01	1.016	1.227	1.1
5 P 4	0	.1009E+01		1.236	2.7
32 D14	0	.1043E+01	1.035	1.223	.7
6 H 6	0	.9659E+00		1.344	9.6
42 F 8	0	.9611E+00	.995	1.336	11.2
9 E 9	0	.1039E+01		1.297	8.8
33 G 5	0	.1046E+01	1.006	1.300	8.4
10 D10	0	.1101E+01		1.221	6.2
35 K12	0	.1099E+01	.998	1.216	5.5
11 A11	0	.6997E+00		1.251	1.6
28 R11	0	.6816E+00	.988	1.254	.2
46 L15	0	.6751E+00	.979	1.249	.0
13 F 1	0	.8515E+00		1.254	2.6
15 R 6	0	.8462E+00	.994	1.248	2.5
16 N14	0	.7417E+00		1.235	2.5
17 N 2	0	.7266E+00	.980	1.237	3.6
21 B13	0	.7398E+00	.997	1.248	1.3
45 B 3	0	.7374E+00	.994	1.238	1.2
18 G 9	0	.9647E+00		1.318	9.4
27 J 7	0	.9556E+00	.991	1.337	8.2
22 H11	0	.1046E+01		1.297	8.9
25 L 8	0	.1024E+01	.979	1.309	7.5
28 J14	0	.1268E+01		1.225	-.3
50 P 9	0	.1274E+01	1.004	1.233	1.4
24 J 1	0	.9223E+00		1.249	.3
49 A 9	0	.9329E+00	1.011	[illegible]	
26 F 3	0	.1328E+01		1.222	2.5
47 N 0	0	.1326E+01	.999	1.217	3.9
29 B 8	0	.1049E+01		1.212	.8
44 H 2	0	.1055E+01	1.006	1.195	1.6
31 N 4	0	.1057E+01		1.200	3.6
34 D 3	0	.1065E+01	1.007	1.199	2.7
37 H 4	0	.1079E+01		1.242	7.2
48 D 8	0	.1075E+01	.996	1.240	6.8

PERCENT. DIFF. OF EXPECT. AND MEAS. FOHN IP2 CY-2, MAP8, 10-20-76, 0 MWD/MTU, C/D=222, 100.2 PCT P, R1

R 1 1

MAP 8

100% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					3.3			.6		-1.1					
P							.5					-1.0			
N		4.5	4.2							-.9		-1.2		4.8	
M									.0						
L	1.4		-1.6			-1.7		.6							
K				-1.9						-.3				-1.5	
J		.1				2.3		1.9	1.1						-1.6
H	.3				2.1					1.0		.7		-1.3	
G				2.1			2.1				1.0				
F		-.8						.8	1.4				-.6		-.3
E							-.1								
D		3.9		-1.2		-2.5		-.9					-2.1		
C									-2.1		-3.6				
B			8.2					-1.9		-3.7			5.3		
A					3.2		-.9								

MEASURED AND PERCENT. DIFF. OF TOHY 1P2 CY-2, MAP8, 10-20-76, 0 MWD/MTU, C/9=222, 100.2 PCT P, R1

R I 1

MAP 8

100% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
R					.604 3.3	.847 1.6	.909 .6	.842 .6	.905 .2	.824 -1.1	.640 -.4					R
P			.690 4.3	.995 2.7	1.152 3.2	1.002 1.5	1.221 .5	.992 .6	1.214 -.1	.980 -.7	1.106 -.9	.962 -1.0	.668 .9			P
N		.692 4.5	1.210 4.2	1.130 2.2	1.053 3.2	1.272 -.2	1.037 -.2	1.069 -.9	1.030 -1.0	1.263 -.9	1.011 -.9	1.093 -1.2	1.172 .9	.694 4.8		N
M		.994 2.3	1.133 2.5	.941 .6	1.178 -1.8	1.087 -1.8	1.168 .2	.972 .4	1.165 .0	1.095 -1.0	1.181 -1.5	.913 -2.4	1.119 1.2	1.019 4.9		M
L	.652 1.4	1.118 .2	1.002 -1.8	1.175 -1.9	.922 -2.2	.970 -1.7	.956 .3	1.083 .6	.952 -.2	.981 -1.4	.930 -1.4	1.170 -2.4	.994 -2.5	1.087 -2.6	.626 -2.6	L
K	.837 .4	.987 .0	1.256 -1.5	1.085 -1.9	.965 -.9	.860 -.0	.993 1.3	.885 2.0	.991 1.1	.857 -.3	.901 -1.4	1.079 -2.5	1.242 -2.6	.972 -1.5	.822 -1.4	K
J	.905 .2	1.216 .1	1.022 -1.7	1.157 .1	.961 .8	1.003 2.3	.971 2.2	1.041 1.9	.960 1.1	.985 .5	.960 .7	1.182 1.4	1.029 -1.1	1.195 -1.7	.889 -1.6	J
H	.839 .3	.988 .2	1.061 .2	.999 2.2	1.099 2.1	.886 2.2	1.042 2.0	.910 1.7	1.041 1.9	.876 1.0	1.088 1.1	.975 .7	1.074 -.4	.974 -1.3	.827 -1.2	H
G	.905 .2	1.217 .1	1.043 .3	1.189 2.1	.974 2.2	1.004 2.4	.969 2.1	1.037 1.5	.965 1.6	.988 .8	.963 1.0	1.168 .2	1.035 -.4	1.203 -1.0	.893 -1.2	G
F	.827 -.8	.979 -.8	1.278 .2	1.120 1.2	1.007 1.2	.860 .0	.988 .8	.874 .8	.994 1.4	.862 .2	.993 -.2	1.102 -.4	1.267 -.6	.983 -.4	.831 -.3	F
E	.653 1.6	1.134 1.6	1.027 .7	1.185 -1.2	.923 -2.1	.971 -2.4	.952 -.1	1.085 .9	.970 1.7	1.000 .5	.914 -3.1	1.182 -1.4	1.007 -1.3	1.105 -1.0	.641 -.3	E
D		1.009 3.9	1.121 1.3	.925 -1.2	1.173 -2.1	1.079 -2.5	1.155 -.9	.959 -.9	1.157 -.8	1.069 -3.4	1.162 -3.1	.912 -2.6	1.063 -2.1	.951 -2.1		D
C		.702 6.0	1.204 3.7	1.143 3.4	.998 -2.1	1.235 -3.1	1.029 -1.0	1.065 -1.2	1.018 -2.1	1.226 -3.7	.983 -3.6	1.106 -.0	1.180 1.6	.673 1.6		C
B			.715 8.2	1.027 5.8	1.151 3.2	1.003 1.6	1.203 -1.0	.967 -1.9	1.175 -3.3	.950 -3.7	1.074 -3.7	.983 1.3	.697 5.3			B
A					.663 3.2	.847 1.6	.895 -.0	.828 -1.0	.875 -3.2	.798 -4.3	.515 -4.3				MEAS DIFF	A

COLD FOR SYMMETRIC THIMBLES

MAP 8

100% Power

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9813E+00		1.334	10.1
14 F 7	0	.9598E+00	.988	1.309	9.6
2 H15	0	.8672E+00		1.262	1.6
19 R 8	0	.8701E+00	1.003	1.252	3.1
3 K 2	0	.1069E+01		1.221	3.8
8 P 6	0	.1051E+01	.983	1.254	.6
36 F14	0	.1085E+01	1.019	1.218	3.3
5 P 4	0	.9943E+00		1.234	2.9
32 D14	1	.1030E+01	1.036	1.224	1.4
6 H 6	0	.9598E+00		1.342	10.3
42 F 8	0	.9740E+00	1.004	1.325	10.3
9 E 9	0	.1033E+01		1.299	9.6
33 G 5	0	.1042E+01	1.016	1.300	7.8
10 D10	0	.1094E+01		1.229	6.8
35 K12	0	.1099E+01	1.004	1.222	5.3
11 A11	0	.5848E+00		1.247	4.3
28 R11	0	.6851E+00	1.001	1.257	3.4
46 L15	0	.6728E+00	.983	1.243	.8
13 F 1	0	.8402E+00		1.245	3.3
15 R 5	0	.8418E+00	.992	1.243	3.5
16 N14	0	.7275E+00		1.233	2.9
17 N 2	0	.7164E+00	.985	1.237	4.1
21 B13	0	.7354E+00	1.016	1.247	1.5
45 B 3	0	.7198E+00	.989	1.247	3.2
18 C 8	0	.9798E+00		1.335	10.0
27 J 7	0	.9725E+00	.993	1.337	8.5
20 C 5	0	.1105E+01		1.200	4.3
30 L13	0	.1128E+01	1.021	1.194	2.4
22 H11	0	.1053E+01		1.291	8.8
25 L 8	0	.1044E+01	.992	1.285	5.2
23 J14	0	.1257E+01		1.220	.6
50 P 9	0	.1263E+01	1.005	1.219	2.3
24 J 1	0	.9716E+00		1.241	1.2
49 A 9	0	.9737E+00	1.002	1.242	2.3
26 F 3	0	.1323E+01		1.206	2.5
47 N 6	0	.1324E+01	1.001	1.209	3.7
29 B 8	0	.1051E+01		1.212	1.7
44 H 2	0	.1050E+01	.999	1.204	4.1
31 N 4	0	.1058E+01		1.200	3.4
34 D 3	0	.1062E+01	1.003	1.202	3.2
37 H 4	0	.1072E+01		1.252	6.1

PERCENT. DIFF. OF EXPECT. AND MEAS. FDHN IP2,CY2,FC9,98 P,C/D=220,1/5/77,BU=1439MWD/DTU,D-8 + H-2 DELETED

R 1 1

MAP 9

100 % POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					5.8			2.4		1.7					
P							2.1					.6			
N		5.7	5.3							-1.9		.3		6.9	
M									-1.7						
L	3.3		-1.4			-3.9		-1.6							
K				-1.6						-4.1				.8	
J		1.7				-1.5		-3.1	-2.9						1.2
H	2.1				-1.4					-2.4		-1.2			
G				-1.0			-2.4				-1.3				
F		1.0						-2.7	-2.2				-.3		2.8
E							-2.7								
D		5.6		-1.0		-3.3							-.6		
C									-1.1		-1.1				
B			9.4					.0		-1.5			8.3		
A					5.5		1.5								

MEASURED AND PERCENT. DIFF. OF FDHN IP2,CY2,FC9,98 P,C/D=220,175/77,BU=1439MWD/DTU,D-8 + H-2 DELETED

R 1 1

MAP 9

100% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
R						.680.	.859.	.919.	.860.	.923.	.844.	.658.				R
						5.8.	3.5.	2.3.	2.4.	2.7.	1.7.	2.3.				
P				.696.	1.007.	1.179.	1.009.	1.230.	1.004.	1.221.	.979.	1.120.	.971.	.677.		P
				5.4.	4.4.	5.8.	3.5.	2.1.	2.2.	1.4.	.4.	.5.	.6.	2.6.		
N		.697.	1.211.	1.132.	1.071.	1.274.	1.042.	1.067.	1.013.	1.239.	1.013.	1.101.	1.179.	.705.		N
		5.7.	5.3.	3.2.	5.6.	.8.	.8.	-1.0.	-2.0.	-1.9.	-.1.	.3.	2.6.	6.9.		
M		.999.	1.135.	.947.	1.145.	1.059.	1.137.	.955.	1.145.	1.080.	1.174.	.918.	1.126.	1.032.		M
		3.5.	3.5.	1.3.	-3.9.	-3.9.	-2.3.	-1.7.	-1.7.	-2.0.	-1.5.	-1.8.	2.6.	6.9.		
L	.665.	1.132.	1.000.	1.174.	.916.	.966.	.942.	1.070.	.940.	.970.	.907.	1.171.	1.012.	1.111.	.640.	L
	3.3.	1.5.	-1.4.	-1.5.	-3.3.	-3.9.	-2.3.	-1.6.	-2.5.	-3.5.	-4.2.	-1.7.	-.3.	-.4.	-.4.	
K	.845.	.986.	1.251.	1.084.	.975.	.849.	.977.	.867.	.972.	.841.	.962.	1.100.	1.259.	.983.	.858.	K
	1.8.	1.2.	-1.0.	-1.6.	-3.0.	-3.2.	-2.3.	-2.3.	-2.8.	-4.1.	-4.2.	-.2.	-.3.	.8.	1.0.	
J	.916.	1.225.	1.021.	1.147.	.947.	.985.	.948.	1.009.	.943.	.970.	.948.	1.163.	1.032.	1.217.	.909.	J
	1.9.	1.7.	-1.3.	-1.5.	-1.8.	-1.5.	-2.4.	-3.1.	-2.9.	-3.1.	-1.7.	-.1.	-.2.	1.0.	1.2.	
H	.858.	1.000.	1.070.	.963.	1.073.	.869.	1.013.	.875.	1.016.	.865.	1.075.	.959.	1.077.	1.006.	.861.	H
	2.1.	1.9.	-.8.	-.9.	-1.4.	-2.0.	-2.8.	-3.5.	-2.4.	-2.4.	-1.2.	-1.2.	-.1.	2.4.	2.4.	
G	.922.	1.235.	1.033.	1.153.	.956.	.983.	.948.	1.015.	.954.	.979.	.952.	1.152.	1.032.	1.220.	.924.	G
	2.6.	2.5.	-.0.	-1.0.	-.9.	-1.8.	-2.4.	-2.6.	-1.8.	-2.2.	-1.3.	-1.0.	-.2.	1.3.	2.8.	
F	.840.	.985.	1.264.	1.085.	.990.	.848.	.974.	.863.	.979.	.853.	.978.	1.086.	1.260.	.988.	.853.	F
	1.3.	1.0.	.0.	-1.5.	-1.5.	-3.4.	-2.7.	-2.7.	-2.2.	-2.8.	-2.6.	-1.5.	-.3.	1.3.	2.8.	
E	.666.	1.155.	1.036.	1.180.	.928.	.972.	.939.	1.059.	.944.	.974.	.929.	1.186.	1.010.	1.123.	.661.	E
	3.6.	3.6.	2.1.	-1.0.	-2.0.	-3.3.	-2.7.	-2.6.	-2.2.	-3.1.	-1.9.	-.5.	-.4.	.7.	2.8.	
D		1.020.	1.123.	.925.	1.168.	1.066.	1.125.	.942.	1.137.	1.078.	1.169.	.923.	1.091.	.960.		D
		5.6.	2.3.	-1.0.	-2.0.	-3.3.	-3.3.	-3.0.	-2.4.	-2.1.	-1.9.	-1.2.	-.6.	-.5.		
C		.709.	1.203.	1.142.	.994.	1.224.	1.015.	1.062.	1.023.	1.245.	1.004.	1.118.	1.193.	.685.		C
		7.4.	4.7.	4.0.	-2.1.	-3.1.	-1.8.	-1.5.	-1.1.	-1.5.	-1.1.	1.9.	3.8.	3.8.		
B			.722.	1.037.	1.176.	1.016.	1.220.	.983.	1.192.	.960.	1.104.	.998.	.715.			B
			9.4.	7.4.	5.5.	4.2.	1.3.	.0.	-1.0.	-1.5.	-1.0.	3.4.	8.3.			
A						.676.	.865.	.912.	.852.	.896.	.829.	.642.			MEAS	A
						5.5.	4.3.	1.5.	1.3.	-.3.	-.1.	-.1.			DIFF	

EDIT FOR SYMMETRIC THIMBLES

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9655E+00		1.285	7.4
14 F 7	0	.9611E+00	.995	1.269	7.2
2 H15	0	.8868E+00		1.238	1.1
19 R 6	0	.8860E+00	.999	1.226	-.5
3 K 2	0	.1091E+01		1.200	1.4
8 B 6	0	.1096E+01	1.004	1.220	-.1
36 F14	0	.1109E+01	1.017	1.199	1.8
5 P 4	0	.1004E+01		1.220	.6
32 D14	0	.1033E+01	1.029	1.200	.9
6 H 6	0	.9713E+00		1.285	8.0
42 F 8	0	.9679E+00	.997	1.275	7.9
9 E 9	0	.1032E+01		1.255	6.3
33 G 5	0	.1043E+01	1.010	1.261	5.7
10 D10	0	.1102E+01		1.189	3.7
35 K12	0	.1107E+01	1.004	1.186	4.2
11 A11	0	.6970E+00		1.228	-.5
28 R11	0	.6991E+00	1.003	1.229	-.7
46 L15	0	.6828E+00	.980	1.226	.1
13 F 1	0	.8651E+00		1.231	1.4
15 R 8	0	.8563E+00	.990	1.224	-.9
16 N14	0	.7311E+00		1.213	1.4
17 N 2	0	.7246E+00	.991	1.211	2.3
21 B13	0	.7413E+00	1.014	1.225	.1
45 B 3	0	.7341E+00	1.004	1.223	1.0
18 G 9	0	.9599E+00		1.287	8.0
27 J 7	0	.9522E+00	.992	1.280	6.2
20 C 5	0	.1125E+01		1.170	1.8
30 L13	0	.1142E+01	1.016	1.169	.8
22 R11	0	.1035E+01		1.248	6.1
25 L 8	0	.1030E+01	.995	1.244	5.9
23 J14	0	.1245E+01		1.202	-.3
50 P 9	0	.1254E+01	1.008	1.202	-1.0
24 J 1	0	.9358E+00		1.221	-.9
49 A 9	0	.9412E+00	1.006	1.209	2.5
26 F 3	0	.1303E+01		1.183	.9
47 N 6	0	.1291E+01	.991	1.181	.1
31 N 4	0	.1068E+01		1.187	1.1
34 D 3	0	.1080E+01	1.012	1.179	1.3
39 M 7	0	.1098E+01		1.198	5.2
48 G12	0	.1112E+01	1.012	1.222	5.5

MAP 9

100% POWER

**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

ATTACHMENT B

INFORMATION SUPPLIED TO NRC AT JUNE 2, 1977 MEETING

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					D-06 4 43	D-30 4 39	D-35 4 40	D-53 4 A6P(9)	D-55 4 41	D-03 4 42	D-67 4 35				
P			D-13 4 36	D-46 4 123	D-40 4 A6P7(8)	B-27 2 R-19(CD)	D-40 4 12P26(20)	B-56 2 R-24(CC)	D-44 4 12P33(20)	B-18 2 R-30(CD)	D-29 4 B6P7(8)	D-32 4 31	D-01 4 32		
N		D-52 4 33	D-27 4 R-21(CC)	C-44 3 103	B-20 2 R-40(CA)	D-15 4 12P20(20)	B-26 2 R-51(SB)	C-29 3 B6P10(7)	B-08 2 R-12(SB)	D-61 4 12P37(20)	B-05 2 R-09(CA)	C-48 3 78	D-59 4 34(CC)	D-50 4 28	
M		D-72 4 29	C-52 3 83	B-17 2 R-44(SA)	C-25 3 57	C-03 3 RS-4(PL)	C-47 3 72	B-32 2 R-23(CB)	C-57 3 77	C-11 3 RS-5(PL)	C-22 3 54	B-40 2 R-49(SA)	C-39 3 94	D-49 4 30	
L	D-45 4 24	D-57 4 A6P(8)	B-25 2 R-26(CA)	C-36 3 58	B-15 2 44	C-13 3 66	B-41 2 110	C-19 1 126	B-50 2 R-27(SA)	C-20 3 129	B-36 2 59	C-30 3 49	B-30 2 R-13(CA)	D-14 4 B6P5(9)	D-63 4 25
K	D-12 4 26	B-60 2 R-16(CD)	D-31 4 12P34(20)	C-08 3 RS-3(PL)	C-15 3 65	B-31 2 R-(01-SD)	C-40 3 109	B-59 2 R-52(CC)	C-42 3 99	B-43 2 R-42(SD)	C-10 3 104	C-07 3 RS-6(PL)	D-56 4 12P3(20)	B-54 2 R-03(CD)	D-38 4 27
J	D-60 4 19	D-62 4 12P27(20)	B-09 2 R-17(SB)	C-62 3 130	B-53 2 R-20(SA)	C-60 3 107	C-06 3 100	C-31 3 51	C-05 3 96	C-54 3 111	B-62 2 112	C-58 3 114	B-37 2 R-36(SB)	D-71 4 12P2(20)	D-07 4 20
H	D-70 4 B6P2(9)	B-63 2 R-30(SC)	C-41 3 SS21(7)	B-02 2 R-47(CD)	C-32 3 34	B-55 2 R-41(CC)	C-09 3 45	B-06 2 R-37(CD)	C-37 3 113	B-50 2 R-05(CC)	C-33 3 62	B-24 2 R-32(CB)	C-46 3 SS(7)	B-39 2 R-53(SC)	D-08 4 B6P3(9)
G	D-22 4 22	D-11 4 12P23(20)	B-10 2 R-31(SA)	C-63 3 101	B-49 2 87	C-59 3 98	C-01 3 106	C-14 3 55	C-23 3 105	C-55 3 38	B-52 2 R-39(SA)	C-61 3 88	B-13 2 R-10(SD)	D-23 4 12P17(20)	D-37 4 23
F	D-36 4 15	B-57 2 AR-40(CD)	D-16 4 12P29(20)	C-02 3 RS-8(PL)	C-16 3 63	B-61 2 R-14(SD)	C-51 3 56	B-45 2 R-09(CC)	C-45 3 21	B-51 2 R-15(SD)	C-24 3 67	C-04 3 RS-1(PL)	D-54 4 12P28(20)	B-64 2 R-43(CD)	D-42 4 16
E	D-64 4 17	D-39 4 B6P6(8)	D-29 2 R-35(CA)	C-38 3 52	B-47 2 118	C-21 3 76	B-46 2 R-46(SA)	C-27 3 64	B-48 2 68	C-17 3 61	B-35R 2 48	C-34 3 46	B-33 2 R-07(CA)	D-17 4 A6P8(8)	D-28 4 18
D		D-10 4 12	C-49 3 119	B-12 2 R-33(SA)	C-28 3 47	C-12 3 RS-7(PL)	C-50 3 102	B-21 2 R-04(CB)	C-43 3 80	C-10 3 RS-2(PL)	C-26 3 50	B-16 2 AR-18(SA)	C-56 3 120	D-09 4 13	
C		D-19 4 14	D-51 4 R-28(CC)	C-54 3 95	B-11 2 R-06(CA)	D-65 4 12P10(20)	B-19 2 R-29(SB)	C-35 3 B6P9(7)	B-04 2 AR-11(SB)	D-20 4 12P 25(20)	B-34 2 R-02(CA)	C-53 3 86	D-04 4 R-45(CC)	D-02 4 9	
B			D-26 4 10	D-69 4 11	D-66 4 B6P8(8)	B-23 2 R-50(CD)	D-68 4 12P18 (20)	B-42 2 R-40(SC)	D-25 4 12P35(20)	B-01 2 R-22(CD)	D-24 4 A5P5(8)	D-47 4 5	D-43 4 6		
A					D-34 4 7	D-18 4 8	D-05 4 1	D-58 4 A6P4(9)	D-41 4 2	D-33 4 3	D-21 4 4				

EXAMPLE, ASSEMBLY G-11

B-49 87	2 - REGION ASSEMBLY # PLUS DEVICE #

INDIAN POINT 2 CYCLE 2 LOADING PATTERN

9/1/76

MAP 1
HZP

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					-1.9			-8.0		-1.3					
P							-7.6					-4.5			
N		3.6	7.2							-3.9		-4.9		4.8	
M									-4.4						
L	8.3		1.2			2.3		-4.7							
K				1.4						3.5				-5.4	
J		-1.3				4.9		3.5	3.3						-7.1
H	-1.0				4.5					1.3		-1.3		-7.1	
G				4.1			4.1				-.1				
F		-2.2						2.9	3.9						1.3
E							2.1								
D		7.1		2.0		.8		.2					-7.3		
C								-1.0			-4.1				
B			12.0					-1.4		-4.7			12.9		
A					12.1		.5								

MAP1

H2P

R				.646.	.635.	.878.	.807.	.997.	.855.	.548.						
				-1.9.	-3.6.	-7.8.	-8.0.	-5.9.	-1.3.	-1.5.						
P			.734.	1.020.	1.161.	.972.	1.196.	.945.	1.231.	1.004.	1.133.	.969.	.668.			
			8.1.	.5.	-2.0.	-3.6.	-7.6.	-7.8.	-5.0.	-2.4.	-1.5.	-4.5.	-1.5.			
N		.737.	1.319.	1.173.	1.025.	1.258.	1.003.	1.040.	1.019.	1.207.	1.000.	1.033.	1.202.	.712.		
		3.6.	7.9.	3.0.	-2.0.	-5.4.	-5.4.	-4.9.	-4.0.	-3.9.	-4.3.	-4.9.	-1.5.	4.3.		
M		1.079.	1.205.	.969.	1.253.	1.126.	1.129.	.888.	1.095.	1.059.	1.139.	.855.	1.128.	1.064.		
		5.3.	5.4.	1.5.	2.2.	2.2.	-1.4.	-4.7.	-4.4.	-4.0.	-5.6.	-7.1.	-1.4.	4.9.		
L	.713.	1.223.	1.003.	1.272.	.929.	.959.	.871.	.951.	.861.	.829.	.927.	1.115.	1.015.	1.139.	.639.	
	8.3.	4.2.	1.2.	1.3.	2.5.	2.3.	-1.4.	-4.7.	-2.5.	-1.0.	2.2.	-7.6.	-2.9.	-3.0.	-3.0.	
K	.891.	1.048.	1.340.	1.117.	.971.	.805.	.894.	.767.	.883.	.802.	.959.	1.072.	1.301.	.973.	.818.	
	2.9.	1.9.	-.0.	1.4.	3.5.	4.0.	1.2.	.6.	1.2.	3.5.	2.2.	-2.3.	-2.9.	-5.4.	-5.6.	
J	.942.	1.230.	1.059.	1.134.	.920.	.916.	.858.	.916.	.853.	.905.	.902.	1.152.	1.018.	1.206.	.835.	
	-1.1.	-1.3.	-.2.	3.5.	4.2.	4.9.	3.9.	3.5.	3.3.	3.7.	2.1.	.6.	-4.1.	-7.0.	-7.1.	
H	.859.	1.015.	1.100.	.971.	1.045.	.903.	.927.	.795.	.917.	.775.	1.001.	.920.	1.043.	.933.	.799.	
	-1.0.	-1.2.	.5.	4.1.	4.5.	5.3.	4.7.	4.2.	3.6.	1.8.	.2.	-1.3.	-4.5.	-9.1.	-9.0.	
G	.945.	1.287.	1.073.	1.193.	.920.	.919.	.850.	.925.	.855.	.889.	.833.	1.123.	1.012.	1.239.	.913.	
	-.7.	-.7.	1.2.	4.1.	4.1.	5.2.	4.1.	4.5.	3.7.	1.9.	-.1.	-1.5.	-4.6.	-4.4.	-4.1.	
F	.848.	1.005.	1.353.	1.142.	.977.	.771.	.890.	.794.	.905.	.784.	.904.	1.054.	1.358.	1.042.	.978.	
	-2.1.	-2.2.	1.0.	4.2.	4.2.	2.2.	2.0.	2.9.	3.8.	1.3.	-3.6.	-3.5.	1.3.	1.3.	1.3.	
E	.575.	1.274.	1.071.	1.230.	.930.	.944.	.902.	1.029.	.925.	.894.	.871.	1.113.	.970.	1.140.	.557.	
	2.5.	2.6.	2.4.	2.0.	2.5.	.6.	2.1.	3.0.	4.7.	5.9.	-1.9.	-7.3.	-7.2.	-2.9.	1.3.	
D		1.086.	1.195.	.954.	1.257.	1.182.	1.176.	.934.	1.152.	1.051.	1.159.	.883.	1.060.	.941.		
		7.1.	4.5.	2.0.	2.5.	.8.	2.5.	.2.	.6.	-4.7.	-3.9.	-5.7.	-7.3.	-7.2.		
C		.743.	1.308.	1.222.	1.073.	1.382.	1.097.	1.099.	1.051.	1.278.	1.003.	1.149.	1.255.	.698.		
		9.5.	7.1.	6.9.	2.6.	3.1.	3.4.	.5.	-1.0.	-4.6.	-4.1.	.5.	2.8.	2.8.		
B			.750.	1.137.	1.315.	1.095.	1.303.	1.012.	1.255.	.981.	1.125.	1.053.	.767.			
			12.0.	12.1.	12.1.	6.5.	.5.	-1.4.	-3.2.	-4.7.	-4.1.	4.7.	12.9.			
A				.738.	.922.	.957.	.892.	.934.	.823.	.530.					MEAS.	
				12.1.	6.4.	.5.	.5.	-2.0.	-4.4.	-4.4.					DIFF.	
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	

