FRACTIONATION RESEARCH, INC.

Topical Report No. 170

REPORTS OF TESTS
TEST OF RASCHIG SUPER-RING® No. 0.7

(Released to Raschig GmbH as They See Fit)

by

July 31, 2008

TABLE OF CONTENTS

REPORTS OF TESTS

Raschig Super-Rings® No. 0.7
(Released to Raschig GmbH as They See Fit)

SUMMARY

Raschig-Super Ring® No. 0.7 (RSR No. 0.7), a random packing designed and manufactured by Raschig GmbH, has been tested in the 4 foot (1.22 m) section of the FRI low pressure distillation column with a 10 foot (3.05 m) bed depth. The test was conducted with the cyclohexane/n-heptane system at 4.5 and 23.5 psia (0.31 and 1.62 bar) and the o/p xylene system at 14.7 psia (1.0 bar). The installation and portions of the tests were observed and approved by Raschig GmbH representative.

INTRODUCTION

The RSR No. 0.7 was selected by the FRI membership as 2006 Category 1 packing test[(1)]. The test was conducted under the Proprietary Device Test Procedures amended at the November 2003 TAC meeting [(2)].

The packing was tested for capacity, efficiency, and pressure drop using the C_6/C_7 system at 4.5 and 23.5 psia (0.31 and 1.62 bar) column pressures, and the o/p xylene at 14.7 psia (1.0 bar). The gamma scan system was used to measure the liquid holdup inside the packed bed.

DESCRIPTION OF EQUIPMENT

Packing - RSR No. 0.7 is a wavy shaped proprietary random packing. Raschig reports that the packing has a specific area of 