[illegible] FOR [illegible] SYMMETRIC TRIANGLES

MAP1
HZP

TRIANGLE	VALID. STATUS	NORMALIZED REACT. RATE-INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9197E+00		1.950	43.0
14 F 7 2 6	0	.9221E+00	1.003	1.941	42.9
2 J15 1 10	0	.9170E+00		1.657	31.5
19 R 8 3 10	1	.8101E+00	.892	1.671	29.6
3 K 2 1 3	0	.1119E+01		1.659	33.3
8 B 5 1 8	0	.1102E+01	.986	1.631	33.1
36 F14 5 10	0	.1129E+01	1.009	1.626	33.2
5 O 4 1 5	0	.1030E+01		1.645	32.9
32 D14 4 7	1	.1123E+01	1.031	1.642	33.5
6 H 5 1 6	0	.3743E+00		1.954	43.5
42 F 8 5 9	0	.3562E+00	.979	1.937	41.7
9 E 9 1 9	0	.3545E+00		1.853	41.0
33 G 5 4 8	0	.3430E+00	.983	1.903	41.2
10 D10 2 1	0	.1175E+01		1.754	37.2
35 K12 5 1	0	.1170E+01	.995	1.735	35.1
11 A11 2 3	0	.7559E+00		1.655	30.6
28 A11 4 0	1	.5705E+00	.974	1.653	32.5
46 L15 6 4	0	.7407E+00	.966	1.634	32.3
13 F 1 2 5	0	.8355E+00		1.642	32.3
15 R 5 2 7	0	.8319E+00	.974	1.637	31.7
16 N14 2 9	0	.7797E+00		1.637	32.3
17 N 2 2 1	1	.7885E+00	.924	1.628	32.5
21 B13 3 5	0	.7392E+00	.987	1.643	30.3
45 B 3 6 3	0	.7355E+00	.995	1.630	30.7
18 G 9 3 1	0	.9006E+00		1.993	43.5
27 J 7 4 1	0	.8907E+00	.989	2.005	45.0
20 C 5 3 4	0	.1133E+01		1.661	33.7
30 L13 4 5	1	.1179E+01	1.041	1.655	32.3
22 A11 3 6	0	.1002E+01		1.830	40.9
25 L 9 3 7	1	.9137E+00	.912	1.871	40.7
23 J14 3 7	0	.1339E+01		1.640	30.0
50 P 3 6 2	0	.1304E+01	.974	1.659	31.0
24 J 1 3 5	0	.9046E+00		1.651	31.2
49 A 9 6 3	1	.9904E+00	1.095	1.643	30.6
29 B 8 4 3	0	.1132E+01		1.655	30.9
44 A 2 6 0	1	.1017E+01	.898	1.637	31.3
31 N 4 4 [illegible]	0	.1051E+01		1.652	32.8
34 O 3 4 1	0	.1054E+01	1.003	1.646	32.8
37 A 4 5 3	0	.1035E+01		1.798	37.9
43 D 8 1 1	1	.1092E+01	1.061	1.777	33.7

PRCENT. DIFF. OF EXPECT. AND MEAS. FDHN 1P2 CY-2,MAP2,9-30-76,0.0-B,179C/D,507BP,RUN-6(NEW PDQ HZP DECKS)

R I I

MAP 2

35% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R															
P					2.8			-.6		-.9					
N							-.7					-1.9			
M		5.6	5.1							-4.1		-2.6		7.0	
L									-2.5						
K		6.2		-4.6		1.2		-1.4							
J					-4.0					3.1				-1.1	
H		-.8				4.6		4.3	4.7						-2.1
G		-.2			3.4					3.4		.6		-3.2	
F				2.1			4.2				2.6				
E		-5.9						-3.4	4.4						1.1
D							-.7								
C		2.3		-.7		-1.6							-5.4		
B									-4.2		-4.1				
A			9.2					-2.2		-4.5				9.8	
					9.9		-.1								

EASURED AND PERCENT DIFF OF FDHN IP2-CY-2,MAP2,9-30-76,0-0-P,179C/D,5078P,RUN-64NEW-PDQ-HZP-DECK51

R I I

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
P								.656 / 2.0	.836 / 1.0	.916 / .6	.851 / .6	.917 / .4	.820 / .9	.642 / .6		
P							.729 / 5.3	1.044 / 2.2	1.179 / 2.6	.971 / 1.2	1.250 / .7	1.001 / .7	1.241 / 1.4	.940 / 2.0	1.128 / 1.9	1.002 / 1.9	.697 / .8
N		.731 / 5.6	1.310 / 5.1	1.186 / 2.2	1.069 / 2.2	1.307 / 1.2	1.040 / 1.2	1.056 / 3.2	1.009 / 4.2	1.268 / 4.1	1.019 / 2.6	1.131 / 2.6	1.256 / .7	.741 / 7.0		
M		1.056 / 3.4	1.186 / 2.2	.944 / 1.0	1.241 / 1.0	1.130 / 1.0	1.178 / 1.2	.933 / 1.0	1.136 / 2.5	1.073 / 4.1	1.170 / 4.7	.895 / 6.1	1.167 / .5	1.095 / 7.2		
L	.678 / 6.2	1.164 / 1.2	.998 / 4.6	1.170 / 4.7	.912 / 2.0	.977 / 1.2	.922 / 1.3	1.015 / 1.4	.909 / .1	.959 / .7	.960 / 3.1	1.153 / 6.1	1.046 / .0	1.147 / .3	.636 / .4	
K	.839 / 1.4	.957 / .2	1.264 / 4.5	1.066 / 4.0	.909 / .3	.828 / 3.4	.934 / 3.5	.813 / 3.5	.933 / 3.4	.826 / 3.1	.996 / 3.1	1.122 / .2	1.321 / .1	.949 / 1.1	.819 / 1.1	
J	.917 / .5	1.248 / .8	1.002 / 4.0	1.152 / 1.2	.922 / 1.3	.943 / 4.6	.891 / 5.5	.932 / 4.3	.884 / 4.7	.943 / 4.5	.948 / 4.1	1.185 / 1.8	1.043 / 1.0	1.232 / 2.1	.902 / 2.1	
H	.855 / .2	1.002 / .6	1.072 / 1.8	.970 / 2.2	1.064 / 3.4	.820 / 4.3	.936 / 4.8	.752 / 3.3	.939 / 5.2	.813 / 3.4	1.059 / 2.8	.955 / .6	1.076 / 1.4	.976 / 3.2	.831 / 3.0	
G	.909 / 1.4	1.238 / 3.6	1.025 / 2.6	1.189 / 2.1	.931 / 2.3	.936 / 3.0	.879 / 4.2	.929 / 4.0	.888 / 5.2	.934 / 3.6	.934 / 2.6	1.170 / .5	1.038 / 1.4	1.237 / 1.6	.907 / 1.5	
F	.778 / 6.0	.902 / 5.9	1.265 / 2.8	1.129 / .9	.975 / 1.0	.819 / 2.3	.929 / 3.1	.812 / 3.4	.941 / 4.4	.815 / 1.7	.958 / .8	1.110 / .9	1.338 / 1.1	.970 / 1.1	.837 / 1.1	
E	.629 / 1.5	1.131 / 1.8	1.031 / 1.5	1.220 / .7	.913 / 1.9	.955 / 1.3	.916 / .7	1.061 / 3.0	.950 / 4.3	1.005 / 4.1	.891 / 4.3	1.181 / 5.4	.992 / 5.2	1.127 / 1.9	.646 / 1.1	
D		1.044 / 2.3	1.169 / .7	.947 / .7	1.204 / 1.9	1.102 / 1.6	1.148 / 1.4	.923 / 2.8	1.096 / 5.9	1.062 / 5.1	1.175 / 4.3	.907 / 4.9	1.098 / 5.4	.967 / 5.3		
C		.730 / 5.5	1.291 / 3.6	1.209 / 4.2	1.025 / 2.0	1.277 / 3.4	1.022 / 2.9	1.046 / 4.1	1.009 / 4.2	1.261 / 4.7	1.003 / 4.1	1.160 / .0	1.273 / 2.2	.707 / 2.2		
B			.755 / 9.2	1.120 / 9.6	1.263 / 9.9	1.019 / 6.2	1.254 / .3	.985 / 2.2	1.207 / 4.1	.916 / 4.5	1.103 / 4.1	1.053 / 3.1	.760 / 9.8			
A					.702 / 9.9	.877 / 6.0	.920 / .1	.853 / .3	.892 / 3.2	.795 / 3.9	.613 / 3.9				MEAS / DIFF	

P MAP2

P 35% POWER

EDIT FOR SYMMETRIC THIMBLES

MAP 2
35% P

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE-INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
J10	0	.9494E+00		1.238	6.7
F 7	0	.9375E+00	.987	1.215	5.7
H15	0	.9173E+00		1.368	-3.5
R 8	0	.8891E+00	.969	1.352	-5.8
K 2	0	.1070E+01		1.366	-6.8
G 6	0	.1037E+01	.970	1.393	10.5
F14	1	.1015E+01	.949	1.386	-11.8
P 4	0	.1074E+01		1.298	-1.5
D14	0	.1081E+01	1.007	1.309	-4.3
H 6	0	.9354E+00		1.223	5.3
F 8	0	.9116E+00	.975	1.207	4.8
E 9	0	.1020E+01		1.198	5.4
G 5	0	.1007E+01	.987	1.212	3.8
D10	0	.1121E+01		1.185	2.4
K12	0	.1096E+01	.977	1.189	.5
A11	0	.7298E+00	0e126	1.330	3.6
R11	1	.6923E+00	0e179 .935	1.369	-7.9
L15	0	.7053E+00	.966	1.374	-4.6
F 1	0	.8643E+00		1.371	-6.0
R 6	0	.8473E+00	.980	1.372	-6.4
N14	0	.7816E+00		1.290	-1.2
M 2	0	.7696E+00	.985	1.293	.3
R13	0	.7850E+00	1.004	1.290	2.4
B 3	0	.7892E+00	1.010	1.294	1.1
G 9	0	.9004E+00		1.185	4.8
J 7	0	.8922E+00	.991	1.196	3.3
C 5	0	.1131E+01		1.258	2.1
L13	0	.1135E+01	1.003	1.269	-3.8
H11	0	.1030E+01		1.202	5.1
L 8	0	.1008E+01	.979	1.199	5.0
J14	0	.1265E+01		1.352	7.1
P 9	0	.1324E+01	1.030	1.337	-4.8
J 1	0	.9377E+00		1.353	6.7
A 9	1	.9713E+00	1.036	1.369	-7.3
B 8	0	.1081E+01		1.303	-2.1
H 2	0	.1061E+01	.981	1.305	-4.5
N 4	0	.1085E+01		1.251	1.8

PERCENT DIFF. OF EXPECT. AND MEAS. FDHN IP2 CV-2,MAP3,10-3-76,0 MWD/MTU,C/D=214,707BP,BASE,NEW PDQ,IN/EX CAL.,R2

R 1 1

MAP 3

70% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					4.2			2.5		-.4					
P							2.4					.1			
N		5.9	5.7							-.5		-.3		5.7	
M									-.2						
L	2.5		-1.9			-2.8		-.1							
K				-2.1						-3.7				.0	
J		3.2				.6		-1.8	-2.2						-.2
H	3.3				1.0					-2.1		-1.0		.1	
G				1.6			-2.3				-1.1				
F		.8						-2.9	-3.8						.5
E							-2.6								
D		5.9		.6		-3.8		-1.9					-2.4		
C									-1.6		-1.7				
B			-10.1					-1.4		-2.7			7.6		
A					3.9		.5								

ED-AND-PERCENT-DIFF-OF-FDHN-IP2-CY-2,MAP3,10-3-76,0-MWD/MTU,C/D=214,707BP,BASE,NEW-PDQ,IN/EX-CAL-,R2

MAP 3

70% POWER

	5	14	13	12	11	10	9	8	7	6	5	4	3	2	1	MEAS DIFF
R					.666	.854	.922	.856	.912	.825	.647					
					4.2	3.1	2.5	2.5	1.4	.4	1.1					
P			.702	1.014	1.158	1.009	1.240	1.008	1.223	.979	1.113	.973	.676			
			5.8	4.3	4.1	3.3	2.4	2.4	1.1	.2	.1	.1	1.8			
N		.703	1.231	1.157	1.061	1.234	1.056	1.079	1.033	1.267	1.020	1.105	1.185	.702		
		5.9	5.7	4.6	4.0	1.7	1.6	.1	.6	.5	.0	-.3	1.8	5.7		
M		1.003	1.145	.955	1.167	1.077	1.156	.968	1.166	1.102	1.187	.914	1.125	1.028		
		3.2	3.4	1.6	2.8	2.9	1.0	.3	-.2	-.6	-1.2	-2.6	1.6	5.8		
L	.656	1.119	1.001	1.177	.920	.971	.943	1.079	.943	.970	.905	1.170	1.005	1.095	.630	
	-2.5	.6	1.9	2.0	2.7	2.8	1.0	.1	1.5	2.8	4.3	2.6	1.5	1.6	1.6	
K	.850	.992	1.266	1.086	.978	.848	.976	.863	.967	.832	.955	1.093	1.254	.977	.830	
	-2.6	1.5	.5	2.1	2.1	1.8	.8	.8	1.7	3.7	4.3	1.4	1.5	.0	.2	
J	.929	1.249	1.039	1.168	.954	.990	.945	1.004	.931	.958	.943	1.175	1.031	1.206	.898	
	-3.3	3.2	.0	.2	.5	.6	.7	1.8	2.2	2.7	1.5	.6	.8	.4	.2	
H	.862	1.016	1.096	.967	1.091	.873	1.014	.870	1.006	.852	1.070	.961	1.073	.985	.837	
	-3.3	3.2	1.7	1.7	1.0	.5	.8	2.0	1.6	2.1	1.0	1.0	.4	.1	.2	
G	.923	1.241	1.050	1.187	.974	.992	.930	.992	.924	.961	.947	1.155	1.034	1.204	.895	
	-2.6	2.5	1.0	1.6	1.7	.6	2.3	2.9	2.9	2.4	1.1	1.1	.5	.5	.5	
F	.836	.985	1.266	1.120	1.010	.847	.958	.845	.947	.836	.970	1.077	1.279	.982	.832	
	.9	.6	1.0	1.1	1.1	1.9	2.6	2.9	3.8	3.2	2.9	2.9	.4	.5	.5	
E	.663	1.152	1.042	1.194	.923	.961	.932	1.054	.936	.963	.931	1.172	.996	1.102	.643	
	-3.6	3.6	2.1	.6	2.5	3.7	2.6	2.4	2.2	3.6	1.6	2.5	2.4	.9	.5	
D		1.029	1.137	.932	1.172	1.066	1.143	.951	1.149	1.075	1.182	.919	1.081	.949		
		5.9	2.6	.6	2.5	3.6	2.1	1.9	1.6	3.0	1.6	2.0	2.4	2.4		
C		.716	1.224	1.159	.995	1.217	1.023	1.061	1.021	1.239	1.003	1.121	1.194	.681		
		7.9	5.2	4.6	2.5	4.4	1.6	1.6	1.8	2.6	1.7	1.1	2.6	2.6		
B			.731	1.041	1.156	1.008	1.214	.971	1.179	.951	1.093	1.003	.714			
			10.1	7.2	3.9	3.1	.3	1.4	2.6	2.7	1.7	3.1	7.6			
A					.665	.853	.904	.837	.885	.813	.529					
					3.9	3.0	.5	.2	1.6	1.8	1.8					

DIT-FOR SYMMETRIC THIMBLES

MAP 3
70% Power

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE-INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
J10	0	.9674E+00		1.428	14.9
F 7	0	.9409E+00	.973	1.415	15.5
H15	0	.8968E+00		1.320	4.8
R 8	0	.8992E+00	.991	1.314	6.4
K 2	0	.1076E+01		1.291	6.9
B 6	0	.1074E+01	.998	1.305	6.4
F14	0	.1104E+01	1.026	1.283	5.9
P 4	0	.1023E+01		1.297	5.5
D14	0	.1058E+01	1.034	1.284	5.0
N 6	0	.9530E+00		1.428	16.2
F 8	0	.9212E+00	.967	1.416	15.5
E 9	0	.1029E+01		1.377	13.9
G 5	0	.1032E+01	1.003	1.388	13.4
D10	0	.1090E+01		1.304	11.7
K12	0	.1110E+01	1.018	1.306	9.3
A11	0	.6914E+00		1.306	7.3
R11	0	.6931E+00	1.002	1.314	5.8
L15	0	.6822E+00	.987	1.307	4.8
F 1	0	.8558E+00		1.313	6.2
R 6	0	.8487E+00	.992	1.302	5.0
N14	0	.7386E+00		1.294	7.6
N 2	0	.7292E+00	.987	1.289	7.9
P13	0	.7595E+00	1.026	1.310	7.2
B 3	0	.7424E+00	1.005	1.308	8.6
G 9	0	.9649E+00		1.432	16.0
J 7	0	.9426E+00	.977	1.440	16.3
C 5	0	.1129E+01		1.249	8.1
L13	0	.1132E+01	1.003	1.256	6.0
H11	0	.1056E+01		1.371	13.8
L 8	0	.1041E+01	.985	1.366	13.8
J14	0	.1302E+01		1.278	4.5
P 9	0	.1293E+01	.994	1.303	4.0
J 1	0	.9449E+00		1.307	5.8
A 9	0	.9456E+00	1.001	1.311	4.6
B 8	0	.1062E+01		1.272	5.6
H 2	0	.1063E+01	1.001	1.266	8.5
N 4	0	.1066E+01		1.262	6.5
D 3	0	.1068E+01	1.002	1.260	7.2
[illegible]	[illegible]	[illegible]			[illegible]
D 8	0	.1080E+01	1.005	1.347	11.5

CENT. DIFF. OF EXPECT. AND MEAS. FDHN IP2 Y-2,MAP4,10-3-76,0 MWD/MTU,C/D=180,70 PCT P, IN/EX-CAL.,R3,NEW PDQ
R I I

MAP 4

70 % POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					4.8			3.6		3.0					
P							3.8					.3			
N		7.8	7.4									-.1		8.7	
M									-1.3						
L	2.6		-.3			-4.5		-1.2							
K				-.1						-5.0				1.0	
J		4.0				-1.7		-5.5	-4.8						1.3
H	4.2				-.8					-3.5		-1.0			
G				.2			-6.0				-1.8				
F		.8						-5.3	-6.0				1.6		3.0
E							-5.1								
D		7.0		-.7		-3.9							-1.6		
C									-2.7		-1.9				
B			10.1					-1.1		-2.8			7.2		
A					7.2		1.7								

MEASURED AND PERCENT. DIFF. OF FORM 1P2 CY-2, AP4,10-3-76,0 MWD/MTU,C/D=180,70 PCT P, IN/FX-CAL.,R3,NEW PDQ

MAP 4
70% Power

	R	1	1													
R					.658. 4.8.	.842. 4.7.	.916. 3.8.	.853. 3.6.	.910. 3.1.	.829. 3.0.	.646. 2.9.					R
P				.722. 7.6.	1.021. 4.7.	1.149. 4.8.	.978. 5.0.	.235. 3.8.	1.010. 3.6.	1.227. 3.1.	.960. 3.0.	1.111. 1.3.	.978. .3.	.690. 2.9.		P
N			.724. 7.8.	1.265. 7.4.	1.171. 4.8.	1.067. 4.6.	1.315. 4.1.	.077. 4.0.	1.094. 1.4.	1.023. -1.2.	1.247. -1.2.	1.021. .1.	1.116. -.1.	1.212. 2.9.	.729. 8.7.	N
M			1.016. 4.2.	1.168. 4.5.	.964. 1.8.	1.159. -4.6.	1.067. -4.6.	.144. -3.1.	.969. -1.3.	1.165. -1.3.	1.107. -1.1.	1.186. -2.4.	.926. -2.4.	1.153. 3.2.	1.061. 8.8.	M
L	.643. 2.6.	1.104. .6.	1.018. -.3.	1.212. -.2.	.944. -1.7.	.970. -4.5.	.945. -3.0.	1.086. -1.2.	.948. -2.6.	.982. -3.4.	.906. -5.7.	1.186. -2.4.	1.009. -1.1.	1.084. -1.2.	.620. -1.2.	L
K	.828. 2.9.	.949. 1.9.	1.273. .8.	1.118. -.1.	.996. -2.0.	.649. -3.6.	.965. -3.6.	.850. -3.9.	.958. -4.3.	.836. -5.0.	.958. -5.7.	1.107. -1.0.	1.249. -1.2.	.941. 1.0.	.814. 1.2.	K
J	.919. 4.1.	1.237. 4.0.	1.056. 1.9.	1.185. .4.	.967. -.7.	.985. -1.7.	.918. -4.5.	.966. -5.5.	.915. -4.8.	.960. -4.2.	.952. -2.2.	1.196. 1.4.	1.036. .1.	1.203. 1.1.	.894. 1.3.	J
H	.858. 4.2.	1.014. 4.0.	1.096. 1.6.	.985. .1.	1.091. -.8.	.862. -2.5.	.975. -4.7.	.603. -6.1.	.976. -4.6.	.853. -3.5.	1.082. -1.6.	.972. -1.0.	1.092. 1.3.	1.007. 3.3.	.851. 3.4.	H
G	.911. 3.2.	1.226. 3.1.	1.044. .8.	1.102. .2.	.976. .7.	.578. -2.4.	.903. -6.0.	.963. -5.6.	.913. -5.0.	.966. -3.5.	.957. -1.8.	1.176. -.4.	1.050. 1.4.	1.218. 2.4.	.909. 3.0.	G
F	.812. .9.	.939. .8.	1.273. .8.	1.126. .7.	1.023. .7.	.843. -4.2.	.947. -5.4.	.637. -5.3.	.942. -6.0.	.845. -4.1.	.977. -3.8.	1.106. -1.1.	1.284. 1.6.	.956. 2.5.	.829. 3.0.	F
E	.654. 4.3.	1.144. 4.3.	1.045. 2.5.	1.205. -.7.	.941. -2.1.	.977. -3.9.	.924. -5.1.	1.039. -5.5.	.915. -6.0.	.971. -4.4.	.928. -3.4.	1.214. -.1.	1.021. .0.	1.110. 1.1.	.646. 3.0.	E
D	15	1.044. 7.0.	1.152. 3.1.	.945. -.7.	1.189. -2.1.	1.075. -3.9.	.134. -4.0.	.932. -5.0.	1.112. -5.8.	1.068. -4.6.	1.173. -3.4.	.926. -2.5.	1.100. -1.6.	.961. -1.5.		D
C		.727. 8.4.	1.242. 5.5.	1.169. 4.6.	.998. -7.2.	1.235. -3.6.	.009. -2.6.	1.038. -3.7.	1.007. -2.7.	1.224. -3.1.	1.001. -1.9.	1.125. .7.	1.211. 2.8.	.690. 2.8.		C
B		4	.739. 10.1.	1.060. 8.7.	1.175. 7.1.	.989. 6.1.	.206. 1.4.	.964. -1.1.	1.160. -2.5.	.905. -2.8.	1.079. -1.6.	.997. 2.2.	.719. 7.2.	2		B
A		12	12		.672. 7.2.	.851. 5.8.	.097. 1.7.	.834. 1.3.	.876. -.7.	.803. -.1.	.626. -.1.	4	3		MEAS. DIFF.	A
					4	10	9	8	7	6	5					

EDIT FOR SYMMETRIC THIMBLES

MAP 4

70 90 POWER

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9687E+00		1.168	-3.4
1 F 7	0	.9528E+00	.984	1.180	-2.7
2 H15	0	.8984E+00		1.414	-12.5
2 R 8	0	.8807E+00	.980	1.418	-14.3
3 K 2	0	.1035E+01		1.432	-15.9
8 B 6	0	.1048E+01	1.013	1.440	-18.2
6 F14	0	.1058E+01	1.022	1.419	-17.7
5 P 4	0	.1031E+01		1.379	-10.8
2 D14	1	.1077E+01	1.044	1.364	-13.3
6 H 6	0	.9553E+00		1.167	-3.3
2 F 8	1	.9034E+00	.946	1.182	-5.7
9 E 9	0	.1039E+01		1.188	-4.8
3 G 5	0	.1044E+01	1.005	1.199	-6.2
0 D10	0	.1113E+01		1.240	-7.0
5 K12	1	.1162E+01	1.049	1.234	-8.6
1 A11	0	.7018E+00		1.415	-13.8
8 R11	0	.6865E+00	.978	1.411	-14.2
6 L15	1	.6717E+00	.957	1.433	-15.0
13 F 1	0	.8557E+00		1.417	-14.3
15 R 6	0	.8557E+00	1.000	1.412	-14.0
16 N14	0	.7742E+00		1.374	-10.5
17 N 2	0	.7509E+00	.983	1.359	-9.0
21 B13	0	.7707E+00	.996	1.358	-12.1
45 B 3	0	.7507E+00	.970	1.368	-11.8
18 G 9	0	.9413E+00		1.171	-5.1
27 J 7	0	.9405E+00	.999	1.182	-4.2
20 C 5	0	.1115E+01		1.303	-12.3
30 E13	0	.1136E+01	1.019	1.321	-12.9
22 H11	0	.1051E+01		1.192	-5.3
25 L 9	0	.1039E+01	.989	1.195	-5.2
23 J14	0	.1290E+01		1.389	-15.6
50 P 9	0	.1307E+01	1.013	1.395	-16.2
24 J 1	0	.9438E+00		1.414	-15.5
49 A 9	0	.9508E+00	1.007	1.424	-16.3
31 N 4	0	.1082E+01		1.300	-11.5
34 D 3	0	.1091E+01	1.008	1.315	-10.4
38 M 7	0	.1139E+01		1.225	-6.8
48 G12	0	.1159E+01	1.017	1.231	-6.9

VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

PERCENT. DIFF. OF EXPECT. AND MEAS. POWER IPZ CY-2,MAP5,10-4-76,0 MWD/MTU,C/D=214,70 PCT P, IN/EX-CAL.,R2, NEW PDQ

MAP 5

70% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
R					3.1			1.9		-.2						R
P												-.7				P
N		5.2	4.9							-.7		-1.1		5.9		N
M									-.3							M
L	2.0		-2.5			-1.8		-.2								L
K				-2.7						-2.4				-.4		K
J		2.1				1.0		-1.3	-1.2						-.9	J
H	2.3				1.2					-1.1		-.5		-1.1		H
G				1.7			-.3				-.3					G
F		-.5						-.9	-.6						1.2	F
E							-.9									E
D		5.6		-1.1		-2.6		-.8					-2.8			D
C									-1.1		-2.0					C
B			8.4					-1.4		-2.4			6.7			B
A					4.7		-.3									A

MEASURED AND PERCENT. DIFF. OF TOHC IP2 CY-2,MAPS,10-4-76,0 BWD/BTU,C/D=214,70 PCT P, INZEX-CAL.,R2, NEW FUM

MAP 5

70% Power

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
R					.659	.654	.917	.650	.907	.826	.645					R
					3.1	3.2	1.9	1.9	.9	-.2	.9					
P			.697	1.001	1.166	1.009	1.233	1.002	1.219	.978	1.109	.965	.673			P
			5.0	2.9	3.0	3.4	1.9	1.9	.7	.2	-.3	-.7	1.3			
N		.699	1.222	1.141	1.050	1.248	1.019	1.057	1.031	1.264	1.015	1.096	1.160	.703		N
		5.2	4.9	3.0	2.9	-1.9	-1.9	-2.0	-.8	-.7	-.5	-1.1	1.3	5.9		
M		.996	1.139	.944	1.150	1.089	1.164	.966	1.165	1.100	1.182	.905	1.121	1.030		M
		2.7	2.7	.6	-1.8	-1.6	-.4	-.4	-.3	-.8	-1.7	-3.6	1.2	5.9		
L	.652	1.114	.995	1.171	.922	.982	.955	1.078	.947	.977	.922	1.159	1.009	1.099	.632	L
	2.0	.2	-2.5	-2.6	-2.6	-1.8	-.3	-.2	-1.1	-2.2	-2.6	-3.6	-1.1	-1.2	-1.2	
K	.839	.981	1.254	1.079	.961	.955	.982	.867	.975	.844	.974	1.097	1.258	.972	.825	K
	1.4	.6	-1.5	-2.7	-1.9	-1.6	-.3	-.4	-1.0	-2.4	-2.6	-1.1	-1.1	-.4	-.3	
J	.919	1.235	1.026	1.162	.955	.994	.949	1.008	.941	.972	.955	1.179	1.029	1.197	.891	J
	2.2	2.1	-1.3	-.5	-.3	1.0	-.3	-1.3	-1.7	-1.3	-.3	.9	-.9	-1.0	-.9	
H	.853	1.005	1.008	.983	1.094	.876	1.018	.873	1.046	.862	1.079	.966	1.069	.973	.826	H
	2.3	2.2	1.0	1.5	1.2	.6	-.3	-1.4	-.7	-1.1	-.2	-.5	-.8	-1.1	-1.0	
G	.914	1.228	1.043	1.169	.975	.997	.950	1.016	.950	.977	.955	1.161	1.030	1.201	.894	G
	1.6	1.5	.4	1.7	1.6	1.3	-.3	-.6	-.2	-.7	-.3	-.7	-.8	-.7	-.6	
F	.823	.970	1.277	1.121	1.010	.955	.976	.863	.978	.952	.977	1.085	1.268	.987	.837	F
	-.5	-.5	.3	1.1	1.1	-1.1	-.9	-.9	-.6	-1.5	-2.2	-2.2	1.2	1.2	1.2	
E	.657	1.142	1.025	1.189	.928	.975	.949	1.078	.961	.991	.924	1.169	.993	1.104	.647	E
	2.7	2.7	1.4	-1.1	-2.0	-2.6	-.9	-.3	.4	-.6	-2.3	-2.8	-2.7	-.7	1.2	
D		1.027	1.133	.929	1.178	1.080	1.157	.963	1.165	1.079	1.174	.915	1.078	.946		D
		5.6	2.2	-1.1	-2.0	-2.6	-.9	-.8	-.3	-2.7	-2.4	-2.6	-2.0	-2.7		
C		.710	1.216	1.148	1.000	1.234	1.031	1.070	1.028	1.243	1.000	1.114	1.168	.677		C
		6.9	4.4	3.6	-2.0	-3.0	-.8	-.6	-1.1	-2.3	-2.0	.5	2.0	2.0		
B			.720	1.037	1.164	1.002	1.205	.971	1.185	.952	1.090	.995	.708			B
			8.4	6.6	4.7	2.7	-.4	-1.4	-2.1	-2.4	-2.0	2.3	6.7			
A					.669	.850	.897	.831	.806	.814	.530				MEAS	A
					4.7	2.7	-.3	-.4	-1.5	-1.6	-1.5				DIFF	

OUT FOR SYMMETRIC THIMBLES

MAP 5

70 % POWER

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE-INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
J10	0	.9766E+00		1.555	22.0
1 F 7	0	.9739E+00	.995	1.528	22.0
2 H15	0	.8972E+00		1.411	14.2
3 R 8	0	.8927E+00	.984	1.397	12.2
3 K 2	0	.1065E+01		1.385	13.7
8 B 6	0	.1061E+01	.997	1.394	12.8
6 F14	0	.1093E+01	1.008	1.378	11.9
5 P 4	0	.1023E+01		1.389	14.2
2 D14	1	.1061E+01	1.037	1.367	12.0
6 H 6	0	.9742E+00		1.552	23.4
7 F 8	0	.9620E+00	.987	1.544	22.9
9 E 9	0	.1045E+01		1.506	20.6
13 G 5	0	.1045E+01	1.001	1.508	20.4
10 D10	0	.1113E+01		1.416	18.2
35 K12	0	.1107E+01	.995	1.411	16.6
11 A11	0	.7909E+00		1.393	14.6
28 R11	0	.7854E+00	.985	1.401	11.9
46 L15	0	.6918E+00	.974	1.381	12.9
13 F 1	0	.8660E+00		1.393	13.6
15 R 6	0	.8538E+00	.986	1.387	13.4
16 N14	0	.7437E+00		1.375	14.0
17 N 2	0	.7346E+00	.988	1.374	14.8
21 B13	0	.7526E+00	1.012	1.400	15.5
65 B 3	0	.7495E+00	.996	1.393	14.5
18 G 9	0	.9778E+00		1.546	22.5
27 J 7	0	.9564E+00	.976	1.560	23.1
20 C 5	0	.1127E+01		1.356	15.0
30 L13	0	.1135E+01	1.007	1.364	13.2
22 H11	0	.1065E+01		1.488	20.9
25 L 8	0	.1050E+01	.986	1.484	21.0
24 J 1	0	.9368E+00		1.396	12.0
49 A 9	0	.9377E+00	1.001	1.395	14.2
29 B 8	0	.1068E+01		1.360	12.7
44 M 2	0	.1057E+01	.990	1.351	13.6
31 N 4	0	.1061E+01		1.353	14.0
34 O 3	0	.1071E+01	1.009	1.351	14.7
37 M 4	0	.1083E+01		1.435	18.2
43 O 8	0	.1109E+01	1.015	1.450	19.5
38 M 7	0	.1120E+01		1.430	19.4
48 G12	0	.1156E+01	1.031	1.458	18.7

PERCENT. DIFF. OF EXPECT. AND MEAS. FDHN JP2 CY-2,MAP6,10-5-76,0 MWD/MTU,C/D=214,70 PCT P, IN/EX-CAL.,R2,NEW PDQ

MAP 6

70% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					3.2			1.3		.5					
P							1.2					.4			
N		7.0	6.5									-.0		7.1	
M									-1.2						
L	1.1		-1.9			-2.4		-1.1							
K				-2.1						-2.9				-.4	
J		2.7				.3		-1.8	-1.8						-1.2
H	2.8				.6					-1.7		-.8		-1.4	
G							-1.0				-.8				
F		-.3						-1.5	-1.2				-.2		1.5
E							-1.4								
D		5.9		-.4		-2.6		-1.7					-1.8		
C									-1.5		-1.9				
B			9.0					-1.3		-2.2			6.3		
A					5.6		-.3								

SURED AND PERCENT. DIFF. OF FDHN IP2 CY-7,MAP6,10-5-76,0 MWD/MTU,C/D=214,70 PCT P, IN/EX-CAL.,R2,NEW PDQ

MAP 6

70% POWER

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
R					.661 3.2	.846 2.1	.912 1.3	.846 1.3	.911 1.2	.833 .5	.651 1.6					R
P			.708 6.7	1.002 5.6	1.147 3.1	1.000 2.2	1.226 1.2	.997 1.2	1.225 1.2	.983 .5	1.117 -.4	.976 .4	.680 2.5			P
N		.710 7.3	1.241 6.5	1.155 4.3	1.051 3.0	1.261 .7	1.046 .6	1.071 -.7	1.019 -2.0	1.248 -2.0	1.022 .2	1.108 -.0	1.193 2.5	.711 7.1		N
M		1.006 3.5	1.152 4.0	.992 1.5	1.173 -2.4	1.082 -2.4	1.151 -1.4	.959 -1.2	1.153 -1.2	1.087 -1.9	1.173 -2.4	.916 -2.4	1.134 2.4	1.041 7.1		M
L	.647 1.1	1.113 -.0	1.001 -1.9	1.177 -2.0	.922 -2.5	.975 -2.4	.944 -1.4	1.068 -1.1	.941 -1.7	.974 -2.4	.918 -2.9	1.173 -2.4	1.003 -1.7	1.094 -1.7	.629 -1.7	L
K	.842 1.6	.986 .8	1.264 -.7	1.086 -2.1	.979 -2.0	.850 -1.6	.973 -1.1	.859 -1.3	.966 -1.8	.839 -2.9	.969 -2.9	1.090 -1.6	1.251 -1.7	.974 -.4	.826 -.3	K
J	.925 2.8	1.243 2.7	1.036 -.3	1.161 -.5	.952 -.5	.987 .5	.943 -.9	1.003 -1.8	.935 -1.8	.964 -2.0	.949 -.8	1.173 .5	1.023 -1.6	1.194 -1.4	.889 -1.2	J
H	.858 2.8	1.011 2.7	1.100 2.0	.985 1.7	1.066 .0	.868 -.2	1.009 -1.2	.869 -2.1	1.006 -1.4	.855 -1.7	1.072 -.7	.962 -.8	1.062 -1.5	.971 -1.4	.825 -1.2	H
G	.916 1.7	1.231 1.7	1.040 .1	1.187 1.7	.973 1.7	.984 .0	.942 -1.0	1.007 -1.4	.943 -.9	.968 -1.6	.949 -.8	1.159 -.8	1.028 -1.1	1.202 -.7	.892 -.9	G
F	.828 -.1	.976 -.3	1.274 .0	1.104 -.4	1.016 1.7	.840 -2.0	.970 -1.4	.857 -1.5	.972 -1.2	.843 -2.3	.974 -2.5	1.093 -1.3	1.271 -.2	.906 .8	.841 1.5	F
E	.660 3.0	1.146 3.0	1.040 1.9	1.197 -.4	.931 -1.5	.972 -2.6	.944 -1.4	1.067 -1.2	.949 -.8	.976 -2.3	.922 -2.5	1.188 -1.1	1.010 -1.0	1.112 -.1	.650 1.5	E
D		1.029 5.9	1.138 2.7	.935 -.4	1.163 -1.5	1.079 -2.6	1.147 -1.8	.953 -1.7	1.151 -1.5	1.079 -2.7	1.172 -2.5	.978 -2.2	1.067 -1.8	.955 -1.8		D
C		.712 7.3	1.221 4.9	1.154 4.2	1.004 -1.6	1.237 -2.8	1.023 -1.5	1.061 -1.6	1.023 -1.5	1.245 -2.2	1.001 -1.9	1.115 .6	1.190 2.2	.678 2.2		C
B			.723 9.0	1.043 7.3	1.175 5.6	1.010 3.2	1.206 -.4	.972 -1.3	1.188 -1.9	.957 -2.2	1.092 -1.9	.992 2.1	.705 6.3			B
A					.676 5.6	.855 3.2	.898 -.3	.831 -.4	.888 -1.4	.819 -1.2	.633 -1.2				MEAS DIFF	A

DIT FOR SYMMETRIC THIMBLES

MAP 6

70% POWER

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE-INTEGRAL	RATIO- T -FIRST	FZ	AXIAL OFFSET
1 J10	0	.9701E+00		1.304	8.0
4 F 7	0	.9581E+00	.986	1.305	9.2
2 H15	0	.8942E+00		1.271	.4
19 R 8	0	.8806E+00	.985	1.264	-1.5
3 K 2	0	.1079E+01		1.229	.1
8 B 6	0	.1065E+01	1.006	1.237	-1.3
36 F14	0	.1056E+01	1.016	1.234	.9
5 P 4	0	.1029E+01		1.232	.5
32 D14	0	.1061E+01	1.031	1.235	-1.5
6 H 6	0	.9615E+00		1.306	8.9
42 F 8	0	.9629E+00	1.001	1.286	7.3
9 E 9	0	.1039E+01		1.258	6.7
33 G 5	0	.1039E+01	1.000	1.273	6.0
10 D10	0	.1112E+01		1.200	4.8
55 K12	0	.1112E+01	1.001	1.186	3.5
11 A11	0	.7349E+00		1.250	1.5
28 R11	0	.6395E+00	.978	1.256	-1.8
46 L15	1	.6753E+00	.958	1.268	.6
13 F 1	0	.8579E+00		1.243	.4
15 R 6	0	.8591E+00	.990	1.246	.1
16 N15	0	.7563E+00		1.242	.4
17 N 2	0	.7405E+00	.980	1.229	1.5
21 B13	0	.7538E+00	.997	1.231	-1.0
45 B 3	0	.7353E+00	.972	1.245	-.4
18 G 9	0	.9589E+00		1.310	8.6
27 J 7	0	.9476E+00	.989	1.318	6.8
20 C 5	0	.1123E+01		1.184	1.4
30 L13	0	.1137E+01	1.013	1.199	.1
22 H11	0	.1053E+01		1.260	6.7
25 L 8	0	.1031E+01	.979	1.256	6.3
23 J14	0	.1301E+01		1.232	-.0
50 P 9	0	.1284E+01	.987	1.237	-.1
24 J 1	0	.9401E+00		1.254	-1.7
49 A 9	0	.9366E+00	.996	1.264	.6
29 B 8	0	.1065E+01		1.222	-.5
44 H 2	0	.1044E+01	.981	1.213	1.4
31 N 4	0	.1072E+01		1.190	.3
34 D 3	0	.1077E+01	1.005	1.191	1.2
37 H 4	0	.1076E+01		1.210	4.3
43 D 8	0	.1069E+01	.994	1.218	5.1

PERCEN. DIEF. OF EXPECT. AND MEAS. FDHN IP2 CY-2,MAP7,10-11-76, 0 BU,CD=212,90 PCT P R2

R 1 1

MAP 7

90% Power

	12	11	10	9	8	7	6	5	4	3	2	1
R				3.1		1.3		.1				
P							1.2			-.8		
N		5.4	5.0					-.7		-1.1		5.6 ?
M						-.7						?
L	2.1		-2.6		-2.6		-.7					?
K				-2.8				-1.8				-.7 ?
J		1.5			.9		.9	.0				-1.0 ?
H	1.7				1.3			-.6		.1		-.97 ?
G				1.7			-.2			.2		?
F		-.1						-.8	-.6		-.3	? ?
E							-1.0					?
D		4.8		-.6		-2.6		-1.3			-2.4	?
C									-2.3			
B			7.5					-1.5		-3.7		7.2
A					4.3		-.3					

MEASURED AND EXPECTED FDHN IP2 CY-2,MAP7,10-11-76, 0 BU,CD=212,90 PCT P R2

R 1 1

	12	11	10	9	8	7	6	5	4	3	2	1
				.658	.843	.909	.844	.906	.826	.643		
				.638	.825	.898	.833	.898	.825	.638		
		.699	.909	1.146	.993	1.223	.995	1.214	.971	1.106	.965	.673
				[illegible]	[illegible]	[illegible]	.993	1.208	.972	1.111	.972	.665

MEASURED AND PERCENT. DIFF. DB FDHN IP2 CY-2,MAP7,10-11-76, 0 BU,CD=212,90 PCT P R2

R 1 1

MAP 7

90% POWER

						.658	.843	.909	.844	.906	.826	.643				R
						3.1	2.1	1.3	1.3	.9	.1	.8				
			.699	.999	1.144	.993	1.223	.995	1.214	.971	1.106	.965	.673			
			5.1	2.8	3.0	2.2	1.2	1.2	.5	-.2	-.4	-.9	1.2			P
		.700	1.224	1.138	1.050	1.283	1.048	1.077	1.031	1.263	1.012	1.097	1.180	.1027		
		5.4	5.0	2.6	2.9	.9	.8	-.1	-.7	-.7	-.8	-1.1	1.2	5.6		N
	.999	1.139	.942	1.172	1.081	1.151	.964	1.161	1.102	1.102	.917	1.123	1.0267			
M	2.7	2.7	.3	-2.6	-2.6	-1.6	-.8	-.7	-.7	-1.8	-3.1	1.3	5.7			M
.52	1.111	.994	1.171	.920	.975	.944	1.075	.947	.985	.927	1.166	1.005	1.0337	.620		
2.1	.1	-2.6	-2.7	-2.9	-2.6	-1.6	-.7	-1.2	-1.4	-2.2	-3.1	-1.5	-1.6	-1.6		L
.837	.976	1.250	1.079	.982	.856	.987	.870	.984	.850	.979	1.093	1.252	.9457	.820		
K 1.4	.4	-1.7	-2.8	-1.9	-1.1	.1	.5	-.2	-1.8	-2.2	-1.5	-1.5	-.7	-.7		K
.913	1.227	1.024	1.158	.955	.995	.970	1.031	.953	.977	.959	1.185	1.032	1.1967	.889		
J 1.7	1.5	-1.4	-.9	-.4	.9	1.6	.9	.0	-.9	-.0	1.4	-.1	-1.0	-1.0		J
.148	.999	1.039	.980	1.097	.877	1.031	.883	1.029	.867	1.085	.973	1.076	.9757	.827		
1.7	1.6	1.0	1.7	1.3	.5	.9	-.1	.7	-.6	.3	.1	-.2	-.97	4.8		H
.911	1.226	1.049	1.169	.976	.992	.951	1.015	.951	.980	.961	1.168	1.036	1.2037	.894		
1.5	1.4	1.0	1.7	1.7	.6	-.2	-.7	-.2	-.6	.2	-.1	-.2	-.4	-.5		G
.826	.971	1.284	1.130	1.019	.856	.979	.865	.980	.854	.987	1.108	1.268	.9757	.831		
.0	-.1	.9	1.8	1.9	-1.2	-.7	-.8	-.6	-1.4	-1.4	-.9	-.3	.3	.7		F
.55	1.139	1.036	1.196	.930	.975	.950	1.017	.959	.987	.935	1.186	1.007	1.104	.643		
2.6	2.6	1.5	-.6	-1.8	-2.5	-1.0	-.5	-.1	-1.4	-1.4	-1.4	-1.3	-.6	.7		E
1.019	1.152	.934	1.181	1.080	1.153	.959	1.155	1.012	1.174	.917	1.082	.919				
4.8	2.1	-.6	-1.8	-2.6	-1.4	-1.3	-1.2	-3.4	-2.4	-2.5	-2.4	-2.4				D
.705	1.212	1.147	1.001	1.231	1.023	1.061	1.015	1.225	.981	1.135	1.193	.960				
6.1	3.9	3.4	-1.9	-3.2	-1.6	-1.6	-2.3	-1.6	-3.9	2.4	2.4	2.4				C
.715	1.031	1.158	1.001	1.20[illegible]	.9[illegible]	1.[illegible]70	.9[illegible]	.[illegible]368	1.0[illegible]	.71[illegible]						
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						B
.566	.849	.895	.829	.871	.794	.614										
4.3	2.8	-.3	-.5	-3.0	-3.8	-3.8										A

. MEAS
? DIFF

15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

EDIT FOR SYMMETRIC THIMBLES

MAP 7

90% Power

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9776E+00		1.333	10.0
14 E 7	0	.9602E+00	.982	1.329	10.0
2 H15	0	.8811E+00		1.259	2.5
19 R 8	0	.8710E+00	.989	1.249	.4
3 K 2	0	.1067E+01		1.237	.2
8 B 6	0	.1044E+01	.978	1.271	-1.6
36 F14	0	.1084E+01	1.016	1.227	1.1
5 P 4	0	.1009E+01		1.236	2.7
32 D14	0	.1043E+01	1.035	1.223	.7
6 H 6	0	.9659E+00		1.344	9.6
42 F 8	0	.9611E+00	.995	1.336	11.2
9 E 9	0	.1039E+01		1.297	8.8
38 G 5	0	.1046E+01	1.006	1.300	8.4
10 D10	0	.1101E+01		1.221	6.2
35 K12	0	.1099E+01	.998	1.216	5.5
11 A11	0	.6897E+00		1.251	1.6
28 R11	0	.6816E+00	.988	1.254	.2
46 L15	0	.6751E+00	.979	1.249	.0
13 F 1	0	.8515E+00		1.254	2.6
15 R 6	0	.8462E+00	.994	1.248	2.5
16 N14	0	.7417E+00		1.235	2.5
17 N 2	0	.7266E+00	.980	1.237	3.6
21 B13	0	.7398E+00	.997	1.248	1.3
45 B 3	0	.7374E+00	.994	1.238	1.2
18 G 9	0	.9647E+00		1.318	9.4
27 J 7	0	.9556E+00	.991	1.337	8.2
22 H11	0	.1046E+01		1.297	8.9
25 L 8	0	.1024E+01	.979	1.309	7.5
23 J14	0	.1268E+01		1.225	-.3
50 P 9	0	.1274E+01	1.004	1.233	1.4
24 J 1	0	.9223E+00		1.249	[illegible]
49 A 9	0	.9329E+00	[illegible]	[illegible]	[illegible]
26 F 3	0	.1328E+01		1.222	2.5
47 N 0	0	.1325E+01	.999	1.217	3.9
29 B 8	0	.1049E+01		1.212	.8
44 H 2	0	.1055E+01	1.006	1.195	1.6
31 N 4	0	.1057E+01		1.200	3.6
34 O 3	0	.1065E+01	1.007	1.199	2.7
37 H 4	0	.1079E+01		1.242	7.2
		[illegible]	.996	1.240	6.8

PERCENT. DIFF. OF EXPECT. AND MEAS. POWER IP2 CY-2, MAP8, 10-20-76, 0 MWD/MTU, C/D=222, 100.2 PCT P, R1

R MAP 8

P 100% Power

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
R					3.3			.6		-1.1					
P							.5					-1.0			
N		4.5	4.2							-.9		-1.2		4.8	
M									.0						
L	1.4		-1.0			-1.7		.6							
K				-1.9						-.3				-1.5	
J		.1				2.3		1.9	1.1						-1.6
H	.3				2.1					1.0		.7		-1.3	
G				2.1			2.1				1.0				
F		-.8						.8	1.4				-.6		-.3
E							-.1								
D		3.9		-1.2		-2.5		-.9					-2.1		
C									-2.1		-3.6				
B			8.2					-1.9		-3.7			5.3		
A					3.2		-.9								

MEASURED AND PERCENT. DIFF. OF 100% 102 CY-2, MAPS, 10-20-76, 0 MWD/MTU, C/D=222, 100.2 PCT P, R1

R I J

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
R						.664. 3.3.	.847. 1.6.	.909. .6.	.842. .5.	.905. .2.	.824. -1.1.	.640. -.4.				R
P				.699. 4.3.	.995. 2.7.	1.152. 3.2.	1.002. 1.5.	1.221. .5.	.992. .6.	1.214. -.1.	.980. -.7.	1.106. -.9.	.962. -1.0.	.668. .9.		P
N			.692. 4.5.	1.210. 4.2.	1.130. 2.4.	1.053. 3.2.	1.272. -.2.	1.037. -.2.	1.069. -.9.	1.030. -1.0.	1.263. -.9.	1.011. -.9.	1.093. -1.2.	1.172. .9.	.694. 4.8.	N
M			.994. 2.3.	1.159. 3.5.	.941. .6.	1.176. -1.8.	1.087. -1.8.	1.165. .2.	.972. .4.	1.165. .0.	1.095. -1.0.	1.181. -1.5.	.913. -2.4.	1.119. 1.2.	1.019. 4.9.	M
L		.652. 1.4.	1.118. .2.	1.002. -1.8.	1.175. -1.9.	.922. -2.2.	.970. -1.7.	.956. .3.	1.083. .6.	.952. -.2.	.981. -1.4.	.930. -1.4.	1.170. -2.4.	.994. -2.5.	1.097. -2.6.	.626. -2.6.	L
K		.837. .4.	.987. .0.	1.256. -1.3.	1.085. -1.9.	.905. -.9.	.860. -.0.	.993. 1.3.	.885. 2.0.	.991. 1.1.	.657. -.3.	.901. -1.4.	1.079. -2.5.	1.242. -2.6.	.972. -1.5.	.822. -1.4.	K
J		.905. .2.	1.216. .1.	1.022. -1.7.	1.157. .1.	.961. .8.	1.005. 2.3.	.971. 2.2.	1.041. 1.9.	.900. 1.1.	.985. .5.	.960. .7.	1.182. 1.4.	1.029. -1.1.	1.195. -1.7.	.889. -1.6.	J
H		.959. .3.	.968. .2.	1.001. .7.	.999. 2.6.	1.059. 2.1.	.890. 2.2.	1.042. 2.0.	.910. 1.7.	1.041. 1.9.	.870. 1.0.	1.088. 1.1.	.975. .7.	1.074. -.4.	.974. -1.3.	.827. -1.2.	H
G		.905. .2.	1.217. .1.	1.045. .3.	1.169. 2.1.	.974. 2.2.	1.004. 2.4.	.969. 2.1.	1.037. 1.5.	.965. 1.6.	.988. .8.	.953. 1.0.	1.168. .2.	1.035. -.4.	1.203. -1.0.	.893. -1.2.	G
F		.827. -.8.	.979. -.8.	1.279. .2.	1.125. 1.2.	1.007. 1.2.	.850. .0.	.988. .8.	.874. .8.	.994. 1.4.	.862. .2.	.993. -.2.	1.102. -.4.	1.267. -.6.	.983. -.4.	.831. -.3.	F
E		.653. 1.6.	1.134. 1.6.	1.027. .7.	1.185. -1.2.	.923. -2.1.	.971. -2.4.	.952. -.1.	1.085. .9.	.970. 1.7.	1.000. .5.	.914. -3.1.	1.182. -1.4.	1.007. -1.3.	1.105. -1.0.	.641. -.3.	E
D			1.009. 3.9.	1.121. 1.3.	.925. -1.2.	1.173. -2.1.	1.079. -2.5.	1.155. -.9.	.989. -.9.	1.157. -.8.	1.069. -3.4.	1.162. -3.1.	.912. -2.6.	1.063. -2.1.	.951. -2.1.	D
C			.702. 6.0.	1.204. 3.7.	1.143. 3.4.	.998. -2.1.	1.235. -3.1.	1.029. -1.0.	1.065. -1.2.	1.018. -2.1.	1.228. -3.7.	.983. -3.6.	1.106. -.0.	1.180. 1.6.	.673. 1.6.	C
B				.715. 6.2.	1.027. 5.6.	1.151. 3.2.	1.003. 1.6.	1.203. -1.0.	.967. -1.9.	1.175. -3.3.	.950. -3.7.	1.074. -3.7.	.983. 1.3.	.697. 5.3.		B
A						.663. 3.2.	.847. 1.6.	.895. -.9.	.820. -1.0.	.875. -3.2.	.798. -4.3.	.615. -4.3.				MEAS DIFF A

MAP 8

100% Power

LOIT [illegible] THIMBLES

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9613E+00		1.334	10.1
14 F 7	0	.9594E+00	.998	1.309	9.6
2 H15	0	.9572E+00		1.262	1.6
19 R 9	0	.9741E+00	1.005	1.252	3.1
3 K 2	0	.1069E+01		1.221	3.9
8 P 6	0	.1051E+01	.983	1.254	.6
36 F14	0	.1089E+01	1.019	1.218	3.3
5 P 4	0	.9943E+00		1.234	2.9
32 D14	1	.1039E+01	1.036	1.224	1.4
6 H 6	0	.9598E+00		1.342	10.3
42 F 8	0	.9760E+00	1.004	1.325	10.3
9 E 9	0	.1033E+01		1.229	4.6
33 G 5	0	.1042E+01	1.016	1.300	7.8
10 D10	0	.1094E+01		1.229	6.8
35 K12	0	.1099E+01	1.004	1.222	5.3
11 A11	0	.5849E+00		1.247	4.3
28 R11	0	.6851E+00	1.001	1.257	3.4
46 L15	0	.6729E+00	.983	1.243	.8
13 F 1	0	.8452E+00		1.245	3.3
15 R 5	0	.8418E+00	.992	1.243	3.5
16 N14	0	.7775E+00		1.233	2.9
17 N 2	0	.7146E+00	.985	1.237	4.1
21 B13	0	.7354E+00	1.016	1.247	1.5
45 B 3	0	.7199E+00	.989	1.247	3.2
18 G 9	0	.9798E+00		1.335	10.0
27 J 7	0	.9725E+00	.993	1.337	5.5
20 C 5	0	.1105E+01		1.200	4.3
30 L13	0	.1188E+01	1.021	1.194	7.4
22 H11	0	.1053E+01		1.291	8.8
25 L 8	0	.1046E+01	.992	1.285	5.2
23 J14	0	.1257E+01		1.220	.6
50 P 9	0	.1243E+01	1.005	1.219	2.3
24 J 1	0	.9216E+00		1.241	1.2
49 A 9	0	.9237E+00	1.002	1.242	2.3
26 E 3	0	.1323E+01		1.206	2.5
47 N 6	0	.1324E+01	1.001	1.209	1.7
29 R 8	0	.1351E+01		1.212	1.7
44 N 2	0	.1350E+01	.999	1.204	4.1
31 N 4	0	.1058E+01		1.200	3.4
34 D 3	0	.1062E+01	1.003	1.202	3.2

MAP 8

100% POWER

PERCENT. DIFF. OF EXPECT. AND MEAS. FDHN IP2,CY2,FC9,96 P,C/D=220,1/5/77,BU=1439MWD/DTU,D-8 + H-2 DELETED

R 1 1

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
R					5.8			2.4		1.7						R
P							2.1					.6				P
N		5.7	5.3							-1.9		.3		6.9		N
M									-1.7							M
L	3.3		-1.4			-3.9		-1.6								L
K				-1.6						-4.1				.8		K
J		1.7				-1.5		-3.1	-2.9						1.2	J
H	2.1				-1.4					-2.4		-1.2				H
G				-1.0			-2.4				-1.3					G
F		1.0						-2.7	-2.2				-.3		2.8	F
E							-2.7									E
D		5.6		-1.0		-3.3							-.6			D
C									-1.1		-1.1					C
B			9.4					.0		-1.5			8.3			B
A					5.5		1.5									A

PAP 9

100 % POWER

MEASURED AND PERCENT. DIFF. OF FDHN IP2,CY2,FC9,98 P,C/D=220,175/77,80=1439M207DTU,D-8 + H-2 DELETED

R 1 1

P MAP 9

P 100% Power

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
R					.680. 5.8.	.859. 3.5.	.919. 2.3.	.860. 2.4.	.923. 2.7.	.844. 1.7.	.658. 2.3.					R
P			.696. 5.4.	1.007. 4.4.	1.179. 5.8.	1.009. 3.5.	1.230. 2.1.	1.004. 2.2.	1.221. 1.4.	.979. .4.	1.120. .5.	.971. .6.	.677. 2.6.			P
N		.697. 5.7.	1.211. 5.3.	1.132. 3.2.	1.071. 5.6.	1.274. .8.	1.042. .8.	1.067. -1.0.	1.013. -2.0.	1.239. -1.9.	1.013. -.1.	1.101. .3.	1.179. 2.6.	.705. 6.9.		N
M		.999. 3.5.	1.135. 3.5.	.947. 1.3.	1.145. -3.9.	1.059. -3.9.	1.137. -2.3.	.955. -1.7.	1.145. -1.7.	1.080. -2.0.	1.174. -1.5.	.918. -1.8.	1.126. 2.6.	1.032. 6.9.		M
L	.665. 3.3.	1.132. 1.5.	1.005. -1.4.	1.174. -1.5.	.916. -3.3.	.966. -3.9.	.942. -2.3.	1.070. -1.6.	.940. -2.5.	.970. -3.5.	.907. -4.2.	1.171. -1.7.	1.012. -.3.	1.111. -.4.	.640. -.4.	L
K	.845. 1.8.	.986. 1.2.	1.251. -1.0.	1.084. -1.6.	.975. -3.0.	.849. -3.2.	.977. -2.3.	.867. -2.3.	.972. -2.8.	.841. -4.1.	.962. -4.2.	1.100. -.2.	1.259. -.3.	.983. .8.	.838. 1.0.	K
J	.916. 1.9.	1.225. 1.7.	1.021. -1.3.	1.147. -1.5.	.947. -1.8.	.985. -1.5.	.948. -2.4.	1.009. -3.1.	.943. -2.9.	.970. -3.1.	.948. -1.7.	1.163. -.1.	1.032. -.2.	1.217. 1.0.	.909. 1.2.	J
H	.856. 2.1.	1.060. 1.9.	1.070. -.8.	.963. -.9.	1.073. -1.4.	.869. -2.0.	1.013. -2.8.	.875. -3.5.	1.016. -2.4.	.865. -2.4.	1.075. -1.2.	.959. -1.2.	1.077. -.1.	1.006. 2.4.	.861. 2.4.	H
G	.922. 2.6.	1.235. 2.5.	1.033. -.0.	1.153. -1.0.	.956. -.9.	.983. -1.8.	.948. -2.4.	1.015. -2.6.	.954. -1.8.	.979. -2.2.	.952. -1.3.	1.152. -1.0.	1.032. -.2.	1.220. 1.3.	.924. 2.8.	G
F	.840. 1.3.	.985. 1.0.	1.234. .0.	1.085. -1.5.	.990. -1.5.	.848. -3.4.	.974. -2.7.	.863. -2.7.	.979. -2.2.	.853. -2.8.	.978. -2.6.	1.086. -1.5.	1.260. -.3.	.998. 1.3.	.853. 2.8.	F
E	.666. 3.6.	1.155. 3.5.	1.036. 2.1.	1.180. -1.0.	.928. -2.0.	.972. -3.3.	.939. -2.7.	1.059. -2.6.	.944. -2.2.	.974. -3.1.	.929. -1.9.	1.166. -.5.	1.010. -.4.	1.123. .7.	.661. 2.8.	E
D		1.020. 5.6.	1.123. 2.3.	.925. -1.0.	1.168. -2.0.	1.066. -3.3.	1.125. -3.3.	.942. -3.0.	1.137. -2.4.	1.078. -2.1.	1.169. -1.9.	.923. -1.2.	1.091. -.6.	.990. -.5.		D
C		.709. 7.4.	1.203. 4.7.	1.142. 4.0.	.994. -2.1.	1.224. -3.1.	1.015. -1.8.	1.062. -1.5.	1.023. -1.1.	1.245. -1.5.	1.004. -1.1.	1.118. 1.9.	1.193. 3.8.	.685. 3.8.		C
B			.722. 9.4.	1.037. 7.4.	1.175. 5.5.	1.016. 4.2.	1.220. 1.3.	.963. .0.	1.192. -1.0.	.960. -1.5.	1.104. -1.0.	.998. 3.4.	.715. 8.3.			B
A					.678. 5.5.	.865. 4.3.	.912. 1.5.	.852. 1.3.	.896. -.3.	.829. -.1.	.642. -.1.				MEAS DIFF	A

FOUR CORE SYMMETRIC THIMBLES

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9655E+00		1.255	7.4
14 F 7	0	.9611E+00	.995	1.269	7.2
2 H15	0	.8868E+00		1.238	1.1
19 R 8	0	.8860E+00	.999	1.226	-.5
3 K 2	0	.1091E+01		1.200	1.4
8 B 6	0	.1096E+01	1.004	1.220	-.1
36 F14	0	.1109E+01	1.017	1.199	1.8
5 P 4	0	.1004E+01		1.220	.6
32 D14	0	.1033E+01	[illegible]	1.200	.9
6 H 6	0	.9713E+00		1.285	8.0
42 F 8	0	.9679E+00	.997	1.275	7.9
9 E 9	0	.1032E+01		1.255	6.3
33 G 5	0	.1043E+01	1.010	1.261	5.7
10 D10	0	.1102E+01		1.189	3.7
35 K12	0	.1107E+01	1.004	1.185	4.2
11 A11	0	.6970E+00		1.228	-.5
28 R11	0	.6991E+00	1.003	1.229	-.7
46 L15	0	.6828E+00	.980	1.226	.1
13 F 1	0	.8651E+00		1.231	1.4
15 R 6	0	.8563E+00	.990	1.224	-.9
16 N14	0	.7311E+00		1.215	1.4
17 N 2	0	.7246E+00	.991	1.211	2.5
21 B13	0	.7413E+00	1.014	1.225	.1
45 B 3	0	.7341E+00	1.004	1.223	1.0
18 G 9	0	.9599E+00		1.287	8.0
27 J 7	0	.9522E+00	.992	1.280	6.2
20 C 5	0	.1125E+01		1.170	1.8
30 L13	0	.1142E+01	1.016	1.169	.8
22 H11	0	.1035E+01		1.248	6.1
25 L 8	0	.1030E+01	.995	1.244	5.9
23 J14	0	.1245E+01		1.202	-.3
50 P 9	0	.1254E+01	1.008	1.202	-1.0
24 J 1	0	.9358E+00		1.221	-.9
49 A 9	0	.9412E+00	1.006	1.209	2.5
26 F 3	0	.1303E+01		1.183	.9
47 N 6	0	.1291E+01	.991	1.181	.1
31 N 4	0	.1068E+01		1.187	1.1
34 D 3	0	.1080E+01	1.012	1.179	1.3

MAP 9

100 % POWER

PERCENT. DIFF. OF EXPECT. AND MEAS. FDHN IP2,CY2,FC10,2-8-77,98.4 P.O=220,BU=2246.2 MWD PER MTU,PRODAC REJECTED

K 1 1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
R								3.1		1.7					
P							3.0					1.9			
N		5.3	5.0							-1.7				6.3	
M									-1.7						
L	4.2					-3.6		-1.7							
K				-4.6						-3.7				.6	
J		1.2				-2.0		-2.4							.5
H	1.5				-1.2					-.3		-.8		.8	
G				-.3			-2.5								
F		.7						-3.2	-3.2				-.4		2.1
E							-2.4								
D				-1.5		-4.0		-1.6							
C									-.7		-.8				
B			7.5							-1.3			8.6		
A					4.7		4.0								

(10)

MEASURED AND PREDICTED DIFF. OF 100M [illegible] MWD PER MTU.PRODAC REJECTED

R						.569.	.660.	.934.	.877.	.931.	.855.	.666.			
						2.4.	2.5.	3.0.	3.1.	2.7.	1.7.	1.9.			
P				.699.	.999.	1.152.	1.001.	1.241.	1.014.	1.222.	.983.	1.134.	.988.	.692.	
				5.1.	3.0.	2.5.	2.1.	3.0.	3.1.	1.4.	.3.	.8.	1.9.	4.0.	
N		.701.	1.207.	1.100.	1.043.	1.290.	1.055.	1.078.	1.011.	1.237.	1.015.	1.116.	1.197.	.707.	
		5.3.	5.0.	2.7.	3.0.	2.5.	2.6.	.2.	-1.7.	-1.7.	.3.	1.9.	4.1.	6.3.	
M		1.017.	1.132.	.959.	1.139.	1.052.	1.125.	.948.	1.136.	1.074.	1.168.	.949.	1.165.	1.051.	
		4.9.	5.1.	2.9.	-3.8.	-3.8.	-2.6.	-1.6.	-1.7.	-1.7.	-1.3.	1.9.	6.3.	6.3.	
L	.851.	1.172.	.966.	1.123.	.902.	.962.	.935.	1.053.	.937.	.971.	.907.	1.179.	1.008.	1.118.	.650.
	4.2.	4.2.	-4.5.	-4.6.	-4.2.	-3.8.	-2.6.	-1.7.	-2.4.	-3.0.	-3.7.	-.4.	-.5.	-.6.	-.6.
K	.850.	1.001.	1.225.	1.043.	.952.	.846.	.972.	.859.	.974.	.844.	.964.	1.089.	1.251.	.986.	.847.
	2.1.	2.0.	-2.5.	-4.6.	-3.9.	-3.5.	-2.7.	-1.9.	-2.5.	-3.7.	-3.7.	-.4.	-.5.	.6.	.7.
J	.919.	1.220.	1.084.	1.123.	.934.	.979.	.944.	1.017.	.950.	.979.	.944.	1.146.	1.024.	1.210.	.911.
	1.4.	1.2.	-2.4.	-2.6.	-2.7.	-2.0.	-2.8.	-2.4.	-2.2.	-2.0.	-1.6.	-.8.	-.5.	.4.	.5.
H	.864.	.996.	1.073.	.962.	1.069.	.867.	1.015.	.885.	1.027.	.883.	1.076.	.958.	1.070.	.991.	.859.
	1.5.	1.3.	-.2.	-.3.	-1.2.	-2.1.	-2.8.	-2.7.	-1.4.	-.3.	-.6.	-.8.	-.5.	.8.	.9.
G	.923.	1.227.	1.031.	1.152.	.957.	.982.	.946.	1.010.	.949.	.977.	.954.	1.148.	1.024.	1.211.	.915.
	1.6.	1.8.	.2.	-.5.	-.3.	-1.7.	-2.5.	-3.0.	-2.2.	-2.1.	-.6.	-.6.	-.5.	.5.	1.0.
F	.848.	.988.	1.281.	1.093.	1.000.	.846.	.988.	.857.	.987.	.841.	.960.	1.088.	1.253.	.990.	.859.
	.6.	.7.	.2.	-.1.	-.0.	-3.4.	-3.0.	-3.2.	-3.2.	-4.0.	-4.0.	-.5.	-.4.	.9.	2.1.
E	.850.	1.131.	1.007.	1.150.	.916.	.950.	.937.	1.057.	.943.	.950.	.932.	1.178.	1.008.	1.134.	.667.
	.6.	.6.	-.5.	-1.0.	-2.7.	-4.0.	-2.4.	-2.3.	-1.6.	-4.0.	-1.0.	-.5.	-.4.	.9.	2.1.
D		.954.	1.079.	.917.	1.132.	1.050.	1.128.	.980.	1.149.	1.076.	1.172.	.923.	1.091.	.990.	
		-1.0.	-1.5.	-1.6.	-2.7.	-4.0.	-2.4.	-1.6.	-.6.	-1.0.	-1.0.	-1.0.	-.5.	2.1.	
C		.716.	1.187.	1.122.	.985.	1.209.	1.014.	1.059.	1.022.	1.242.	1.004.	1.137.	1.248.	.723.	
		7.9.	5.3.	5.0.	-2.7.	-3.5.	-1.5.	-.6.	-.7.	-1.3.	-.8.	3.7.	8.6.	8.6.	
B		.716.	1.012.	1.178.	1.024.	1.233.	.992.	1.188.	.983.	1.115.	1.008.	.723.			
		7.9.	6.4.	4.7.	4.4.	4.0.	.9.	-1.4.	-1.3.	-.8.	4.0.	8.6.			
A				.569.	.678.	.943.	.855.	.901.	.835.	.649.					MEAS
				4.7.	4.4.	4.0.	4.0.	-.7.	-.7.	-.7.					DIFF

(10)

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9594E+00		1.281	6.5
14 F 7	0	.9507E+00	.991	1.268	7.8
2 H15	0	.6594E+00		1.215	1.5
12 A 8	0	.6912E+00	1.007	1.207	-.1
3 K 2	0	.1101E+01		1.190	1.6
6 J 8	0	.1101E+01	1.000	1.205	.1
35 F14	0	.1117E+01	1.015	1.178	-5.3
9 H 6	0	.9774E+00		1.257	6.5
42 F 8	0	.9687E+00	.991	1.280	7.6
10 J10	0	.1087E+01		1.196	4.7
39 K12	0	.1079E+01	.992	1.201	5.5
11 H11	0	.6998E+00		1.219	2.5
46 E15	0	.6942E+00	.995	1.205	-.4
13 F 1	0	.3688E-00		1.210	1.3
15 H 6	0	.3625E+00	.996	1.209	1.6
16 H14	0	.7603E+00		1.209	1.2
17 H 2	0	.7229E+00	.990	1.201	2.1
21 G15	0	.7357E+00	1.005	1.219	.5
45 E 5	0	.7388E+00	1.012	1.215	.7
18 G11	0	.1028E+01		1.241	5.4
37 L 8	0	.1018E+01	.992	1.239	5.4
23 G14	0	.1234E+01		1.182	-1.4
50 P 9	0	.1267E+01	1.027	1.167	2.4
24 J 1	0	.9653E+00		1.205	-.7
42 K 9	0	.9528E+00	1.018	1.192	-.2
26 F 3	0	.1267E+01		1.167	.5
47 N 8	0	.1276E+01	.991	1.186	2.0
27 G 4	0	.1060E+01		1.226	6.0
41 D 8	0	.1079E+01	1.018	1.214	4.9
28 H 7	0	.1097E+01		1.197	2.6
40 J12	0	.1121E+01	1.022	1.211	5.2

**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

INPUT EPSILON FOR THE VALIDITY CHECK ON SYMMETRIC THIMBLES = .0350

10

PERCENT. DIFF. OF EXPECT. AND MEAS. FDHN IP2 CY-2,FC11,2-28-77,100.1%BP,2220,2821.1 MWD PER MTU,
R 1 1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
R								1.9		1.6					
P							1.5								
N		4.7	4.3							-2.5				5.0	
M									-1.7						
L	2.1					-3.9		-1.0							
K				-4.2						-3.6				1.1	
J		1.2				-1.6		-.2							.7
H	1.4				-1.0					-.0		.2		.6	
G				-.2			-1.1								
F		.2						-2.2	-2.0				-.3		.6
E							-2.1								
D				-.9		-3.9		-1.3							
C									.1		-.1				
B			7.5							-.5			6.0		
A					4.1		4.3								

11

MEASURED AND PERCENT. DIFF. OF FDHN IP2 CY-2,FC11.2-28-77,100.1BBP.2220,2821.1 MWD PER MTU.

	R	1	1														
R					.657.	.844.	.927.	.874.	.936.	.860.	.671.						
					-.4.	-.4.	1.7.	1.9.	2.7.	1.5.	1.6.						
P				.700.	.993.	1.125.	.979.	1.222.	1.000.	1.216.	.977.	1.125.	.990.	.704.			
				4.5.	2.1.	-.4.	-.3.	1.5.	1.7.	1.0.	-.5.	-.5.	1.7.	5.0.			
N			.702.	1.200.	1.118.	1.032.	1.247.	1.020.	1.058.	1.000.	1.222.	.985.	1.151.	1.208.	.704.		
			4.7.	4.5.	2.0.	2.1.	-.5.	-.5.	-1.4.	-2.4.	-2.5.	-2.5.	5.0.	5.0.	5.0.		
M			1.010.	1.145.	.950.	1.133.	1.046.	1.127.	.951.	1.151.	1.062.	1.149.	.978.	1.151.	1.023.		
			3.8.	4.5.	2.0.	-3.9.	-3.9.	-2.0.	-1.2.	-1.7.	-2.4.	-2.6.	5.0.	5.0.	5.1.		
L		.674.	1.154.	.969.	1.130.	.901.	.959.	.939.	1.058.	.939.	.959.	.905.	1.183.	1.014.	1.132.	.661.	
		2.1.	2.1.	-4.2.	-4.2.	-4.1.	-3.9.	-2.0.	-1.0.	-1.9.	-3.0.	-3.6.	.4.	.3.	.2.	.1.	
K		.857.	.993.	1.227.	1.043.	.962.	.847.	.981.	.855.	.956.	.845.	.962.	1.092.	1.256.	.993.	.858.	
		1.2.	1.1.	-2.1.	-4.2.	-3.6.	-3.4.	-1.7.	-.1.	-1.3.	-3.6.	-3.6.	.3.	.2.	1.1.	1.3.	
J		.923.	1.219.	1.005.	1.125.	.935.	.983.	.957.	1.040.	.959.	.980.	.947.	1.152.	1.024.	1.211.	.917.	
		1.3.	1.2.	-2.0.	-2.2.	-2.3.	-1.6.	-1.4.	-.2.	-1.3.	-1.8.	-1.1.	.2.	-.2.	.6.	.7.	
H		.870.	.996.	1.073.	.961.	1.069.	.873.	1.026.	.899.	1.040.	.836.	1.080.	.964.	1.070.	.990.	.864.	
		1.4.	1.3.	-.1.	-.2.	-1.0.	-1.4.	-1.5.	-1.1.	-.1.	-.0.	.1.	.2.	-.4.	.6.	.8.	
G		.925.	1.222.	1.027.	1.148.	.956.	.990.	.960.	1.023.	.958.	.983.	.958.	1.149.	1.022.	1.202.	.910.	
		1.5.	1.4.	.1.	-.2.	-.2.	-.8.	-1.1.	-1.5.	-1.3.	-1.5.	.1.	-.1.	-.4.	-.2.	-.1.	
F		.850.	.984.	1.255.	1.085.	.996.	.854.	.979.	.867.	.979.	.849.	.967.	1.084.	1.249.	.983.	.852.	
		.4.	.2.	.1.	-.3.	-.2.	-2.6.	-1.9.	-2.2.	-2.0.	-3.1.	-3.1.	-.4.	-.3.	.2.	.6.	
E		.663.	1.136.	1.010.	1.162.	.915.	.959.	.938.	1.051.	.947.	.967.	.929.	1.175.	1.008.	1.132.	.664.	
		.4.	.5.	-.1.	-.9.	-2.5.	-3.9.	-2.1.	-1.7.	-1.1.	-3.1.	-1.1.	-.4.	-.4.	.2.	.6.	
D			.965.	1.086.	.923.	1.150.	1.045.	1.123.	.950.	1.147.	1.075.	1.166.	.921.	1.091.	.980.		
			-.9.	-.9.	-.3.	-2.5.	-3.9.	-2.4.	-1.3.	-.3.	-1.1.	-1.1.	-1.1.	-.4.	.7.		
C			.720.	1.189.	1.131.	.996.	1.201.	1.007.	1.070.	1.026.	1.248.	1.010.	1.121.	1.219.	.710.		
			7.5.	3.4.	3.2.	-2.5.	-4.2.	-1.8.	-.3.	.1.	-.4.	-.1.	2.3.	6.0.	5.0.		
B				.720.	1.029.	1.176.	1.024.	1.256.	.999.	1.203.	.977.	1.129.	.998.	.710.			
				7.5.	5.7.	4.0.	4.3.	4.3.	1.5.	-.1.	-.5.	-.1.	2.5.	6.0.			
A					.687.	.882.	.950.	.894.	.920.	.854.	.667.						MEAS.
					4.1.	4.2.	4.3.	4.3.	1.0.	.9.	1.0.						DIFF.

11

EDIT FOR SYMMETRIC THIMBLES

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9637E+00		1.271	5.2
14 F 7	0	.9599E+00	.996	1.244	6.1
2 H15	0	.8535E+00		1.195	-1.2
19 R 8	0	.8949E+00	1.013	1.183	-.2
3 K 2	0	.1113E+01		1.173	1.0
8 B 6	0	.1123E+01	1.009	1.191	.5
36 F14	0	.1117E+01	1.003	1.171	-.1
5 H 6	0	.9823E+00		1.252	5.0
42 F 8	0	.9758E+00	.993	1.269	5.7
10 D10	0	.1081E+01		1.198	4.3
35 K12	0	.1080E+01	.999	1.197	4.3
11 A11	0	.6993E+00		1.195	-1.4
45 L15	0	.6858E+00	.981	1.193	2.5
13 F 1	0	.8552E+00		1.197	1.9
15 R 6	0	.8636E+00	1.010	1.191	1.5
16 M14	0	.7302E+00		1.199	1.2
17 N 2	0	.7165E+00	.981	1.200	2.7
21 B13	0	.7332E+00	1.004	1.199	.2
46 B 3	0	.7229E+00	.990	1.206	2.9
22 H11	0	.1028E+01		1.242	4.7
25 L 8	0	.1029E+01	1.001	1.236	5.7
23 J14	0	.1233E+01		1.159	-1.4
50 P 9	0	.1225E+01	.994	1.176	-.1
24 J 1	0	.9401E+00		1.199	-.4
49 A 9	0	.9560E+00	1.017	1.175	2.3
26 F 3	0	.1277E+01		1.167	1.2
47 N 6	0	.1249E+01	.978	1.158	2.5
37 H 4	0	.1059E+01		1.214	4.9
43 D 8	0	.1073E+01	1.004	1.211	5.1
38 M 7	0	.1091E+01		1.193	4.5
48 G12	0	.1114E+01	1.021	1.210	4.6

**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

INPUT EPSILON FOR THE VALIDITY CHECK ON SYMMETRIC THIMBLES = .0350

11

PERCENT. DIFF. OF EXPECT. AND MEAS. FDHN IP2 CY-2,FC12,2-28-77,97.6%BP,216,2821.1 MWD PER MTU.

3 1 1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
R								2.7		2.3					
P							2.5								
N		5.1	4.7							-1.8				6.0	
M									-2.0						
L	3.5					-4.8		-2.2							
K				-4.1						-3.4				.8	
J		.9				-2.0		-2.1							.7
H	1.3				-1.5					-2.2		.0		.8	
G				-.9											
F		1.1						-2.9	-2.3				-1.4		2.7
E							-2.5								
D				-1.4		-3.9		-2.0							
C									-.5		-.9				
B			8.1							-1.4			8.1		
A					5.5		4.4								

(12)

MEASURED AND PERCENT. DIFF. OF FDHN IP2 CY-2,FC12,2-28-77,97.8BPP,216,2821.1 MWD PER MTU,

R 1 1

															.667.	.854.	.932.	.880.	.947.	.863.	.674.			
R															1.4.	1.2.	2.6.	2.7.	3.1.	2.3.	2.3.			
													.704.	.996.	1.145.	.984.	1.232.	1.008.	1.221.	.981.	1.133.	.936.	.712.	
P													4.9.	2.3.	1.5.	.9.	2.5.	2.6.	1.6.	.6.	.5.	2.3.	6.0.	
								.765.	1.207.	1.121.	1.045.	1.272.	1.042.	1.071.	1.006.	1.230.	.996.	1.163.	1.222.	.712.				
N								5.1.	4.7.	2.2.	2.3.	1.6.	1.5.	-.2.	-1.8.	-1.3.	-1.5.	6.1.	6.0.	6.0.				
							1.019.	1.151.	.953.	1.124.	1.037.	1.111.	.942.	1.128.	1.060.	1.162.	.989.	1.163.	1.033.					
M							4.5.	4.9.	2.2.	-4.8.	-4.8.	-3.5.	-2.2.	-2.0.	-1.9.	-1.6.	6.0.	6.1.	6.1.					
		.682.	1.169.	.970.	1.133.	.899.	.953.	.926.	1.058.	.935.	.572.	.909.	1.187.	1.015.	1.131.	.660.								
L		3.5.	3.6.	-4.1.	-4.1.	-4.5.	-4.8.	-3.5.	-2.2.	-2.6.	-2.9.	-3.4.	.5.	.4.	.2.	.2.								
		.856.	.989.	1.221.	1.045.	.962.	.846.	.972.	.869.	.975.	.849.	.967.	1.095.	1.256.	.983.	.851.								
K		1.5.	1.4.	-2.5.	-4.1.	-3.8.	-3.7.	-2.9.	-2.1.	-2.6.	-3.4.	-3.4.	.5.	.3.	.8.	.9.								
		.919.	1.213.	1.081.	1.191.	.935.	.981.	.950.	1.020.	.945.	.573.	.942.	1.152.	1.027.	1.210.	.915.								
J		1.1.	.9.	-2.4.	-2.7.	-2.6.	-2.0.	-2.3.	-2.1.	-2.6.	-2.8.	-1.9.	.0.	.2.	.7.	.7.								
		.867.	.993.	1.066.	.955.	1.066.	.871.	1.017.	.863.	1.015.	.868.	1.070.	.964.	1.074.	.930.	.864.								
H		1.3.	1.1.	-.7.	-.9.	-1.5.	-1.9.	-2.3.	-2.3.	-2.2.	-2.2.	-1.1.	.0.	.1.	.8.	.9.								
		.925.	1.228.	1.025.	1.141.	.951.	.989.	.952.	1.017.	.950.	.577.	.949.	1.143.	1.020.	1.207.	.922.								
G		2.2.	2.2.	.4.	-.9.	-.9.	-1.2.	-2.1.	-2.4.	-2.5.	-2.4.	-1.1.	-.7.	-.5.	.4.	1.4.								
		.855.	.986.	1.258.	1.062.	.994.	.843.	.970.	.863.	.975.	.836.	.975.	1.075.	1.234.	.982.	.866.								
F		1.5.	1.1.	.4.	-.7.	-.7.	-4.1.	-3.1.	-2.9.	-2.5.	-2.5.	-2.6.	-1.5.	-1.4.	.7.	2.7.								
		.668.	1.145.	1.017.	1.164.	.917.	.962.	.936.	1.058.	.945.	.975.	.926.	1.163.	.996.	1.136.	.676.								
E		1.4.	1.5.	.1.	-1.4.	-2.6.	-3.9.	-2.5.	-2.2.	-1.5.	-2.6.	-1.6.	-1.5.	-1.5.	.7.	2.7.								
			.960.	1.081.	.919.	1.151.	1.047.	1.122.	.945.	1.134.	1.067.	1.162.	.917.	1.081.	1.001.									
D			-1.4.	-1.4.	-1.4.	-2.5.	-3.9.	-2.5.	-2.0.	-1.1.	-1.9.	-1.6.	-1.6.	-1.5.	2.8.									
			.726.	1.132.	1.132.	.965.	1.205.	1.007.	1.052.	1.016.	1.235.	1.082.	1.131.	1.245.	.725.									
C			8.1.	5.5.	3.2.	-2.6.	-3.7.	-1.8.	-1.1.	-.8.	-1.3.	-.9.	3.1.	8.1.	8.1.									
				.726.	1.040.	1.183.	1.023.	1.254.	.993.	1.157.	.962.	1.118.	1.007.	.725.										
B				8.1.	6.8.	5.4.	4.9.	4.4.	1.1.	-1.2.	-1.4.	-.9.	3.4.	8.1.										
						.694.	.895.	.948.	.874.	.907.	.841.	.657.											MEAS	
A						5.5.	4.5.	4.4.	4.4.	-.2.	-.2.	-.2.											DIFF	

12

EDIT FOR SYMMETRIC THIMBLES :

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9682E+00		1.288	7.2
14 F 7	0	.9682E+00	1.000	1.270	7.6
2 H15	0	.5464E+00		1.224	2.7
19 R 8	0	.8936E+00	1.008	1.215	1.7
3 K 2	0	.1107E+01		1.203	3.0
8 R 6	0	.1105E+01	.998	1.220	1.1
36 F14	0	.1120E+01	1.012	1.207	3.3
6 H 8	0	.9634E+00		1.296	9.2
42 F 8	0	.9651E+00	1.002	1.298	8.7
10 D10	0	.1055E+01		1.223	5.9
35 K12	0	.1033E+01	.996	1.221	5.9
11 A11	0	.7071E+00		1.229	1.6
46 L15	0	.6948E+00	.983	1.219	3.4
13 F 1	0	.8698E+00		1.226	2.9
15 K 6	0	.8665E+00	.996	1.217	2.4
16 N14	0	.7359E+00		1.214	2.7
17 N 2	0	.7247E+00	.985	1.213	3.7
21 B13	0	.7391E+00	1.004	1.214	1.1
45 B 3	0	.7388E+00	1.004	1.224	2.6
22 H11	0	.1020E+01		1.265	6.0
25 L 5	0	.1009E+01	.989	1.264	8.9
23 J14	0	.1219E+01		1.180	2.5
50 P 9	0	.1245E+01	1.022	1.178	4.0
24 J 1	0	.9306E+00		1.221	.7
49 A 9	0	.9547E+00	1.026	1.198	3.8
26 F 3	0	.1263E+01		1.185	3.3
47 R 6	0	.1263E+01	1.000	1.185	1.5
37 H 9	0	.1065E+01		1.242	5.4
43 D 8	0	.1069E+01	1.001	1.244	5.6
38 H 7	0	.1094E+01		1.217	5.8
48 G12	0	.1111E+01	1.015	1.237	6.1

**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

INPUT EPSILON FOR THE VALIDITY CHECK ON SYMMETRIC THIMBLES = .0550

12

PERCENT. DIFF. OF EXPECT. AND MEAS. FORN IP2 CY-2,FC13,3-7-77,80.5%F,2150,2997.3 MWD/MTU,BASE CASE IN/EX CAL,R2.

R 1 1

R								1.6		1.2					
P							1.3					2.4			
N		5.3	5.0							-1.3				5.7	
M									-1.7						
L	1.6					-3.2		-1.6							
K				-4.1						-3.6				1.4	
J		1.7				-1.4		-2.6							.6
H	2.1				-1.4					-.5		1.2		.3	
G				-1.0			-2.1								
F		.5						-2.4	-2.3				-.0		2.3
E							-2.2								
D				-.5		-3.4		-1.6							
C									-.5		.3				
B			8.0							-.3			7.1		
A					4.6		1.9								

(13)

MEASURED AND PERCENT. DIFF. OF FDHN IP2 CY-2.FC13.3-7-77.80.5WBP.2150.2997.3 MWD/MTU.BASE CASE IN/EX CAL.R2.

2FC13R2

	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
R						.659.	.845.	.926.	.873.	.933.	.859.	.674.			
						-.4.	-.4.	1.4.	1.6.	2.2.	1.2.	1.8.			
P			.706.	1.004.	1.127.	.979.	1.220.	.997.	1.215.	.930.	1.139.	.997.	.698.		
			5.1.	3.1.	-.5.	-.3.	1.3.	1.4.	.9.	-.3.	.6.	2.4.	3.9.		
N		.707.	1.209.	1.129.	1.042.	1.246.	1.019.	1.061.	1.006.	1.230.	1.013.	1.121.	1.197.	.709.	
		5.3.	5.0.	3.0.	3.1.	-.5.	-.5.	-1.1.	-1.8.	-1.8.	.2.	2.3.	4.0.	5.7.	
M		1.014.	1.152.	.959.	1.140.	1.051.	1.121.	.946.	1.129.	1.067.	1.155.	.952.	1.157.	1.030.	
		4.1.	5.1.	3.0.	-3.2.	-3.2.	-2.4.	-1.6.	-1.7.	-1.8.	-1.9.	2.3.	5.7.	5.7.	
L	.673.	1.150.	.970.	1.130.	.904.	.965.	.934.	1.061.	.936.	.971.	.904.	1.186.	1.018.	1.140.	.666.
	1.6.	1.6.	-4.0.	-4.1.	-3.6.	-3.2.	-2.4.	-1.6.	-2.2.	-2.6.	-3.6.	.7.	.7.	.7.	.6.
K	.854.	.958.	1.224.	1.042.	.963.	.849.	.972.	.867.	.972.	.845.	.962.	1.094.	1.260.	.996.	.861.
	.6.	.6.	-2.3.	-4.1.	-3.5.	-3.1.	-2.6.	-2.1.	-2.6.	-3.5.	-3.6.	.7.	.7.	1.4.	1.5.
J	.930.	1.225.	1.002.	1.127.	.936.	.984.	.944.	1.014.	.949.	.978.	.948.	1.162.	1.026.	1.211.	.919.
	1.9.	1.7.	-2.2.	-1.9.	-2.2.	-1.4.	-2.8.	-2.6.	-2.3.	-2.0.	-.9.	1.2.	.1.	.5.	.6.
H	.875.	1.002.	1.058.	.953.	1.063.	.870.	1.011.	.832.	1.025.	.882.	1.082.	.973.	1.072.	.986.	.864.
	2.1.	1.9.	-1.4.	-.9.	-1.4.	-1.8.	-2.9.	-3.0.	-1.6.	-.5.	.4.	1.2.	-.1.	.3.	.5.
G	.935.	1.234.	1.015.	1.137.	.949.	.986.	.951.	1.015.	.954.	.978.	.961.	1.155.	1.023.	1.208.	.917.
	2.5.	2.4.	-.8.	-1.0.	-.9.	-1.3.	-2.1.	-2.5.	-1.7.	-2.0.	.4.	.6.	-.1.	.3.	.5.
F	.854.	.958.	1.243.	1.062.	.975.	.853.	.977.	.864.	.975.	.845.	.962.	1.086.	1.252.	.994.	.868.
	.6.	.6.	-.7.	-2.2.	-2.2.	-2.7.	-2.1.	-2.4.	-2.3.	-3.5.	-3.6.	-.1.	-.0.	1.2.	2.3.
E	.667.	1.140.	1.012.	1.171.	.915.	.965.	.936.	1.055.	.938.	.952.	.934.	1.177.	1.010.	1.145.	.677.
	.7.	.7.	.1.	-.5.	-2.3.	-3.2.	-2.2.	-2.0.	-1.9.	-3.5.	-.5.	-.1.	-.1.	1.1.	2.3.
D		.969.	1.090.	.925.	1.150.	1.050.	1.119.	.945.	1.134.	1.077.	1.172.	.926.	1.095.	.996.	
		-.5.	-.5.	-.5.	-2.3.	-3.4.	-2.0.	-1.6.	-1.3.	-.9.	-.5.	-.5.	-.1.	2.2.	
C		.725.	1.194.	1.135.	.967.	1.200.	.997.	1.050.	1.020.	1.249.	1.014.	1.131.	1.232.	.719.	
		8.0.	3.8.	3.6.	-2.3.	-4.2.	-2.6.	-1.3.	-.5.	-.2.	.3.	3.2.	7.1.	7.1.	
B			.725.	1.037.	1.187.	1.016.	1.228.	.986.	1.203.	.979.	1.136.	1.008.	.719.		
			8.0.	6.5.	4.8.	3.4.	1.9.	.2.	-.1.	-.3.	.3.	3.4.	7.1.		
A				.694.	.878.	.930.	.876.	.923.	.859.	.670.					MEAS
				4.8.	3.4.	1.9.	1.9.	1.2.	1.1.	1.2.					DIFF

EDIT FOR SYMMETRIC THIMBLES

2FC13R2

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9612E+00		1.257	5.0
14 F 7	0	.9557E+00	.994	1.248	6.6
2 H15	0	.8999E+00		1.201	.3
19 R 8	0	.8917E+00	.991	1.198	1.1
3 K 2	0	.1123E+01		1.182	.6
8 B 6	0	.1128E+01	1.004	1.201	2.5
35 F14	0	.1123E+01	1.000	1.182	.5
6 H 6	0	.9786E+00		1.252	6.3
42 F 8	0	.9739E+00	.995	1.256	6.6
10 J10	0	.1081E+01		1.204	5.2
35 K12	0	.1081E+01	1.000	1.199	2.1
11 A11	0	.7061E+00		1.204	1.9
43 L15	0	.6840E+00	.969	1.202	1.8
13 F 1	0	.8704E+00		1.203	.1
15 R 6	0	.8609E+00	.989	1.206	1.5
16 N14	0	.7359E+00		1.202	2.0
17 N 2	0	.7215E+00	.984	1.201	2.8
21 H13	0	.7373E+00	1.006	1.207	2.4
45 B 5	0	.7314E+00	.998	1.198	.1
22 H11	0	.1034E+01		1.226	5.3
25 L 5	0	.1013E+01	.980	1.242	4.1
23 J14	0	.1224E+01		1.171	-.9
50 P 9	0	.1224E+01	1.000	1.156	-.7
24 J 1	0	.9385E+00		1.204	-.6
49 A 9	0	.9352E+00	.997	1.198	-.2
26 F 3	0	.1279E+01		1.169	1.2
47 N 6	0	.1256E+01	.982	1.166	1.5
37 R 4	0	.1050E+01		1.200	3.5
43 D 8	0	.1054E+01	.976	1.215	3.5
38 R 7	0	.1097E+01		1.192	4.4
45 G12	0	.1091E+01	.994	1.225	5.9

**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

INPUT EPSILON FOR THE VALIDITY CHECK ON SYMMETRIC THIMBLES = .0350

PERCENT. DIFF. OF EXPECT. AND MEAS. FDHN IP2 CY-2,3FC14,3-7-77,TIME 2200,79.8 P,2120,3022.78J,IN-EK CAL,FIRST PEA

R 1 1

R								1.7		1.5					
P							1.5					2.4			
N		4.7	4.4							-1.5				5.0	
M									-1.7						
L	.9					-2.9		-1.5							
K				-3.4						-4.2				1.7	
J		1.3				-1.9		-2.1							.9
H	1.7				-1.4					-1.4		.0		.3	
G				-.7			-3.0								
F		1.7						-2.3	-2.5				-.2		2.1
E							-2.3								
D				-.2		-3.1		-1.7							
C									-.2		.1				
B			7.0							-.3			5.5		
A					4.7		1.9								

14

MEASURED AND PERCENT. DIFF. OF FDHV IP2 CY-2,3FC14,5-7-77,TIME 2200,79.8 P,2120,3022.73J,IN-EX CA_,FIRST PEA

2FC14R2

	R	1	1													
					.560.	.343.	.921.	.870.	.927.	.353.	.671.					
R					.3.	.3.	1.5.	1.7.	2.3.	1.5.	2.1.					
			.705.	1.001.	1.129.	.971.	1.215.	.995.	1.208.	.955.	1.135.	.999.	.599.			
P			4.5.	2.5.	.2.	.5.	1.5.	1.5.	.9.	.0.	.8.	2.4.	3.6.			
		.705.	1.206.	1.126.	1.037.	1.250.	1.024.	1.055.	1.006.	1.223.	1.013.	1.125.	1.198.	.708.		
N		4.7.	4.4.	2.5.	2.6.	.2.	.1.	-.7.	-1.6.	-1.5.	.2.	2.4.	3.7.	5.0.		
		1.010.	1.149.	.953.	1.147.	1.053.	1.126.	.950.	1.133.	1.072.	1.159.	.957.	1.154.	1.025.		
M		3.5.	4.5.	2.5.	-2.9.	-2.9.	-2.3.	-1.5.	-1.7.	-1.7.	-1.9.	2.4.	5.0.	5.1.		
	.654.	1.137.	.977.	1.142.	.914.	.975.	.941.	1.063.	.940.	.975.	.903.	1.201.	1.026.	1.142.	.657.	
L	.9.	.9.	-3.4.	-3.4.	-3.1.	-2.9.	-2.3.	-1.5.	-2.4.	-2.3.	-4.3.	1.6.	1.5.	1.4.	1.3.	
	.844.	.970.	1.224.	1.053.	.972.	.855.	.980.	.875.	.978.	.845.	.951.	1.107.	1.256.	.933.	.855.	
K	.4.	.4.	-1.9.	-3.4.	-3.1.	-3.0.	-2.4.	-1.8.	-2.5.	-4.2.	-4.3.	1.5.	1.4.	1.7.	1.8.	
	.921.	1.213.	1.004.	1.131.	.941.	.935.	.949.	1.020.	.930.	.975.	.945.	1.153.	1.024.	1.207.	.915.	
J	1.5.	1.3.	-1.9.	-1.8.	-2.2.	-1.9.	-2.5.	-2.1.	-2.5.	-2.3.	-1.8.	.0.	.1.	.8.	.9.	
	.870.	.935.	1.054.	.959.	1.069.	.870.	1.010.	.863.	1.023.	.879.	1.073.	.955.	1.056.	.934.	.861.	
H	1.7.	1.5.	-.8.	-.7.	-1.4.	-2.4.	-3.1.	-3.3.	-1.8.	-1.4.	-.6.	.0.	-.6.	.3.	.5.	
	.932.	1.230.	1.029.	1.144.	.957.	.935.	.946.	1.012.	.954.	.934.	.957.	1.151.	1.018.	1.200.	.911.	
G	2.8.	2.8.	.5.	-.7.	-.7.	-2.0.	-3.0.	-2.9.	-2.1.	-2.1.	-.5.	-.1.	-.5.	.2.	.5.	
	.358.	.933.	1.257.	1.077.	.992.	.953.	.975.	.855.	.930.	.853.	.975.	1.036.	1.246.	.976.	.853.	
F	2.0.	1.7.	.7.	-1.1.	-1.1.	-3.4.	-3.0.	-2.9.	-2.5.	-2.3.	-2.8.	-.3.	-.2.	1.0.	2.1.	
	.573.	1.153.	1.023.	1.179.	.923.	.972.	.940.	1.061.	.944.	.975.	.931.	1.178.	1.008.	1.138.	.572.	
E	2.2.	2.3.	1.2.	-.2.	-1.7.	-3.1.	-2.3.	-2.2.	-1.9.	-2.3.	-1.5.	-.3.	-.2.	1.0.	2.1.	
		.974.	1.096.	.932.	1.162.	1.055.	1.125.	.949.	1.140.	1.075.	1.166.	.922.	1.095.	.998.		
D		-.2.	-.2.	-.2.	-1.7.	-3.1.	-2.4.	-1.7.	-1.1.	-1.3.	-1.3.	-1.3.	-.3.	2.3.		
		.722.	1.136.	1.135.	.993.	1.203.	1.002.	1.061.	1.021.	1.244.	1.012.	1.121.	1.219.	.712.		
C		7.0.	3.5.	3.3.	-1.7.	-3.2.	-2.0.	-1.1.	-.2.	-.3.	.1.	2.0.	5.5.	5.5.		
			.722.	1.034.	1.180.	.999.	1.220.	.933.	1.198.	.953.	1.129.	.998.	.712.			
B			7.0.	6.0.	4.7.	3.4.	1.9.	.2.	.1.	-.3.	.2.	2.3.	5.5.			
					.539.	.359.	.924.	.872.	.922.	.354.	.659.				MEAS	
A					4.7.	3.4.	1.9.	1.9.	1.7.	1.5.	1.7.				DIFF	

EDIT FOR SYMMETRIC THIMBLES

2FC14R2

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9553E+00		1.473	13.4
14 F 7	0	.9706E+00	1.004	1.433	13.5
2 H15	0	.8390E+00		1.365	13.2
19 R 8	0	.8354E+00	.995	1.360	11.3
5 K 2	0	.1112E+01		1.377	12.4
8 B 6	0	.1117E+01	1.005	1.367	11.2
36 F14	0	.1119E+01	1.007	1.375	13.5
6 H 6	0	.9763E+00		1.474	19.0
42 F 8	0	.9692E+00	.992	1.470	17.0
10 D10	0	.1096E+01		1.393	17.1
35 K12	0	.1094E+01	.998	1.399	15.7
11 A11	0	.7014E+00		1.361	14.2
46 L15	1	.6760E+00	.964	1.367	14.0
13 F 1	0	.8613E+00		1.370	14.0
15 R 5	0	.8565E+00	.994	1.354	13.4
16 N14	0	.7320E+00		1.345	13.7
17 N 2	0	.7209E+00	.985	1.349	14.9
21 B13	0	.7348E+00	1.004	1.353	13.4
45 B 3	0	.7245E+00	.990	1.367	13.2
22 H11	0	.1034E+01		1.433	18.0
25 L 8	0	.1020E+01	.986	1.429	18.0
23 J14	0	.1219E+01		1.337	11.0
50 P 9	0	.1226E+01	1.005	1.350	11.9
24 J 1	0	.9335E+00		1.359	11.5
49 A 9	0	.9302E+00	.996	1.354	11.7
26 F 3	0	.1274E+01		1.357	12.7
47 N 6	0	.1254E+01	.984	1.359	13.0
37 H 4	0	.1073E+01		1.425	18.4
43 D 8	0	.1063E+01	.991	1.407	16.5
38 H 7	0	.1105E+01		1.391	17.4
48 B12	0	.1108E+01	1.003	1.413	17.5

**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

INPUT EPSILON FOR THE VALIDITY CHECK ON SYMMETRIC THIMBLES = .0350

PERCENT. DIFF. OF EXPECT. AND MEAS. FDHN IP2 CY-2,2FC15R1,3-8-77,80.3 P,2150,3035.5BU,IN-EX CAL,BOTTOM

R 1 1

(15)

R								2.8.		1.4.					
P							2.7.					1.7.			
N		4.4.	4.0.							-1.4.				5.8.	
M									-1.3.						
L	1.8.					-3.8.		-1.3.							
K				-4.4.						-4.4.				2.2.	
J		1.7.				-1.3.		-2.8.							.7.
H	2.0.				-1.6.					-1.6.		.4.		-.4.	
G				-.8.			-3.5.								
F		.7.						-3.5.	-3.3.				.3.		2.1.
E							-2.8.								
D				-.0.		-3.6.		-2.1.							
C									-.4.		.6.				
B			7.3.							-.2.			6.2.		
A					4.8.		3.2.								

MEASURED AND PERCENT. DIFF. OF FORM IP2 CY-2,2FC15R1,3-8-77,80.3 P,2150,3035.580,IN-EX CAL,BOTTOM

2FC15R2

R 1 1																	
R					.672. 1.8.	.859. 1.8.	.934. 2.8.	.882. 2.8.	.933. 2.6.	.856. 1.4.	.671. 1.6.						
P			.701. 4.2.	.990. 1.5.	1.149. 1.7.	.991. 1.9.	1.232. 2.7.	1.006. 2.7.	1.218. 1.5.	.978. .5.	1.139. .9.	.992. 1.7.	.698. 3.6.				
N		.703. 4.4.	1.200. 4.0.	1.114. 1.5.	1.026. 1.5.	1.271. 1.7.	1.041. 1.7.	1.070. -.3.	1.008. -1.5.	1.232. -1.4.	1.015. .5.	1.115. 1.6.	1.197. 3.7.	.712. 5.8.			
M		1.009. 3.5.	1.143. 4.2.	.946. 1.4.	1.135. -3.8.	1.047. -3.8.	1.125. -2.2.	.950. -1.4.	1.136. -1.5.	1.072. -1.5.	1.171. -.8.	.948. 1.6.	1.161. 5.8.	1.032. 5.8.			
L	.672. 1.8.	1.149. 1.8.	.966. -4.5.	1.128. -4.4.	.903. -4.1.	.963. -3.8.	.939. -2.2.	1.068. -1.3.	.938. -2.4.	.953. -3.3.	.900. -4.4.	1.204. 2.0.	1.030. 1.9.	1.149. 1.8.	.671. 1.7.		
K	.853. 1.0.	.982. 1.0.	1.222. -2.2.	1.040. -4.4.	.961. -4.0.	.847. -3.7.	.975. -2.7.	.875. -1.6.	.976. -2.6.	.841. -4.4.	.957. -4.4.	1.110. 2.0.	1.272. 1.8.	.994. 2.2.	.864. 2.3.		
J	.926. 1.8.	1.220. 1.7.	1.002. -2.1.	1.125. -2.2.	.935. -2.6.	.983. -1.9.	.943. -3.2.	1.013. -2.8.	.945. -2.9.	.972. -3.0.	.943. -1.9.	1.155. .4.	1.020. -.3.	1.206. .5.	.915. .7.		
H	.875. 2.0.	.999. 1.8.	1.056. -.7.	.956. -.8.	1.065. -1.6.	.867. -2.5.	1.006. -3.5.	.870. -3.5.	1.019. -2.2.	.875. -1.6.	1.076. -.6.	.967. .4.	1.058. -1.4.	.978. -.4.	.857. -.1.		
G	.931. 2.4.	1.228. 2.4.	1.024. .0.	1.141. -.8.	.953. -.8.	.982. -2.0.	.939. -3.5.	1.005. -3.5.	.947. -2.7.	.977. -2.5.	.955. -.6.	1.154. .3.	1.015. -.8.	1.196. -.3.	.905. -.5.		
F	.853. 1.1.	.960. .7.	1.251. .1.	1.071. -1.6.	.985. -1.6.	.847. -3.7.	.967. -3.5.	.858. -3.5.	.969. -3.3.	.849. -3.5.	.965. -3.5.	1.091. .3.	1.254. .3.	.955. 1.3.	.862. 2.1.		
E	.669. 1.3.	1.145. 1.4.	1.019. .8.	1.180. -.0.	.924. -1.9.	.965. -3.6.	.933. -2.8.	1.052. -2.7.	.936. -2.5.	.966. -3.5.	.934. -.8.	1.183. .3.	1.014. .3.	1.143. 1.3.	.674. 2.1.		
D		.975. -.0.	1.097. -.0.	.933. -.0.	1.158. -1.9.	1.049. -3.6.	1.119. -2.7.	.943. -2.1.	1.133. -1.5.	1.072. -1.5.	1.170. -.8.	.925. -.8.	1.101. .3.	.997. 2.2.			
C		.723. 7.3.	1.197. 3.7.	1.136. 3.5.	.991. -1.9.	1.202. -3.8.	.999. -2.4.	1.056. -1.6.	1.019. -.4.	1.247. -.2.	1.017. .6.	1.126. 2.6.	1.225. 6.2.	.715. 6.2.			
B			.723. 7.3.	1.035. 6.1.	1.183. 4.8.	1.013. 4.2.	1.238. 3.2.	.986. .5.	1.200. .0.	.970. -.2.	1.137. .7.	1.003. 2.8.	.715. 6.2.				
A					.692. 4.8.	.878. 4.1.	.938. 3.2.	.885. 3.2.	.930. 2.2.	.852. 2.2.	.675. 2.2.					MEAS DIFF	

2FC15R2

EDIT FOR SYMMETRIC THIMBLES

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9604E+00		1.219	-4.6
14 F 7	0	.9610E+00	1.001	1.202	-4.7
2 H15	0	.8920E+00		1.336	-7.6
19 R 8	0	.8942E+00	1.003	1.295	-9.9
3 K 2	0	.1123E+01		1.309	-8.8
8 B 6	0	.1130E+01	1.007	1.300	-10.0
36 F14	0	.1116E+01	.994	1.303	-7.2
6 H 6	0	.9729E+00		1.216	-3.2
42 F 8	0	.9590E+00	.986	1.224	-3.1
10 J10	0	.1086E+01		1.216	-5.4
35 K12	0	.1081E+01	.993	1.225	-5.5
11 N11	0	.7041E+00		1.300	-9.8
46 L15	0	.6839E+00	.971	1.314	-9.9
13 F 1	0	.8649E+00		1.316	-8.4
15 R 6	0	.8591E+00	.993	1.293	-8.9
16 N14	0	.7338E+00		1.304	-8.0
17 J 2	0	.7253E+00	.988	1.304	-7.2
21 E13	0	.7357E+00	1.003	1.310	-9.5
45 B 5	0	.7280E+00	.992	1.306	-9.1
22 H11	0	.1035E+01		1.211	-5.1
25 L 8	0	.1028E+01	.993	1.229	-4.8
23 J14	0	.1228E+01		1.305	-8.5
50 P 9	0	.1247E+01	1.016	1.313	-9.9
24 J 1	0	.9431E+00		1.321	-10.1
49 A 9	0	.9442E+00	1.001	1.324	-9.0
26 F 3	0	.1282E+01		1.279	-5.6
47 N 6	0	.1270E+01	.990	1.281	-10.3
37 H 4	0	.1075E+01		1.215	-6.1
43 D 8	0	.1060E+01	.986	1.234	-6.0
38 M 7	0	.1094E+01		1.235	-5.9
48 G12	0	.1102E+01	1.007	1.246	-7.1

**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

INPUT EPSILON FOR THE VALIDITY CHECK ON SYMMETRIC THIMBLES = .0350

MEASURED AND PERCENT. DIFF. OF FDHN IP2 CY-2,FC16,3-28-77,99.6WBP,221,3540.5 MWD PER MTU,

	R	1	1													
R					.665.	.850.	.927.	.877.	.935.	.863.	.677.					
					-.5.	-.5.	1.2.	1.3.	2.0.	1.1.	1.3.					
P			.703.	.990.	1.131.	.979.	1.216.	.995.	1.215.	.983.	1.143.	.992.	.698.			
			4.0.	1.3.	-.6.	-.4.	1.0.	1.1.	.9.	.0.	.5.	1.4.	3.2.			
N		.705.	1.197.	1.109.	1.023.	1.240.	1.015.	1.059.	1.006.	1.230.	1.010.	1.110.	1.190.	.711.		
		4.3.	3.9.	1.2.	1.3.	-.6.	-.6.	-1.2.	-1.5.	-1.4.	.1.	1.4.	3.3.	5.2.		
M		1.009.	1.140.	.941.	1.135.	1.050.	1.129.	.952.	1.133.	1.065.	1.158.	.943.	1.152.	1.029.		
		3.2.	4.0.	1.2.	-2.9.	-2.9.	-1.3.	-.7.	-.9.	-1.5.	-1.3.	1.4.	5.2.	5.2.		
L	.675.	1.149.	.974.	1.132.	.906.	.967.	.943.	1.070.	.943.	.974.	.911.	1.169.	1.005.	1.131.	.664.	
	1.1.	1.1.	-3.5.	-3.5.	-3.2.	-2.9.	-1.3.	-.5.	-1.3.	-2.2.	-2.6.	-.4.	-.4.	-.5.	-.6.	
K	.859.	.989.	1.225.	1.044.	.968.	.856.	.986.	.886.	.989.	.854.	.970.	1.077.	1.241.	.990.	.862.	
	.6.	.6.	-1.8.	-3.5.	-2.7.	-2.4.	-1.2.	-.0.	-.9.	-2.6.	-2.6.	-.4.	-.5.	.7.	.9.	
J	.928.	1.217.	1.003.	1.125.	.940.	.990.	.960.	1.037.	.960.	.983.	.946.	1.154.	1.022.	1.211.	.923.	
	1.2.	1.1.	-1.7.	-1.6.	-1.6.	-.8.	-1.2.	-.5.	-1.2.	-1.6.	-.7.	.9.	.1.	.6.	.7.	
H	.877.	.995.	1.071.	.960.	1.071.	.878.	1.028.	.900.	1.036.	.882.	1.078.	.967.	1.076.	.994.	.876.	
	1.3.	1.2.	-.1.	.2.	-.4.	-.9.	-1.3.	-1.0.	-.5.	-.5.	.2.	.9.	.4.	1.0.	1.1.	
G	.931.	1.222.	1.025.	1.145.	.957.	.993.	.964.	1.026.	.960.	.981.	.957.	1.150.	1.025.	1.209.	.922.	
	1.5.	1.5.	.3.	.1.	.2.	-.5.	-.8.	-1.4.	-1.2.	-1.7.	.2.	.6.	.3.	.5.	.6.	
F	.859.	.966.	1.252.	1.081.	.995.	.855.	.982.	.869.	.983.	.851.	.967.	1.083.	1.250.	.991.	.866.	
	.5.	.3.	.3.	-.1.	-.0.	-2.5.	-1.7.	-1.9.	-1.6.	-2.9.	-2.9.	.2.	.2.	.8.	1.3.	
E	.673.	1.145.	1.006.	1.156.	.914.	.962.	.941.	1.062.	.949.	.967.	.925.	1.175.	1.012.	1.146.	.677.	
	.6.	.7.	-.3.	-1.5.	-2.3.	-3.4.	-1.5.	-1.3.	-.6.	-2.9.	-1.2.	.2.	.2.	.8.	1.3.	
D		.964.	1.079.	.916.	1.146.	1.045.	1.122.	.947.	1.141.	1.066.	1.159.	.919.	1.097.	.991.		
		-1.5.	-1.5.	-1.5.	-2.3.	-3.4.	-1.9.	-1.2.	-.2.	-1.4.	-1.2.	-1.2.	.2.	1.4.		
C		.718.	1.181.	1.121.	.986.	1.207.	1.010.	1.068.	1.019.	1.236.	1.003.	1.120.	1.220.	.716.		
		6.3.	2.5.	2.3.	-2.4.	-3.3.	-1.1.	-.3.	-.2.	-.9.	-.6.	2.3.	5.9.	5.9.		
B			.718.	1.027.	1.178.	1.009.	1.224.	.984.	1.194.	.973.	1.131.	1.002.	.716.			
			6.3.	5.0.	3.6.	2.7.	1.7.	-.0.	-.8.	-1.0.	-.6.	2.5.	5.9.			
A					.692.	.877.	.932.	.860.	.917.	.854.	.668.					MEAS
					3.6.	2.6.	1.7.	1.6.	.0.	-.0.	.0.					DIFF

PERCENT. DIFF. OF EXPECT. AND MEAS. FDHN IP2 CY-2,FC16,3-28-77,99.6@BP,221,3540.5 MWD PER MTU,

	R	1	1														
R									1.3.		1.1.						
P							1.0.						1.4.				
N			4.3.	3.9.							-1.4.					5.2.	
M										-.9.							
L		1.1.				-2.9.		-.5.									
K				-3.5.							-2.6.					.7.	
J			1.1.			-.8.		-.5.									.7.
H		1.3.			-.4.						-.5.		.9.			1.0.	
G				.1.			-.8.										
F			.3.					-1.9.	-1.6.					.2.			1.3.
E							-1.5.										
D				-1.5.		-3.4.		-1.2.									
C										-.2.		-.6.					
B				6.3.							-1.0.			5.9.			
A					3.6.		1.7.										

1

EDIT FOR SYMMETRIC THIMBLES

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.9733E+00		1.212	3.2
14 F 7	0	.9624E+00	.989	1.202	4.2
2 H15	0	.8857E+00		1.211	-1.0
19 R 8	0	.8899E+00	1.005	1.204	-2.4
3 K 2	0	.1112E+01		1.179	-.8
8 B 6	0	.1119E+01	1.006	1.184	-2.2
36 F14	0	.1124E+01	1.011	1.185	-.1
6 H 6	0	.9795E+00		1.215	3.8
42 F 8	0	.9843E+00	1.005	1.208	1.0
10 D10	0	.1087E+01		1.154	1.5
35 K12	0	.1084E+01	.997	1.147	1.4
11 A11	0	.7011E+00		1.197	.1
46 L15	0	.6841E+00	.976	1.210	-.7
13 F 1	0	.8639E+00		1.201	-.5
15 R 6	0	.8618E+00	.998	1.190	-.2
16 N14	0	.7324E+00		1.188	-1.0
17 N 2	0	.7201E+00	.983	1.196	-.2
21 B13	0	.7278E+00	.994	1.205	-1.7
45 B 3	0	.7249E+00	.990	1.191	-2.3
22 H11	0	.1031E+01		1.190	2.3
25 L 8	0	.1031E+01	1.000	1.184	2.2
23 J14	0	.1223E+01		1.188	-3.6
50 P 9	0	.1216E+01	.994	1.200	-3.1
24 J 1	0	.9397E+00		1.201	-2.9
49 A 9	0	.9328E+00	.993	1.202	-2.1
26 F 3	0	.1271E+01		1.163	-2.0
47 N 6	0	.1253E+01	.986	1.157	-3.0
37 H 4	0	.1075E+01		1.173	2.0
43 D 8	0	.1077E+01	1.002	1.166	1.2
38 M 7	0	.1092E+01		1.151	1.9
48 G12	0	.1110E+01	1.017	1.168	2.0

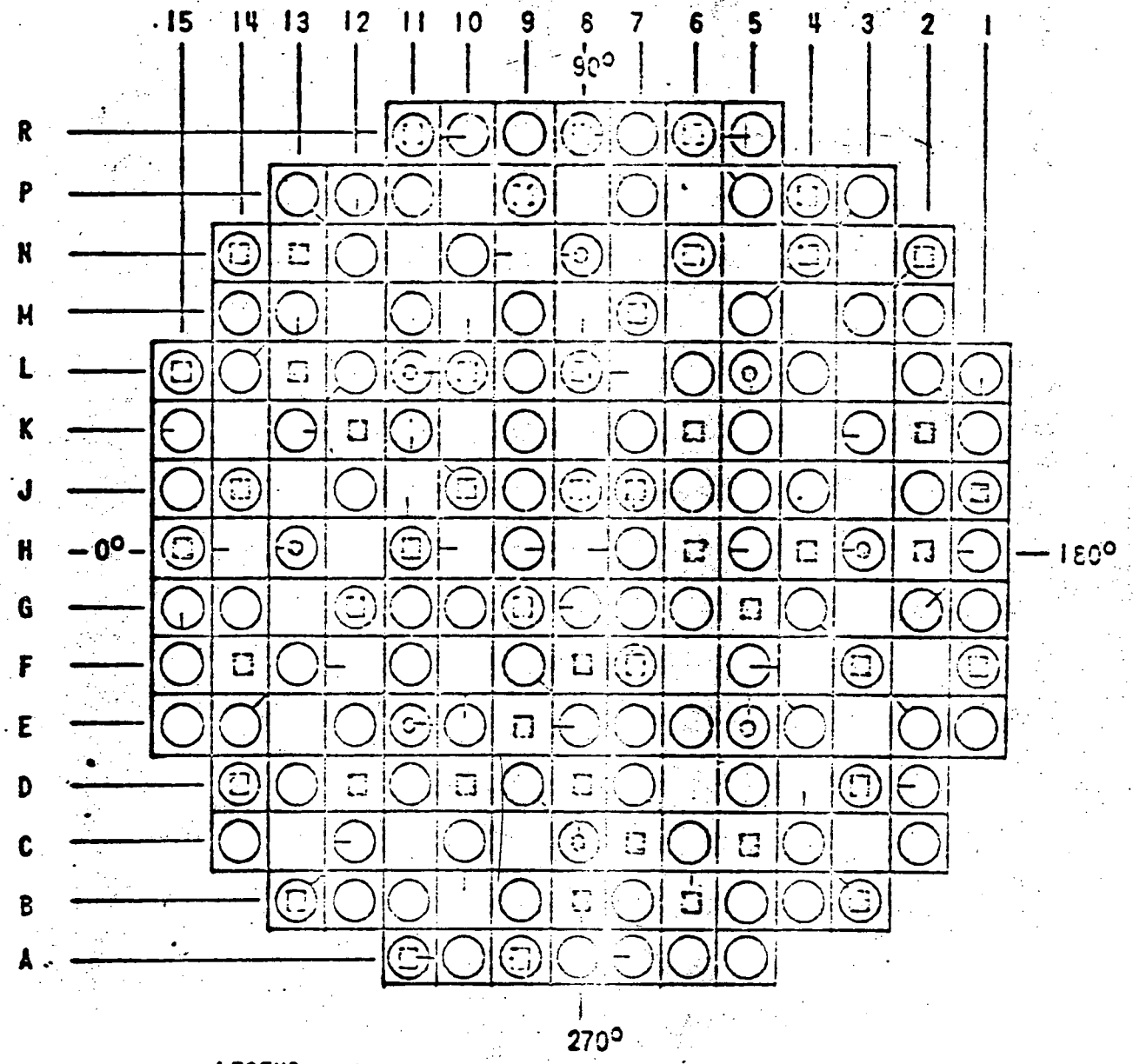
**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

INPUT EPSILON FOR THE VALIDITY CHECK ON SYMMETRIC THIMBLES = .0350

16

ATTACHMENT C

INFORMATION SUPPLIED TO NRC AT OCTOBER 31, 1977 MEETING



LEGEND:

- THERMOCOUPLE
- MOVABLE DETECTOR
- FLOW-MIXING DEVICE
- FIXED DETECTOR

. In-Core Instrumentation, Thermocouples and Movable Detectors

IP2 Cycle 2
HZP Map, MOL
2 Map 19, Table 1
Ratio to First of Normalized Reaction Rate Integrals

Symmetry Group	Thimble Loc.	Ratio to First (Norm. R.R. Intgrl) A	B	C
1	J-10	1.000	1.000	1.000
	F-7	0.984	0.984	1.003
2	H-15	1.000	1.000	1.000
	R-8	0.978	0.979	0.892
3	K-2	1.000	1.000	1.000
	B-6	1.015	1.016	0.986
	F-14	1.019	1.012	1.009
4	P-4	1.000	1.000	1.000
	D-14	1.043	1.044	1.091
5	E-9	1.000	1.000	1.000
	G-5	0.977	0.978	0.983
6	D-10	1.000	1.000	1.000
	K-12	0.978	0.976	0.995
7	A-11	1.000	1.000	1.000
	R-11	0.986	0.985	0.874
	L-15	0.997	0.999	0.966
8	F-1	1.000	1.000	1.000
	R-6	0.979	0.989	0.974
9	N-14	1.000	1.000	1.000
	N-2	0.979	0.975	0.924
	B-13	1.004	1.001	0.987
	B-3	1.007	1.014	0.995
10	G-9	1.000	1.000	1.000
	J-7	1.020	1.019	0.989

Symmetry Group	Thimble Loc.	Ratio to First (Norm. R.R. Intgrel) A	B	C
11	C-5	1.000	1.000	1.000
	L-13	0.998	0.995	1.041
12	H-11	1.000	1.000	1.000
	L-8	0.983	0.983	0.912
13	J-14	1.000	1.000	1.000
	P-9	1.013	1.021	0.974
14	J-1	1.000	1.000	1.000
	A-9	1.031	1.039	1.095
15	F-3	1.000	1.000	1.000
	N-6	0.987	0.992	N.A.
16	B-8	1.000	1.000	1.000
	H-2	0.971	0.976	0.898
17	N-4	1.000	1.000	1.000
	D-3	1.033	1.036	1.003
18	H-4	1.000	1.000	1.000
	D-8	1.029	1.021	1.061
19	M-7	1.000	1.000	1.000
	G-12	1.037	1.033	1.089

A - INCORE Analysis B - Hand Calculation, C - Results taken from Map 1 (HZP, 9/22/76)

Checked by [illegible] 8/31/76

EDIT FOR SYMMETRIC THIMBLES

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE-INTEGRAL	RATIO-TO-FIRST	F2	AXIAL OFFSET
1 J10	0	.9865E+00		1.179	1.6
14 F 7	0	.9880E+00	1.002	1.163	1.6
2 N15	0	.8798E+00		1.221	-1.9
19 R 8	0	.8808E+00	1.001	1.202	-3.2
3 K 2	0	.1130E+01		1.194	-1.9
8 B 6	0	.1118E+01	.990	1.184	-2.1
36 F14	0	.1123E+01	.994	1.191	-3.2
5 E 9	0	.1047E+01		1.174	1.0
33 G 8	0	.1026E+01	.980	1.154	.7
10 D10	0	.1094E+01		1.127	.1
35 K12	0	.1085E+01	.991	1.132	.4
11 A11	0	.7061E+00		1.200	-1.0
26 R11	1	.6717E+00	.951	1.216	-2.7
46 L15	0	.6919E+00	.980	1.202	-1.4
13 F 1	0	.8652E+00		1.212	-1.4
15 R 6	0	.8568E+00	.990	1.192	-1.1
16 N14	0	.7258E+00		1.198	-1.5
17 A 2	0	.7157E+00	.986	1.202	-1.0
21 B13	0	.7239E+00	.997	1.199	-3.1
45 B 3	0	.7222E+00	.995	1.206	-.6
18 G 9	0	.9944E+00		1.178	1.3
27 J 7	0	.9791E+00	.985	1.150	.9
20 C 5	0	.1135E+01		1.152	-1.4
30 L13	0	.1125E+01	.995	1.191	-2.9
22 N11	0	.1031E+01		1.164	1.0
25 L 8	0	.1022E+01	.991	1.158	1.0
23 J14	0	.1185E+01		1.203	-4.2
50 F 9	0	.1203E+01	1.015	1.192	-4.0
24 J 1	0	.9165E+00		1.217	-3.9
49 A 9	0	.9257E+00	1.010	1.209	-2.1
26 F 3	0	.1228E+01		1.177	-1.5
47 N 6	0	.1234E+01	1.005	1.178	-1.9
29 B 2	0	.1094E+01		1.203	-3.5
44 H 2	0	.1100E+01	1.005	1.186	-2.6
31 N 4	0	.1066E+01		1.186	-1.9
34 D 3	0	.1058E+01	.992	1.167	-1.8
37 [illegible] 4	0	.1088E+01		1.145	.9
43 D 8	0	.1089E+01	1.001	1.146	-.1
38 M 7	0	.1098E+01		1.144	.6
48 G12	0	.1100E+01	1.002	1.151	1.1

17

MEASURED AND PERCENT. DIFF. OF FQPN IP2 CY-2,FC17,5-23-77,99.86FP,D=225,4223.5 MWD PER MTU

R 1 1

R					.668.	.853.	.927.	.878.	.933.	.865.	.678.				
					-1.0.	-.9.	.5.	.6.	1.2.	.5.	.5.				
P			.701.	.978.	1.132.	.979.	1.210.	.990.	1.207.	.982.	1.131.	.962.	.689.		
			3.3.	-.5.	-1.0.	-.9.	.4.	.5.	.2.	-.6.	-1.1.	-1.9.	1.5.		
N		.703.	1.188.	1.095.	.998.	1.233.	1.009.	1.063.	1.008.	1.231.	.990.	1.073.	1.168.	.712.	
		3.6.	3.2.	.4.	-1.0.	-.9.	-.9.	-.6.	-1.1.	-1.1.	-1.8.	-1.9.	1.5.	4.9.	
M		.996.	1.112.	.922.	1.151.	1.061.	1.132.	.955.	1.132.	1.065.	1.146.	.910.	1.110.	1.028.	
		1.8.	1.6.	-.6.	-1.5.	-1.5.	-.5.	.0.	-.6.	-1.1.	-1.9.	-1.9.	1.5.	4.9.	
L	.686.	1.144.	.986.	1.142.	.913.	.978.	.946.	1.072.	.950.	.989.	.925.	1.146.	1.016.	1.152.	.679.
	2.0.	.0.	-2.2.	-2.2.	-2.1.	-1.4.	-.5.	.0.	-.1.	-.4.	-.4.	-1.9.	.8.	.7.	.7.
K	.860.	.979.	1.216.	1.052.	.979.	.869.	.958.	.888.	.997.	.868.	.988.	1.085.	1.254.	.992.	.865.
	-.1.	-.9.	-2.3.	-2.3.	-1.4.	-.7.	.2.	.3.	.1.	-.8.	-.4.	.8.	.7.	.4.	.4.
J	.913.	1.155.	.992.	1.125.	.947.	1.003.	.979.	1.044.	.975.	.998.	.966.	1.171.	1.033.	1.211.	.926.
	-.3.	-.5.	-2.6.	-.8.	-.4.	.6.	.9.	.3.	.5.	.2.	1.5.	2.9.	1.4.	.5.	.5.
H	.871.	.962.	1.056.	.960.	1.077.	.850.	1.048.	.913.	1.050.	.880.	1.079.	.956.	1.089.	.989.	.875.
	-.1.	-.3.	-1.3.	.6.	.5.	.5.	.6.	.1.	.8.	-.5.	.7.	.2.	1.8.	.4.	.4.
G	.931.	1.216.	1.018.	1.144.	.957.	1.004.	.973.	1.043.	.982.	.994.	.956.	1.129.	1.022.	1.205.	.931.
	1.0.	.9.	.0.	.5.	.6.	.7.	.2.	.2.	1.1.	-.2.	.4.	-.8.	.4.	-.0.	1.1.
F	.862.	.988.	1.245.	1.075.	.991.	.872.	.993.	.884.	.999.	.864.	.963.	1.048.	1.217.	.984.	.874.
	.1.	.0.	.0.	-.1.	-.1.	-.4.	-.4.	-.2.	.2.	-1.3.	-3.0.	-2.6.	-2.2.	-.3.	1.4.
E	.671.	1.138.	1.003.	1.161.	.921.	.978.	.951.	1.080.	.966.	.995.	.921.	1.139.	.984.	1.130.	.685.
	-.5.	-.5.	-.5.	-.6.	-1.3.	-1.4.	-.1.	.7.	1.5.	.2.	-1.3.	-2.5.	-2.4.	-1.1.	1.4.
D		.965.	1.084.	.922.	1.153.	1.060.	1.138.	.958.	1.146.	1.063.	1.153.	.910.	1.065.	.954.	
		-1.2.	-.5.	-.6.	-1.3.	-1.5.	.0.	.4.	.9.	-1.2.	-1.3.	-2.0.	-2.7.	2.6.	
C		.695.	1.165.	1.123.	.996.	1.221.	1.022.	1.076.	1.022.	1.233.	1.000.	1.101.	1.170.	.690.	
		2.3.	1.5.	2.6.	-1.3.	-1.9.	.4.	.6.	.3.	-.9.	-.8.	.6.	1.6.	1.6.	
B			.720.	1.031.	1.190.	1.014.	1.212.	.985.	1.199.	.978.	1.134.	1.004.	.718.		
			6.1.	6.1.	4.1.	2.7.	.6.	.0.	-.5.	-1.0.	-.8.	2.4.	5.8.		
A					.702.	.884.	.928.	.877.	.921.	.858.	.672.				
					4.1.	2.6.	.7.	.6.	-.1.	[illegible]	[illegible]				

MEAS
DIFF

(12)

38 A 7	0	.1090E+01		1.171	-1.0
48 G12	0	.1096E+01	1.006	1.160	-.5

**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

[illegible] THE VALIDITY CHECK ON SYMMETRIC THIMBLES = .0350

18

[illegible]	[illegible]	[illegible]	RATIO- TO-FIRST	[illegible]	AXIAL [illegible]
1 J13	0	[illegible]E+00		1.147	.0
14 F 7	0	[illegible]E+00	.999	1.140	.6
2 H15	0	[illegible]E+00		1.233	-3.4
19 K 6	0	[illegible]E+00	.996	1.214	-4.5
3 [illegible]	0	.1120E+01		1.202	-2.1
[illegible]	0	.1117E+01	.998	1.194	-3.5
36 F14	0	.1116E+01	.997	1.207	-2.4
5 P 4	0	.9768E+00		1.218	-3.5
32 D14	0	.9630E+00	.986	1.200	-5.6
6 H 6	0	.1017E+01		1.151	-.8
42 F[illegible]	0	.1004E+01	.988	1.160	-.0
[illegible]	0	.1046E+01		1.150	.7
33 [illegible]	0	.1049E+01	1.003	1.145	-.2
10 D10	0	.1083E+01		1.140	-1.3
35 A12	0	.1084E+01	1.000	1.155	-2.4
11 A11	0	.7657E+00		1.202	-2.4
26 [illegible]11	0	[illegible]E+00	.977	1.223	-3.7
[illegible]	1	[illegible]E+00	[illegible]	1.226	-2.7
[illegible]	0	[illegible]E+00		1.226	-.3
15 [illegible]	0	[illegible]E+00	1.005	1.193	-2.1
16 [illegible]14	0	.7502E+00		1.202	-3.3
17 [illegible]	0	[illegible]E+00	.990	1.211	-[illegible]
[illegible]	1	[illegible]	.973	[illegible]	[illegible]
[illegible]	1	[illegible]	[illegible]	[illegible]	-1.5
12 [illegible]	0	.9922E+00		1.144	-.5
27 J 7	0	.9960E+00	.997	1.141	-.7
20 [illegible]	0	.1129E+01		1.173	-2.7
30 L14	0	.1129E+01	.999	1.162	-2.8
22 H11	0	.1038E+01		1.144	-.6
25 L 6	0	.1026E+01	.988	1.148	.5
23 J14	0	.1173E+01		1.211	-2.8
[illegible]	0	.1[illegible]E+01	1.017	1.214	-4.4
24 [illegible]	0	[illegible]E+00		1.222	-4.6
45 [illegible]	0	.9972E+00	1.008	1.217	-4.2
28 F 3	0	.1234E+01		1.178	-4.2
47 [illegible]	0	.1217E+01	.987	1.199	-3.9
[illegible]		.1110E+01		1.1[illegible]	-3.3
[illegible]		[illegible]	[illegible]	1.[illegible]	-3.1
31 [illegible]	0	.1084E+01		1.187	-2.7
34 [illegible]	0	.1087E+01	1.002	1.164	-2.9
[illegible]	[illegible]	[illegible]		1.161	[illegible]

15

MEASURED AND PERCENT. DIFF. OF FOHN IP2 CY-2,FC18,6-16-77,100.8OSF,D=224,4883.6 MWD PER MTU

R 1 1

				.689.	.866.	.918.	.871.	.932.	.880.	.689.				
				2.0.	.8.	.2.	.3.	1.7.	2.4.	2.0.				
		.706.	[illegible]	1.161.	.990.	1.195.	.981.	1.199.	.985.	1.138.	.975.	.693.		
		3.9.	1.3.	2.3.	.8.	.1.	.2.	.5.	.5.	.1.	-.1.	2.0.		
	.708.	1.186.	1.097.	1.025.	1.228.	1.009.	1.058.	.998.	1.214.	.996.	1.086.	1.167.	.722.	
	4.3.	3.3.	.7.	2.0.	-.5.	-.5.	-.9.	-1.6.	-1.6.	-.8.	-.3.	2.0.	6.3.	
	.994.	1.112.	.924.	1.135.	1.046.	1.123.	.951.	1.126.	1.058.	1.144.	.911.	1.114.	1.039.	
	1.6.	2.0.	-.5.	-2.7.	-2.7.	-1.4.	-.7.	-1.1.	-1.5.	-1.9.	-1.9.	2.2.	6.4.	
.680.	1.132.	.961.	1.139.	.911.	.973.	.946.	1.074.	.949.	.984.	.920.	1.145.	1.006.	1.139.	.676.
.7.	-.5.	-2.3.	-2.4.	-2.8.	-2.7.	-1.4.	-.6.	-1.1.	-1.5.	-1.8.	-1.9.	.1.	.1.	.0.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	1.127.	.951.	1.010.	.969.	1.058.	.986.	1.005.	.967.	1.163.	1.022.	1.199.	.922.
-.4.	-.6.	-2.6.	-1.0.	-.9.	-.0.	.2.	.1.	-.0.	-.4.	.7.	2.1.	.8.	.5.	.6.
.867.	.975.	1.052.	.959.	1.079.	.896.	1.055.	.923.	1.064.	.895.	1.088.	.961.	1.080.	.986.	.876.
-.3.	-.4.	-1.4.	.2.	-.1.	-.3.	-.2.	-.4.	.6.	-.3.	.7.	.3.	1.1.	.7.	.8.
[illegible]	[illegible]	1.016.	1.148.	.961.	1.010.	[illegible]	1.053.	.991.	1.007.	.965.	1.137.	1.019.	1.199.	.926.
[illegible]	[illegible]	[illegible]	.2.	[illegible]	-.0.	[illegible]	-.4.	.5.	[illegible]	[illegible]	[illegible]	.5.	.5.	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.873.	[illegible]	.871.	[illegible]	[illegible]	[illegible]	1.061.	1.227.	.989.	.876.
-.2.	-.4.	-.3.	-.7.	-.7.	-1.6.	-.9.	-.6.	-.2.	[illegible]	-1.5.	-1.3.	-.6.	.7.	1.9.
.875.	1.137.	1.003.	1.142.	.921.	.974.	.953.	1.080.	.965.	.990.	.921.	1.153.	.993.	1.136.	.689.
-.1.	-.1.	-.2.	-.4.	-1.7.	-2.6.	-.7.	-.1.	.6.	-1.0.	-1.7.	-1.1.	-1.2.	-.1.	1.9.
	.976.	1.088.	.925.	1.147.	1.046.	1.128.	.956.	1.145.	1.060.	1.147.	.913.	1.072.	.960.	
	.0.	-.2.	-.4.	-1.7.	-2.7.	-1.0.	-.2.	.5.	-1.4.	-1.7.	-1.7.	-1.7.	-1.7.	
	.894.	1.160.	1.111.	.967.	1.196.	1.018.	1.079.	1.020.	1.221.	.995.	1.100.	1.170.	.694.	
	2.2.	1.4.	2.0.	-1.7.	-3.1.	.4.	1.0.	.6.	-1.0.	-1.0.	.9.	2.2.	2.2.	
		.710.	1.015.	1.187.	1.015.	1.219.	.990.	1.196.	.972.	1.127.	.999.	.721.		
		4.5.	4.4.	4.4.	3.3.	2.1.	1.1.	.2.	-1.0.	-.9.	2.3.	6.1.		
				.705.	.888.	.936.	.888.	.925.	.857.	.674.				
				4.4.	3.3.	2.1.	2.1.	.9.	-.3.	-.2.				

MEAS
DIFF

18

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J13		.1091E+01		1.19[illegible]	-.7
14 F 7	[illegible]	.[illegible]E+00	.[illegible]7	1.135	.5
2 F15	0	.8667E+00		1.227	-1.1
19 K 6	0	.8814E+00	1.017	1.196	-3.8
3 K 2	0	.1108E+01		1.212	-3.6
8 B 6	0	.1105E+01	.997	1.208	-5.4
36 F14	0	.1117E+01	1.008	1.209	-5.2
5 P 4	0	.9674E+00		1.205	-4.1
32 D14	0	.9483E+00	.980	1.155	-1.8
6 [illegible] 5	0	.1012E+01		1.153	1.1
42 F 8	0	.1019E+01	1.002	1.151	1.2
9 E 9	0	.1052E+01		1.151	-1.1
33 G 5	0	.1073E+01	1.020	1.141	-.5
10 D10	0	.1085E+01		1.128	-1.1
35 K12	0	.1088E+01	.999	1.146	.4
11 A11	[illegible]	.6281E+00		1.194	-3.6
28 A11	[illegible]	.6543E+00	1.009	1.202	-[illegible].5
46 L15	[illegible]	.7096E+00	1.031	1.206	-3.2
13 F 1	0	.6386E+00		1.216	-4.2
15 R 6	0	.6350E+00	.995	1.202	-4.8
16 [illegible]14	[illegible]	.7071E+00		1.197	-1.3
17 [illegible] 2	[illegible]	.7068E+00	1.000	1.192	-1.4
21 B13	0	.7202E+00	1.018	1.186	-3.0
45 B 3	1	.7517E+00	1.063	1.191	-2.0
18 G 9	0	.1015E+01		1.153	-1.6
27 J 7	0	.9951E+00	.980	1.143	-2.0
20 C 5	0	.1146E+01		1.157	-2.2
30 L13	0	.1135E+01	.990	1.172	-2.1
22 H11	0	.1044E+01		1.150	-1.4
35 L [illegible]	0	.1039E+01	.995	1.153	-1.9
23 J14	0	.1165E+01		1.209	-2.9
50 P 9	1	.1117E+01	.958	1.213	-3.1
24 J 1	0	.9049E+00		1.216	-4.5
49 A 9	0	.8811E+00	.974	1.220	.7
26 E 3	0	.1221E+01		1.188	-4.3
47 [illegible] 6	[illegible]	.1229E+01	1.006	1.178	-3.2
29 [illegible]		.1091E+01		1.114	-[illegible].5
44 [illegible]	1	.1155E+01	1.068	1.189	-1.5
31 [illegible]		.1074E+01		1.183	-2.3
34 [illegible]		.1383E+01	1.006	1.156	-2.2
37 [illegible]		.1356E+01		1.149	-1.[illegible]
43 [illegible]		.1109E+01	1.005	1.148	.7

20

38 [illegible].7	0	.1104E+01		1.157	-.7
40 [illegible]		.1[illegible]E+01	.985	1.15[illegible]	-.4

**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

INPUT EPSILON FOR THE VALIDITY CHECK ON SYMMETRIC THIMBLES = .[illegible]

MEASURED AND PERCENT. DIFF. OF FLOW IP2 CY-2, 2MAP20 77.06BP,D=210,5658.4 MWD PER MTU 8-17-77,RUN NO. 2

	R	1	1												
					.696.	.841.	.899.	.861.	.925.	.850.	.674.				
R					3.9.	-.5.	-.4.	.0.	2.4.	.5.	.9.				
			.698.	.997.	1.169.	.947.	1.163.	.965.	1.190.	.958.	1.127.	.974.	.691.		
P			2.2.	2.3.	3.9.	-.7.	-.9.	-.4.	1.7.	.4.	.2.	-.1.	1.1.		
		.699.	1.165.	1.058.	1.041.	1.155.	.957.	1.036.	1.080.	1.216.	1.001.	1.085.	1.157.	.769.	
J		2.3.	2.1.	.7.	4.0.	-5.1.	-5.1.	-2.6.	-.2.	-.2.	-.6.	-.3.	1.1.	3.7.	
		.998.	1.102.	.953.	1.136.	1.046.	1.125.	.961.	1.142.	1.077.	1.165.	.922.	1.104.	1.011.	
Y		2.5.	1.1.	-.2.	-3.1.	-3.1.	-1.8.	-.6.	-.3.	-.2.	-.6.	-1.3.	1.2.	3.8.	
	.712.	1.154.	.966.	1.146.	.919.	.984.	.957.	1.091.	.960.	.993.	.914.	1.156.	1.025.	1.148.	.683.
L	6.2.	2.6.	-2.1.	-2.2.	-3.1.	-3.0.	-1.8.	-.6.	-1.6.	-2.1.	-3.6.	-1.3.	2.4.	2.1.	2.0.
	.868.	.966.	1.198.	1.054.	.987.	.883.	1.016.	.905.	1.011.	.874.	.978.	1.107.	1.247.	.968.	.859.
K	2.7.	1.2.	-1.8.	-2.3.	-2.8.	-2.6.	-1.5.	-1.4.	-2.0.	-3.5.	-3.6.	2.6.	2.2.	1.4.	1.6.
	.918.	1.179.	.988.	1.127.	.952.	1.020.	.992.	1.053.	.984.	1.006.	.965.	1.166.	1.049.	1.212.	.952.
J	.7.	.6.	-2.0.	-1.8.	-1.7.	-1.1.	-1.2.	-1.8.	-2.0.	-2.5.	-.8.	1.7.	3.6.	3.4.	3.2.
	.869.	.977.	1.050.	.956.	1.083.	.907.	1.058.	.907.	1.056.	.902.	1.097.	.969.	1.111.	1.011.	.896.
H	.9.	.8.	-1.5.	-1.1.	-1.3.	-1.2.	-1.3.	-1.7.	-1.4.	-1.7.	-.0.	.3.	4.3.	4.3.	4.1.
	.925.	1.202.	1.010.	1.132.	.964.	1.024.	.995.	1.053.	.990.	1.014.	.974.	1.146.	1.035.	1.202.	.937.
G	2.5.	2.5.	.1.	-1.2.	-1.1.	-.7.	-.9.	-1.7.	-1.4.	-1.7.	-.1.	-.0.	2.7.	2.5.	3.7.
	.865.	.975.	1.223.	1.055.	.992.	.884.	1.014.	.899.	1.012.	.884.	1.000.	1.069.	1.216.	.957.	.853.
F	2.4.	2.2.	.2.	-2.3.	-2.3.	-2.5.	-1.7.	-2.0.	-1.9.	-2.5.	-1.5.	-.9.	-.3.	.4.	1.0.
	.675.	1.134.	1.001.	1.152.	.926.	.982.	.963.	1.085.	.971.	.981.	.948.	1.166.	.997.	1.126.	.677.
E	.8.	.8.	.0.	-1.7.	-2.4.	-3.3.	-1.2.	-1.2.	-.5.	-3.4.	-.1.	-.4.	-.4.	.1.	1.0.
		.964.	1.076.	.919.	1.143.	1.044.	1.129.	.964.	1.157.	1.077.	1.170.	.932.	1.085.	.970.	
D		-1.0.	-1.4.	-1.7.	-2.4.	-3.3.	-1.4.	-.3.	1.0.	-.2.	-.1.	-.3.	-.5.	-.5.	
		.699.	1.157.	1.112.	.977.	1.180.	1.005.	1.072.	1.016.	1.224.	1.008.	1.125.	1.201.	.717.	
C		2.2.	1.1.	1.9.	-2.4.	-3.2.	-.4.	.6.	.8.	.3.	.6.	3.2.	4.9.	4.9.	
			.722.	1.018.	1.159.	.960.	1.165.	.965.	1.170.	.955.	1.132.	1.026.	.754.		
B			5.7.	4.4.	3.0.	.7.	-.6.	-.5.	.3.	.1.	.6.	5.3.	10.3.		
					.690.	.852.	.897.	.856.	.909.	.856.	.680.				MEAS
					3.0.	.8.	-.7.	-.6.	.6.	1.3.	1.4.				DIFF

20

EDIT FOR SYMMETRIC THIMBLES

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATE.INTEGRAL	RATIO-TO-FIRST	FZ	AXIAL OFFSET
1 J10	0	.1014E+01		1.208	4.5
14 F 7	0	.1008E+01	.994	1.191	4.7
2 H15	0	.8610E+00		1.167	1.5
19 R 8	0	.8644E+00	1.004	1.161	.3
3 K 2	0	.1107E+01		1.181	1.6
8 B 6	0	.1107E+01	1.000	1.183	.5
36 F14	0	.1108E+01	1.001	1.174	-.4
5 P 4	0	.9575E+00		1.162	1.8
32 D14	0	.9548E+00	.997	1.148	.9
6 H 6	0	.1046E+01		1.211	5.0
42 F 8	0	.1040E+01	.994	1.201	4.9
9 E 9	0	.1077E+01		1.202	4.2
33 G 5	0	.1077E+01	1.000	1.190	4.1
10 D10	0	.1093E+01		1.175	3.4
35 K12	0	.1091E+01	.998	1.175	3.3
11 A11	0	.6873E+00		1.174	1.4
28 R11	0	.6792E+00	.988	1.176	1.3
46 L15	0	.7009E+00	1.020	1.175	2.8
13 F 1	0	.8406E+00		1.174	-.1
15 R 6	0	.8393E+00	.999	1.179	2.9
16 N14	0	.7058E+00		1.179	1.2
17 N 2	0	.7033E+00	.996	1.165	1.8
21 B13	0	.7013E+00	.994	1.195	4.5
45 B 3	1	.7393E+00	1.048	1.166	5.8
18 G 9	0	.1035E+01		1.191	4.3
27 J 7	0	.1019E+01	.984	1.171	3.5
20 C 5	0	.1134E+01		1.163	2.2
30 L13	0	.1135E+01	1.000	1.158	1.7
22 H11	0	.1061E+01		1.198	4.3
25 L 8	0	.1057E+01	.996	1.188	4.1
23 J14	0	.1147E+01		1.142	1.8
50 P 9	0	.1142E+01	.995	1.169	2.5
24 J 1	0	.9007E+00		1.174	.4
49 A 9	0	.9003E+00	1.000	1.174	2.3
26 F 3	0	.1204E+01		1.155	.6
47 N 6	0	.1220E+01	1.013	1.147	.9
29 B 8	0	.1110E+01		1.155	1.3
44 H 2	0	.1094E+01	.986	1.170	.2
31 N 4	1	.1099E+01		1.151	[illegible]
34 D 3	1	.1047E+01	.956	1.155	3.0

24

48 G12	0	.1109E+01	1.010	1.198	4.4

**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

INPUT EPSILON FOR THE VALIDITY CHECK ON SYMMETRIC THIMBLES = .0350

MEASURED AND PERCENT. DIFF. OF FDHN IP2 CY-2, 2MAP24,10008BP,D=216,6471 MWD PER MTU,9-16-77

	R	1	1													
R					.681 1.1	.842 -1.1	.900 -.8	.859 -.6	.917 1.1	.853 .3	.675 .2					
P				.691 1.4	.976 .2	1.141 1.1	.954 -1.1	1.165 -1.1	.964 -.8	1.184 .5	.963 -.2	1.130 .1	.977 .3	.691 1.3		
N			.693 1.7	1.157 1.3	1.081 -.7	1.012 1.1	1.180 -3.4	.974 -3.4	1.042 -2.3	1.000 -.9	1.212 -.8	1.001 .0	1.093 .4	1.157 1.4	.705 3.4	
M			.989 1.6	1.095 .5	.923 -1.0	1.145 -2.0	1.055 -2.0	1.140 -.3	.966 .2	1.141 -.2	1.067 -.9	1.169 .0	.940 .8	1.112 2.1	1.007 3.5	
L	.703 4.4	1.146 1.6	.982 -2.0	1.145 -2.0	.923 -2.4	.991 -2.0	.969 -.2	1.097 .3	.968 -.3	.999 -1.2	.932 -1.4	1.178 .8	1.008 .7	1.134 .5	.676 .4	
K	.858 .8	.965 -.0	1.194 -2.3	1.054 -2.1	.993 -1.8	.891 -1.2	1.030 .3	.922 .9	1.030 .3	.892 -1.1	.997 -1.4	1.085 .8	1.229 .6	.968 .3	.855 .4	
J	.900 -.8	1.166 -1.0	.980 -2.9	1.137 -.5	.967 -.4	1.033 .6	1.009 .7	1.078 .6	1.007 .5	1.029 .2	.983 1.2	1.169 2.3	1.022 1.2	1.184 .6	.912 .6	
H	.859 -.6	.964 -.8	1.050 -1.5	.973 .9	1.099 .5	.920 .7	1.079 .7	.935 .4	1.084 1.2	.919 .5	1.108 1.4	.972 .9	1.082 1.6	.978 .6	.869 .6	
G	.915 .9	1.188 .9	1.011 .2	1.152 .8	.980 .9	1.040 1.3	1.015 1.3	1.077 .6	1.014 1.2	1.030 .3	.983 1.2	1.141 -.2	1.012 .3	1.175 -.2	.913 .6	
F	.853 .3	.967 .2	1.224 .2	1.076 -.0	1.011 -.0	.901 -.1	1.034 .7	.917 .3	1.031 .4	.893 -1.0	1.003 -.8	1.061 -1.5	1.198 -2.0	.958 -.7	.855 .4	
E	.674 .1	1.129 .1	1.001 .0	1.168 -.1	.932 -1.3	.994 -1.7	.967 -.5	1.094 .1	.975 .4	.999 -1.2	.933 -1.3	1.135 -2.8	.973 -2.8	1.109 -1.7	.676 .4	
D		.970 -.3	1.086 -.2	.932 -.1	1.153 -1.4	1.057 -1.8	1.123 -1.7	.953 -1.1	1.127 -1.4	1.062 -1.3	1.153 -1.3	.909 -2.5	1.049 -3.6	.938 -3.6		
C		.691 1.3	1.152 .9	1.105 1.5	.987 -1.4	1.189 -2.7	1.007 -.2	1.070 .4	1.012 .3	1.212 -.8	.996 -.5	1.102 1.2	1.171 2.5	.699 2.5		
B			.783 3.1	1.000 2.8	1.155 2.3	.979 1.5	1.193 1.3	.977 .5	1.181 .3	.957 -.8	1.123 -.5	1.010 3.8	.741 8.7			
A					.689 2.4	.863 1.4	.919 1.2	.875 1.3	.918 1.2	.853 .2	.675 .3					MEAS DIFF

24

ATTACHMENT D

RESULTS OF LATEST FULL CORE FLUX MAPS

MEASURED AND PREDICTED [illegible]

Row		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
R	MEAS					.870	.808	.910	.878	.914	.866	.778				
	DIFF					.1	.1	1.1	1.6	1.9	2.2	2.8				
P	MEAS			.657	.962	1.119	.956	1.174	.977	1.155	.947	1.116	.971	.681		
	DIFF			2.1	-.3	.1	.1	1.7	1.5	.1	-.7	.8	.8	.7		
N	MEAS		.694	1.150	1.072	.995	1.178	.981	1.092	.971	1.161	.906	1.087	1.135	.681	
	DIFF		2.4	2.7	-.8	.1	-1.8	-1.9	-1.8	-2.4	-2.4	-.8	.7	.7	-.2	
M	MEAS		.991	1.093	.927	1.145	1.064	1.123	.951	1.113	1.044	1.142	.952	1.078	.964	
	DIFF		2.9	1.2	-.7	-1.9	-1.9	-1.9	-1.8	-.7	-2.8	-2.6	-.2	-.2	1.8	
L	MEAS	.727	1.157	.972	1.138	.976	1.006	.988	1.090	.988	1.166	.955	1.103	1.012	1.137	.687
	DIFF	7.6	4.5	-2.2	-2.3	-2.9	-1.9	-1.9	-1.8	-1.9	-1.9	-2.0	-.2	1.9	1.7	1.7
K	MEAS	.871	.968	1.173	1.047	.997	.906	1.039	.980	1.054	.906	1.005	1.095	1.227	.964	.856
	DIFF	2.8	1.5	-2.3	-2.5	-2.7	-2.0	-1.4	-1.1	-1.4	-2.1	-2.0	.8	1.8	1.0	1.0
J	MEAS	.894	1.148	.969	1.125	.968	1.042	1.070	1.090	1.024	1.145	.988	1.153	1.014	1.164	.908
	DIFF	-.4	-.6	-1.1	-1.9	-1.9	-1.1	-1.2	-1.1	-.6	-.9	.1	.8	1.8	1.2	1.2
H	MEAS	.858	.957	1.046	.968	1.101	.930	1.089	.948	1.100	.944	1.112	.965	1.078	.971	.856
	DIFF	-.2	-.4	-1.5	-.2	-.8	-1.1	-1.3	-1.9	-.4	-.7	.8	-.4	1.2	1.0	1.0
G	MEAS	.897	1.153	.984	1.141	.994	1.048	1.018	1.064	[illegible]	1.046	.987	1.130	1.012	1.175	.913
	DIFF	-.8	-.1	-1.2	-.3	-.8	-.9	-1.4	-1.7	-.2	-.7	.1	-.5	1.2	1.8	1.8
F	MEAS	.872	.937	1.187	1.066	1.018	.917	1.040	[illegible]	1.033	.907	1.006	1.054	1.226	.974	.875
	DIFF	-1.7	-1.8	-1.2	-.8	-.7	-1.4	-1.4	-1.7	-2.0	-1.9	-1.8	-1.8	2.1	2.1	2.1
E	MEAS	.672	1.112	.989	1.160	.992	1.005	.974	1.097	[illegible]	1.005	.943	1.151	1.014	1.141	.689
	DIFF	[illegible]	-.5	-.5	-.9	-1.1	-2.2	-1.3	-1.7	-1.2	-2.0	-1.2	-1.8	2.1	2.1	2.1
D	MEAS		.969	1.080	.930	1.150	1.050	1.129	.965	1.135	1.061	1.151	.928	1.173	.985	
	DIFF		.4	-.0	-.4	-1.3	-2.2	-1.1	.7	-.8	-1.1	-1.2	-1.2	.8	2.1	
C	MEAS		.699	1.145	1.102	.981	1.175	.996	1.061	1.001	1.195	.979	1.119	1.224	.741	
	DIFF		2.4	1.5	2.0	-1.3	-2.2	-.5	.1	.0	-.5	-.3	.5	8.5	8.5	
B	MEAS			.713	1.000	1.147	.989	1.181	.972	1.150	.949	1.116	1.002	.741		
	DIFF			4.5	3.6	2.6	4.1	2.4	1.1	.2	-.6	-.5	.5	8.5		
A	MEAS					.693	.877	.919	.877	.966	.852	.880				
	DIFF					2.6	3.0	2.4	2.3	1.0	.6	.7				

MEAS
DIFF

THIMBLE	VALID. STATUS	NORMALIZED REACT. RATIO INTEGRAL	RATIO (D-E)/(D+E)	F/	AXIAL DEFL
1 J14	0	.10301+01		1.136	-.2
14 F 7	0	.10331+01	1.003	1.137	-.1
2 H15	0	.85071+00		1.217	-.9
19 R 8	0	.85911+00	1.009	1.126	-2.0
3 K 2	0	.11221+01		1.260	-2.7
8 D 6	0	.11131+01	.992	1.198	-4.6
46 G14	0	.10871+01	.969	1.219	-2.2
5 P 4	0	.96451+00		1.199	-2.8
22 O14	0	.95241+00	.988	1.180	-3.9
10 O10	0	.11071+01		1.126	-1.2
35 P12	0	.10861+01	.981	1.133	-.7
11 M11	0	.69051+00		1.186	-2.2
29 G11	0	.67171+00	.976	1.205	-1.4
46 L15	1	.72191+00	1.048	1.178	-3.9
13 F 1	0	.86781+00		1.204	-3.9
15 R 6	0	.84995+00	1.001	1.188	-3.9
16 *14	0	.71341+00		1.167	-3.5
21 B13	0	.70871+00	.993	1.183	-2.8
45 P 3	0	.73625+00	1.012	1.175	-1.6
18 G 5	0	.10531+01		1.158	-1.1
27 J 7	0	.10441+01	.991	1.176	-1.6
20 C 5	0	.11431+01		1.156	-2.1
30 L13	0	.11471+01	1.006	1.164	-2.1
34 J 1	0	.88995+00		1.203	-4.1
49 A 9	0	.91431+00	1.022	1.152	-3.3
29 P 8	0	.11011+01		1.180	-2.0
44 H 2	0	.11031+01	1.003	1.176	.2
37 H 4	0	.11021+01		1.143	-1.4
43 D 1	0	.10981+01	.988	1.126	.2
38 N 7	0	.10981+01		1.156	-.7
48 G12	0	.11101+01	1.011	1.156	.6

**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

INPUT EPSILON FOR THE VALIDITY CHECK ON SYMMETRIC THIMBLES = .0550

1.547

ASURED AND PERCENT. DIFF. OF POWER [illegible]

```
     .687  .859  .905  .969  .916  .882  .885
     1.6   .6    1.9   1.8   2.6   1.7   1.9

   .895  .968 1.131  .959 1.160  .970 1.162  .959 1.120  .968  .894
   1.8   .5   1.6    .5   1.2   1.3   1.4    .5    .6    .6   1.6

  .697 1.142 1.072 1.007 1.109  .993 1.050  .979 1.117  .991 1.008 1.181  .700
  2.0  1.7   -.4   1.6   -.4   -.9   -.9  -1.3  -1.3    .0    .6   1.6   3.0

  .972 1.087  .928 1.129 1.041 1.130  .967 1.137 1.055 1.161  .940 1.101  .998
  1.0   .9   -.7  -3.0  -3.0  -1.3   -.5   -.8  -1.3   -.3    .6   2.2   5.7

 .682 1.114  .973 1.142  .929 1.000  .980 1.111  .960 1.009  .951 1.172 1.002 1.129  .681
  .9   .0  -1.8  -1.9  -3.0  -3.0  -1.3   -.9  -1.2  -2.1  -2.7    .6   1.1    .9    .8

 .843  .949 1.173 1.051 1.002  .909 1.050  .995 1.055  .919 1.008 1.001 1.208  .960  .856
 -.2   -.6  -1.8  -2.0  -2.7  -2.6  -1.5   -.5  -1.0  -2.0  -2.7   1.2   1.0   1.1   1.5

 .896 1.149  .916 1.126  .974 1.009 1.029 1.104 1.051 1.009  .908 1.162 1.013 1.115  .907
I  .3   .2  -2.2  -1.7  -1.8  -1.9  -1.1   -.8  -1.1  -1.3   -.6   1.5   1.5   1.5   1.6

 .860  .960 1.048  .967 1.104  .930 1.097  .959 1.107  .949 1.110  .976 1.079  .975  .872
H  .5   .3  -1.1   -.6  -1.1  -1.3  -1.3  -1.1   -.6   -.7    .1    .3   1.8   1.9   1.9

 .905 1.161  .995 1.130  .996 1.055 1.028 1.101 1.059 1.050  .975 1.141 1.004 1.156  .910
G 1.3  1.2   -.2   -.6   -.6   -.8   -.6  -1.1   -.6  -1.1    .1   -.3    .7    .8   1.6

 .848  .951 1.191 1.064 1.022  .916 1.052  .951 1.050  .919 1.019 1.059 1.117  .951  .859
F  .3   .2   -.2   -.8   -.8  -1.4  -1.1  -1.4  -1.2  -1.4  -1.1  -1.3  -1.4    .2   1.6

 .682 1.124  .992 1.148  .940 1.005  .985 1.106  .970 1.002  .950 1.160  .980 1.118  .687
E  .9   .9    .1  -1.4  -1.7  -2.4   -.7   -.7   -.2  -2.7  -1.0   -.4   -.5    .9   1.7

  .975 1.077  .921 1.142 1.047 1.133  .971 1.159 1.067 1.155  .931 1.005  .970
D 1.3  -.1  -1.9  -1.9  -2.4  -1.0   -.2    .7   -.6   -.8    .0    .7    .7

  .702 1.140 1.093  .972 1.105 1.006 1.077 1.009 1.191  .990 1.093 1.158  .700
C 2.8  1.5   1.9  -1.9  -2.4    .9   1.6   1.2   -.2   -.2   1.4   2.6   2.6

   .713  .995 1.130  .967 1.172  .971 1.159  .946 1.112  .901  .713
B  4.4   3.3   2.1   1.7   2.2   1.5   1.1   -.9   -.2   1.9   4.5

     .690  .860  .912  .879  .909  .948  .819                 MEAS
A    2.1   1.7   2.1   2.2   1.8   .4    .9                   DIFF
```

THIMBLE	VALID STATUS	NORMALIZED REACT. RATE (ORIGINAL)	RATIO TO FIRST	[illegible]	RATIO DIFFER.
1 J10	0	.10311E+01	1.000	1.193	.7
14 F 7	0	.10256E+01	.995	1.137	1.1
2 H15	0	.89635E+00		1.176	-.8
19 K 8	0	.89597E+00	1.010	1.150	-1.8
3 K 2	0	.11011E+01		1.173	-1.2
8 H 6	0	.10988E+01	.997	1.166	-2.1
38 F14	0	.10971E+01	.997	1.175	-2.8
5 P 4	0	.94101E+00		1.168	-2.2
32 D14	0	.94821E+00	1.000	1.160	-2.1
6 H 6	0	.10591E+01		1.192	1.3
42 F 8	0	.10651E+01	1.005	1.139	1.0
9 E 9	0	.10841E+01		1.193	.7
33 G 5	0	.11001E+01	1.015	1.137	.7
10 D10	0	.10971E+01		1.129	.1
35 K12	0	.10901E+01	.994	1.131	.6
11 A11	0	.67011E+00		1.150	-.9
28 B11	0	.67441E+00	.995	1.169	-1.1
46 L15	0	.67001E+00	.990	1.176	.6
13 F 1	0	.83331E+00		1.179	-1.4
15 H 6	0	.83571E+00	1.003	1.196	-1.7
16 H14	0	.69901E+00		1.162	-1.5
17 N 2	0	.69551E+00	.995	1.168	-1.0
21 H13	0	.70051E+00	1.002	1.164	-.5
45 B 3	0	.70111E+00	1.003	1.16.	-1.3
16 G 9	0	.10571E+01		1.133	.8
27 J 7	0	.10561E+01	1.000	1.1.3	-.0
20 C 5	0	.11351E+01		1.131	-.6
30 L13	0	.11331E+01	.995	1.195	.3
22 H11	0	.10381E+01		1.154	-.3
25 L 8	0	.10661E+01	1.008	1.128	.6
23 J14	0	.11241E+01		1.162	-1.7
50 P 9	0	.11351E+01	1.010	1.169	-1.5
24 J 1	0	.88761E+00		1.169	-2.2
49 A 9	0	.88261E+00	.994	1.185	-2.3
26 F 3	0	.11721E+01		1.150	-2.9
47 N 6	0	.11751E+01	1.003	1.199	-3.0
29 H 8	0	.11101E+01		1.151	-.9
44 H 2	0	.10981E+01	.989	1.193	-1.3
31 H 4	0	.10861E+01		1.199	-.5
34 D 3	0	.10871E+01	1.001	1.133	-.1
37 H 4	0	.11051E+01		1.195	.0
41 D 8	0	.11081E+01	1.003	1.138	.7

112 [illegible]

DITY STATUS = 1 MEANS SYMMETRIC THIMBLE TEST FAILED

EPSILON FOR THE VALIDITY CHECK ON SYMMETRIC THIMBLES 4 [illegible]

CASUALD AND PERCENT. DIFF. OF FROM [illegible]

R	1	1					.686.	.891.	.896.	.862.	.911.	.856.	.588.				
							2.0.	.5.	1.1.	1.3.	2.0.	2.2.	2.3.				
						.700.	.967.	1.127.	.937.	1.195.	.902.	1.147.	.932.	1.196.	.963.	.700.	
J						2.1.	.6.	2.0.	.9.	.9.	1.1.	1.1.	-.1.	.0.	.1.	2.0.	
				.703.	1.146.	1.069.	1.009.	1.172.	.989.	1.093.	.973.	1.159.	.970.	1.080.	1.19[illegible].	.712.	
I				2.4.	2.0.	-.9.	2.0.	-1.1.	-1.1.	-1.0.	-2.2.	-2.2.	-1.1.	.1.	2.0.	3.8.	
				.976.	1.092.	.933.	1.163.	1.075.	1.148.	.968.	1.152.	1.052.	1.151.	.940.	1.100.	1.000.	
H				1.5.	1.5.	-.6.	-.5.	-.1.	-.1.	-1.0.	-1.5.	-2.3.	-1.2.	.1.	2.0.	3.9.	
	.684.	1.113.	.974.	1.140.	.937.	1.017.	1.001.	1.115.	.990.	1.015.	.991.	1.100.	1.029.	1.152.	.691.		
L	1.7.	.6.	-1.5.	-1.6.	-2.9.	-2.1.	-.1.	-.9.	-1.5.	-2.2.	-2.9.	.1.	4.0.	4.2.	1.3.		
	.837.	.951.	1.166.	1.056.	1.013.	.929.	1.065.	.952.	1.062.	.995.	1.019.	1.049.	1.200.	.945.	.849.		
K	.0.	-.2.	-1.6.	-1.8.	-2.5.	-2.1.	-.9.	-.7.	-1.2.	-2.0.	-2.9.	-2.9.	1.3.	1.3.	1.3.		
	.871.	1.116.	.973.	1.134.	.986.	1.062.	1.056.	1.107.	1.055.	1.053.	.994.	1.162.	1.003.	1.145.	.894.		
J	-1.7.	-1.6.	-2.2.	-1.3.	-1.6.	-1.0.	-1.3.	-1.9.	-1.5.	-2.0.	-.7.	1.1.	.8.	.9.	.9.		
	.837.	.937.	1.045.	.974.	1.115.	.951.	1.109.	.953.	1.101.	.993.	1.120.	.973.	1.063.	.960.	.859.		
H	-1.6.	-1.6.	-1.4.	-.4.	-.9.	-.9.	-1.2.	-1.2.	-1.1.	-1.8.	-.5.	-.3.	.9.	.9.	.9.		
	.909.	4.159.	1.001.	1.145.	.997.	1.070.	1.044.	1.106.	1.035.	1.051.	.995.	1.144.	1.003.	1.152.	.900.		
G	2.1.	2.2.	.7.	-.9.	-.4.	-.4.	-.6.	-1.1.	-1.2.	-2.2.	-.6.	-.3.	.2.	1.5.	1.6.		
	.854.	.945.	1.143.	1.063.	1.027.	.947.	1.069.	.950.	1.061.	.929.	1.018.	1.058.	1.217.	.957.	.859.		
F	1.8.	1.3.	.7.	-1.2.	-1.3.	-1.0.	-.5.	-1.1.	-1.2.	-2.2.	-2.0.	-2.0.	2.7.	2.5.	2.6.		
	.684.	1.124.	1.008.	1.154.	.950.	1.0[illegible].	1.001.	1.123.	.992.	1.015.	.955.	1.140.	.972.	1.110.	.691.		
E	1.7.	1.7.	1.8.	-1.2.	-1.6.	-1.6.	.9.	-.2.	-.4.	-2.5.	-1.1.	-1.8.	-1.1.	.4.	3.6.		
		.971.	1.089.	.924.	1.142.	1.050.	1.142.	.982.	1.157.	1.064.	1.159.	.939.	1.055.	.944.			
D		1.0.	1.9.	-1.6.	-1.6.	-1.1.	.0.	.4.	.1.	-1.0.	-1.1.	-1.0.	-1.8.	-1.8.			
		.704.	1.154.	1.186.	.974.	1.167.	1.005.	1.073.	1.005.	1.173.	.977.	1.082.	1.155.	.693.			
C		2.6.	2.7.	4.4.	-1.6.	-1.6.	1.0.	1.2.	1.1.	-1.1.	-1.1.	.5.	1.0.	1.0.			
			.716.	.997.	1.157.	.955.	1.113.	.951.	1.195.	.922.	1.095.	.976.	.713.				
B			4.4.	3.7.	2.4.	2.4.	2.6.	1.4.	.2.	-1.2.	-1.1.	1.5.	3.9.				
						.693.	.897.	.908.	.872.	.912.	.898.	.866.					MEAS
A						2.4.	2.4.	2.4.	2.5.	.0.	-1.1.	-1.1.					DIFF

EDIT FOR SYMMETRIC THIMBLES

THIMBLE	VALID. STATUS	NORMALIZED PEAK. RATE.INTEGRAL	RATIO TO.PEAK	PZ	AXIAL DIFFEL
1 J10	0	.1054E+01		1.194	-1.7
14 F 7	0	.1053E+01	.998	1.190	-1.6
13 D13	0	.1122E+01		1.195	-2.3
45 K12	0	.1107E+01	.986	1.190	-2.0
11 A11	0	.6850E+00		1.199	-3.8
28 R11	0	.6790E+00	.991	1.204	-4.1
46 L13	0	.6769E+00	.988	1.196	-4.0
13 F 1	0	.8403E+00		1.225	-5.7
15 R 6	0	.8372E+00	.996	1.193	-5.3
16 N14	0	.7154E+00		1.190	-1.6
17 N 2	0	.7054E+00	.986	1.200	-1.3
21 R13	0	.7088E+00	.991	1.192	-1.8
47 R 3	0	.7055E+00	.986	1.190	-2.3
18 G 9	0	.1080E+01		1.162	-2.7
27 J 7	0	.1074E+01	.995	1.162	-1.0
20 C 5	0	.1149E+01		1.165	-3.0
50 L13	0	.1152E+01	1.007	1.177	-3.4
22 R11	0	.1087E+01		1.171	-2.1
25 L 8	0	.1082E+01	.996	1.160	-1.7
23 J14	0	.1121E+01		1.204	-4.0
50 P 9	0	.1127E+01	1.006	1.205	-4.4
24 J 1	0	.8831E+00		1.210	-4.9
44 A 9	0	.8895E+00	1.007	1.211	-4.1
29 E 8	0	.1117E+01		1.187	-3.9
44 H 2	0	.1089E+01	.976	1.189	-2.9
31 U 4	0	.1094E+01		1.178	-2.7
34 D 3	0	.1073E+01	.981	1.164	-2.2
37 H 4	0	.1120E+01		1.152	-2.60
43 D 8	0	.1126E+01	1.005	1.142	-1.5
38 H 7	0	.1105E+01		1.167	-1.7
48 U12	0	.1114E+01	1.008	1.171	-1.1

**VALIDITY STATUS = 1 MEANS SYMMETRIC THIMBLE (S) FAILED

INPUT EPSILON FOR THE VALIDITY CHECK ON SYMMETRIC THIMBLES = .0450

Request No. 2:

It was stated at the meeting that no impacting was detected at full flow conditions. Yet the summary of Tape 33 apparently indicated 19 impacts under 4 pump subcritical conditions. Explain the discrepancy. Include a discussion of why loose-part impacting would be sensitive to core criticality and thermal power.

Response:

Our statement at the October 31st NRC meeting in Washington that no metal impacting was detected at full flow conditions was for the steady flow and not for the transient condition. Tape No. 33 contained pump startup transient data with reactor coolant temperature at 538°F and the reactor in a sub-critical condition. Metal impacting (19 impacts calculated from the rate of impacts equal to 0.4 impacts/sec over a period of 49 seconds), with four pumps on, was inferred from the data taken after switching on the fourth pump. See attached tables 1 and 2 presented at the October 31st NRC meeting. Thus it constituted a transient flow and not a steady flow condition data.

In our opinion the sensitivity of loose-object impacting would be independent of core criticality and thermal power, as it depends upon the reactor coolant flow condition.

TABLE I

MAGNETIC TAPE SUMMARY

Tape #3	Temperature °F	Pumps	Power
30	Cold - 105	Start-Up 1 2 3 4	Not Critical
31	Cold - 105	Shutdown 1 2 3 4	Not Critical
32	Hot - 542	Shutdown 1 2 3 4	Not Critical
33	Hot - 538	Start-Up 1 2 3 4	Not Critical
34	Hot - 515-550	Four-Pump Operation	1% Steady-State 1% Increasing Power 55% Increasing Power 75% Increasing Power
35	Hot	Four-Pump Operation	92% Power Steady-State

TABLE II (Rev. 1)

SUMMARY OF RESULTS

Tape #	Temp.(°F)	Pumps	Power	Location of Source	Amplitude of Signal (gpp)	Rate: Impacts/Sec.	Observation Period (Sec.)	Probable Cause
30	105	21	NC	Vessel	.3- .8	1.3	7.5	LP in Vessel
		21,22	NC	Vessel	.4-1.6	1.0	81	LP in Vessel
		21,22,23	NC	Vessel	.3- .5	1.2	7.5	LP in Vessel
				Vessel	.3- .5	.3	81	LP in Vessel
		21,22,23,24	NC	Vessel	.3- .5	.5	60	LP in Vessel
32	542	21,22,23,24	NC	SG 24	.3- .4 RV	.3	16	
					.8-1.5 SG 24	1.9	7.5	
		22,23,24	NC	SG 24	.3- .5 RV	.3	60	
					1.0-1.6 SG 24	2.2	45	
		23,24	NC	RV	.3- .4	.25	60	LP in Vessel
				SG 24	.8-1.2	2.1	45	
		24	NC	SG 21	.3- .4	.3	60	
				SG 24	.9-1.3	2.5	45	
		All Off	NC	Vessel	.2- .6	1.4	60	LP in Vessel
33	538	21	NC	Vessel	.2- .8	.98	60	LP in Vessel
		21,22	NC	Vessel	.3-3.0	2.0	60	LP in Vessel
		21,22,23	NC	Vessel	.3- .9	1.5	48	LP in Vessel
		21,22,23,24	NC	Vessel	.3- .4	.4	48	LP in Vessel
34	545	21,22,23,24	1% Inc.	Vessel	.5- .6			Rod Step and Operation of External Equip
				SG 24	1.4	Very Few		
	550	21,22,23,24	55% Inc.	Vessel	.4			Rod Steps
	550	21,22,23,24	75% Inc.	Vessel	.3- .6			Rod Steps and Operations of External Equip
				SG 21	.9-1.7			
				SG 22	.5-1.7	Very Few		
				SG 23	.5-1.3			
35	551	21,22,23,24	92%			No Impacts Detected		

September 20, 1977 Rev. 1: 9/28/77

ADDENDUM TO
TABLE II (Rev. 1)
SUMMARY OF RESULTS

Tape #	Temp. (°F)	Pumps	Power	Location of Source	Amplitude of Signal (gpp)	Rate: Impacts/Sec.	Observation Period (Sec.)	Probable Cause
31	105	21,22,23,24	NC	Vessel	.2 - .3	.2	18	LP in Vessel
		22,23,24	NC	Vessel	.2 - .8	.1	100	LP in Vessel
		23,24	NC	Vessel	.2 - .8	.3	80	LP in Vessel
		24	NC	Vessel	.2 - .8	1.0	60	LP in Vessel
		All Off	NC	Vessel	.15- .9	.9	50	LP in Vessel

September 29, 1977

Request No. 3:

What is the cost, manpower, man-rem exposure and outage time necessary to remove and re-install the reactor internals package?

Response:

Cost - approximately 10 million dollars.

Manpower - 3700 man hours.

Exposure - 3-15 man rem.

Outage Time - 18 days.

Note: Above estimates include time for search and retrieval in addition to the incremental cost for the added outage time.

Request No. 4:

Con Ed stated at our 10/31/77 meeting that the reactor coolant might be too murky for a TV scan to be practical. What is the current value of coolant radioactivity? What is the current value of optical transmissibility for incandescent light? Give the current percent of colloidially suspended solids and the chemical compositions of these solids. Discuss the degree of optical dispersion expected and its effect on image resolving power.

Response:

The current value of coolant radioactivity, as of 12-30-77, is 2.0 uci/ml for unfiltered and undegassed reactor coolant water, and 0.60 uci/ml for degassed and evaporated reactor coolant water. Both activities are for beta and gamma radiation.

The current value of optical transmissibility for incandescent light is 4.0 nephlos or 1.5 Jackson candle units.

The current value for total suspended solids (T.S.S.) is 0.63 ppm at current load conditions. This is equivalent to 6.3×10^{-5} percent of the coolant water. Greater than 90 percent of the colloidially suspended solids are ferric oxides.

The suspended solids are essentially opaque to light transmission. The current value of optical transmissibility for incandescent light has been measured to be 4.0 nephlos or 1.5 Jackson candle units. Our past experience has indicated that much debris and crud will be stired up by the filling of the reactor cavity, by the changing of coolant flow conditions and by the movement of fuel, thereby reducing the optical transmissibility.

Request No. 5:

Discuss quantitatively the probability of dropping loose objects into the reactor by doing a TV scan and by doing a boroscope scan. The experience of the industry to date must be considered.

Response:

The probability of dropping loose objects into the reactor vessel in the course of performing a TV or boroscope scan is a serious consideration. Records of industrial experience in this area are not readily available; however, the head of a boroscope was dropped into the Unit No. 1 reactor vessel several years ago while making an inspection of the reactor internals. Considerable effort was required to retrieve the boroscope head.

Request No. 6:

Discuss the most probable location of the loose-part in the lower plenum considering the low spots and considering MIMS triangulation data.

Response:

Results from the analysis of MIMS data reported at the NRC meeting on October 31st, 1977 in Washington were based upon the signals from two accelerometers mounted at the bottom of the reactor vessel. Therefore, no triangulation analysis of this data (taken during August 1977) is available for the discussion of the possible location of the loose-object at the bottom of the reactor vessel.

At the June 2nd 1977 NRC meeting held at Con Edison offices and in a letter from W. J. Cahill, Jr. to R. W. Reid dated November 29, 1976, we did provide the results of triangulation analysis of data taken during September 1976, using four accelerometers mounted at the bottom of the reactor vessel. The source location technique is described in the attachment, which was handed to the NRC Staff at the June 2nd meeting. It was our conclusion that a loose object was moving in a random manner and there was no clear indication from the data that the source was confined to any particular quadrant at the bottom of the vessel. The fact that the impacts were observed during pump transients and not during normal full flow condition indicates that the source was not wedged anywhere and it remained relatively stationary under normal operations. Generally, the most likely place for the object to be is the bottom of the reactor vessel.

Of the four accelerometers mounted at the bottom of the reactor vessel, two are permanently installed and two are part of a temporary installation. Whenever practical, in taking future recordings of MIMS data, one or both of the temporary channels will be utilized to enable triangulation analysis.

ATTACHMENT - SOURCE LOCATION BY TRIANGULATION ANALYSIS

INFORMATION SUPPLIED TO NRC STAFF AT JUNE 2, 1977 MEETING

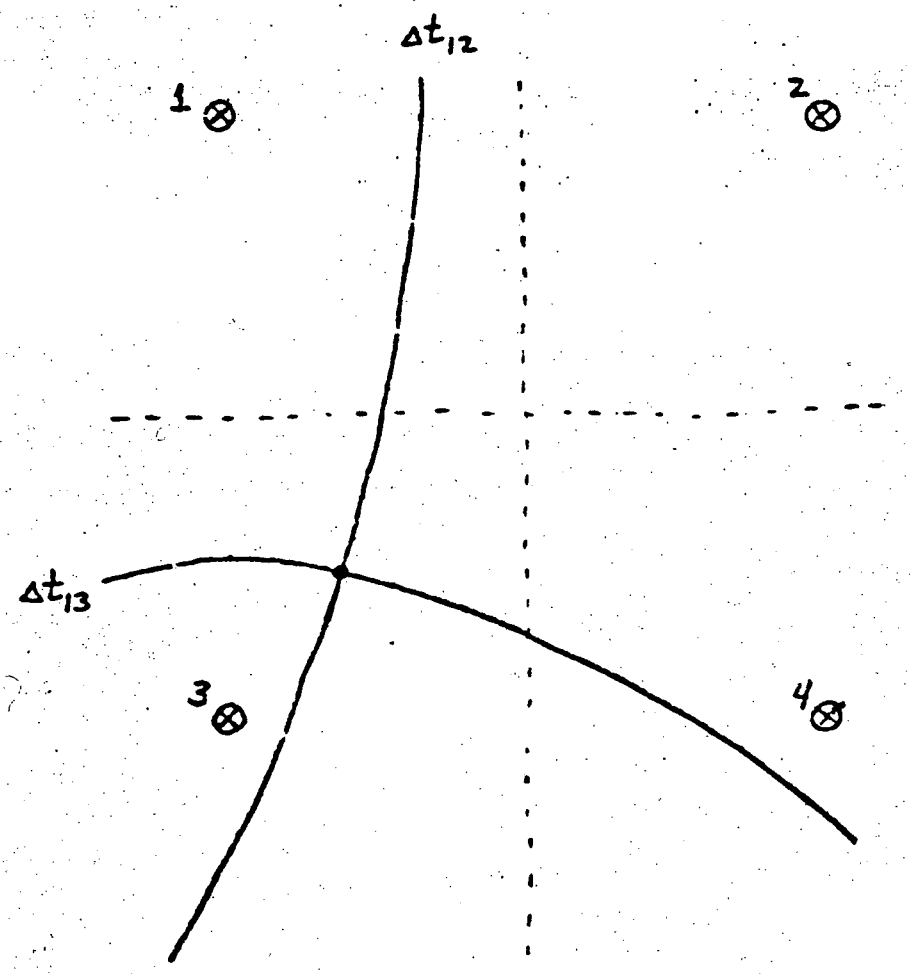
Source Location Technique

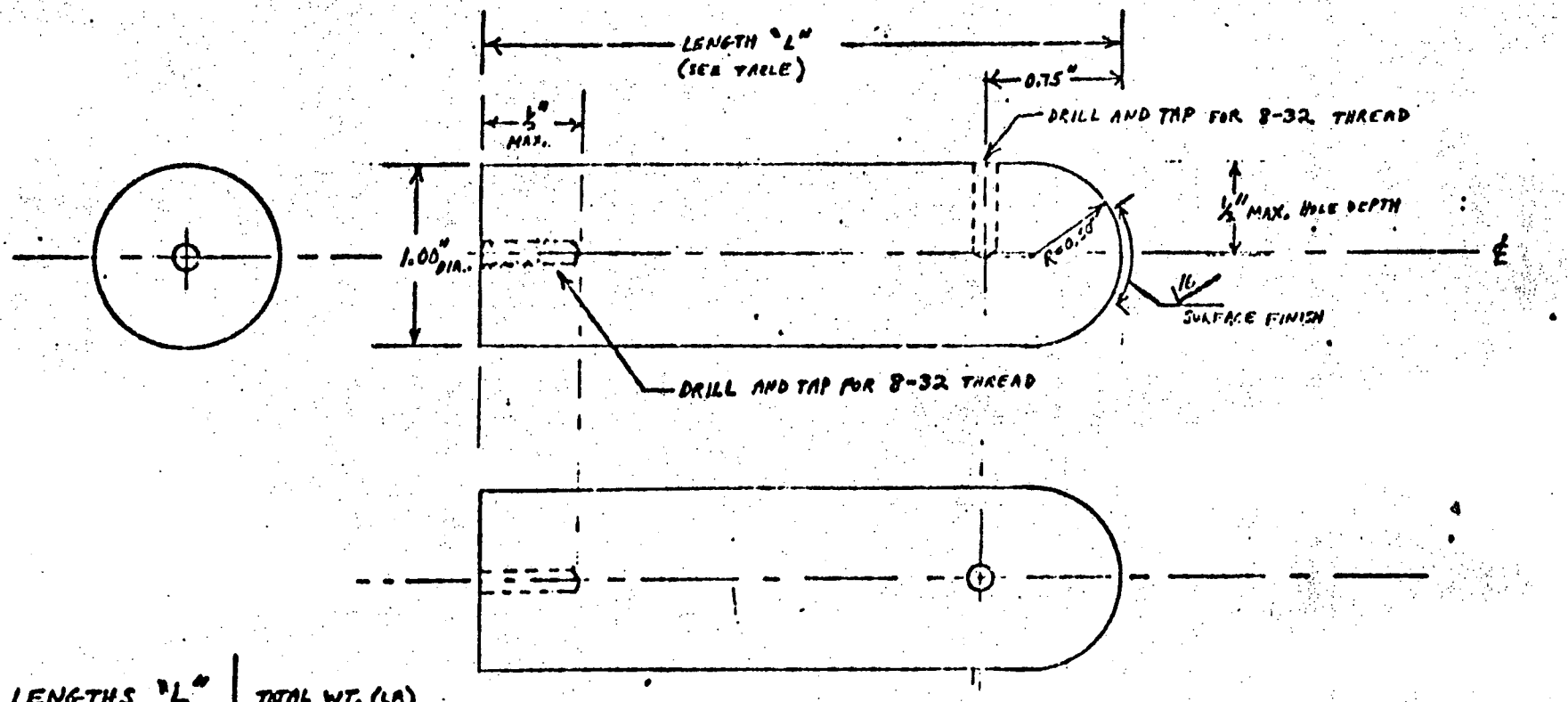
It is mathematically possible to calculate the source of a "disturbance" on a structure such as a metal impact or an acoustic emission, if:

1) 3 or more sensors detect the disturbance, and
2) the signal arrival-time differences can be measured accurately enough.

On IPP-2, a total of 4 accelerometers were attached in a 50"-square pattern. The velocity in thick steel for the type of wave detected was about 100,000 in/sec, or equivalently, 1 ft/100 μs. Arrival-time differences were therefore determined by tape play back at slow speed, with output signals recorded on a high-speed visicorder.

The source location process, known as "hyperbolic triangulation" when done on a plane surface, can be easily visualized graphically. A certain arrival-time difference between channel 1 and channel 2 determines a set of possible source locations defined by the hyperbola Δt_{12}. The arrival-time difference between channel 1 and channel 3 also defines a curve Δt_{13}. The intersection of the two curves is the calculated source location.





LENGTHS "L"	TOTAL WT. (LB)
13.65"	3.0
11.40"	2.5
9.16"	2.0
6.91"	1.5
4.66"	1.0
2.41"	0.5
1.29"	0.25

Figure A-1

METAL IMPACT DEVICE SCALE 1/1

MAT'L: 304 STAINLESS STEEL

QTY: 1 PIECE OF EACH LENGTH "L", 7 PCS. TOTAL

NOTE: SURFACE FINISH SPECIFICATION ON HEMISPHERICAL END

John R. Smith 12/10/75

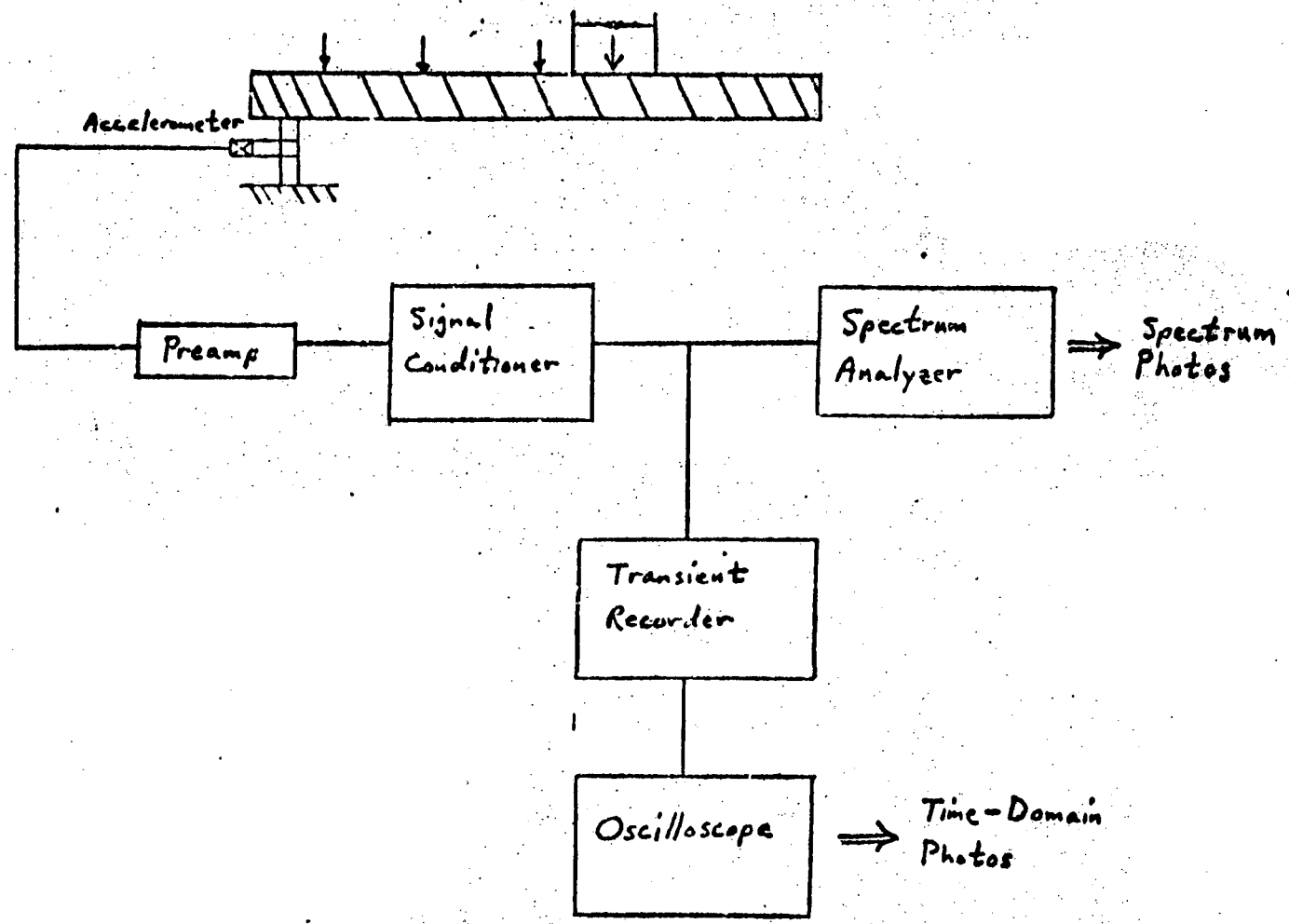


Figure A-2. Laboratory test apparatus.

SKETCH SHEET
FORM 28577

Request No. 7:

Develop and describe a scanning program which will cover sufficient area to have a high probability of locating the loose object.

Response:

We have developed two alternative programs for locating the presumed loose part in the IP-2 pressure vessel. Both are impracticable, one because of a low probability of finding the part and almost zero probability of retreiving it; the other because of its high cost and high risk of serious damage to the reactor, albeit higher probability of finding and retrieving a loose part if it exists.

The alternative programs are:

I. Make a TV Search Without Removing the Reactor Lower Internals-

If the reactor contains a loose object it probably is lodged within the space below the core support dome, the lowest of three perforated diaphragms below the core. This region contains a forest of 96 support columns, 25 instrumentation thimbles, and four energy absorbing devices. If the entire core were discharged to the fuel storage pool (as was done at Turkey Point for their TV search) approximately 97 of the 193 core lattice positions will grant passage to the bottom for minature TV cameras and lights which are about 1 1/4 inches diameter. At the expense of one to two weeks of very taxing effort, we should be able to observe about half of the bottom of the reactor vessel.

Without removing the lower internals, we would assign a probability of finding a foreign object at about 40%. We suppose that the probability of identifying anything we find may be 30% so that the combined probability of finding and identifying an object may be 12%. The chances of retrieving any object through the 1 3/4 inch windows to the bottom are vanishingly small.

This program will incur the expense of several millions of dollars in down time. In addition, the discharge and subsequent loading of the entire core, or even a substantial fraction of it, exposes the fuel to risk of damage in handling; it exposes the overall operation to added risk of delay from equipment failure, and it introduces a rather high risk of losing something inside the reactor vessel. Snaking lights and cameras through small openings while supported by their electric cables invites trouble.

We look on this alternative approach as having too small a probability of success at the expense of perhaps $5 million and some risk of accident.

II. Remove the Reactor Lower Internals-

If the entire core were discharged and the lower internals assembly removed, we could use our full size TV cameras and powerful lights to search the entire lower region of the reactor pressure vessel. This would give a greater probability of finding and retrieving a loose part if it exists.

However, compared with the other alternative program, this would result in additional down time of perhaps several weeks at a minimum, costing perhaps $10 million, and would expose the lower internals to grave risk. We might damage the internals or, more likely, we might find it very difficult to reinstall the assembly because of initial close tolerances and dimensional changes since startup. Lacking a support stand for the lower internals, it would be necessary to suspend the assembly from the polar crane throughout the program, which represents a misuse of a crane, introduces some risk and denies use of the crane for other work.

Request No. 8:

If the scanning program is not planned for the next refueling shutdown, provide the date which it would be done and justification for the delay.

Response:

It is our intention to identify and probably retrieve the loose object during the 10 year reactor vessel inspection. This is presently expected to occur during a refueling outage in about 1984. We feel this is a reasonable approach because of the following:

a) Nuclear noise measurements have demonstrated that no abnormal core barrel motion exists.

b) Incore flux maps continue to demonstrate that no core anomalies exist (see response to Request No. 1).

c) MIMS data analysis has demonstrated that there are no significant differences in the behavior of the loose object from that noted after the last refueling outage.

d) The MIMS provides continuous monitoring of conditions within the reactor coolant system and any significant changes observed will be evaluated.

e) In the vessel bottom, there are four barriers that would hinder the object from reaching the core. These are the lower support casting, the flow distribution plate, the lower core plate and the lower nozzle plate. Each of these do have flow holes which provide partial access, however, the holes in the four plates do not all line directly up. Therefore, there is a very small projected area through which the object could flow directly from the vessel bottom to the core area. Considering these barriers, it is highly unlikely that the object will get to the core region. Should it get to this core region, however, it has been determined, based on conservatively large estimates of the size of the loose object, that the largest flow blockage that could occur would be less than 10 percent of the nominal flow to one fuel assembly. This will not affect core thermal performance. Tests performed by Westinghouse have shown that even in the case of 100 percent blockage of flow to an assembly, the flow completely recovers 30 inches downstream of the blockage and there is no significant effect on the subchannel coolant flow and enthalpy rise. Since the blockage would occur at the bottom portion of the core where the local power is small, there is even less effect on the Minimum Departure from Nucleate Boiling Ratio (MDNBR). The MDNBR in the fuel usually occurs above the core midplane.

Since the control rod thimbles are not opened at the bottom(there are only small side flow holes at the thimble wall), there cannot be any impairment of rod motion due to the loose object.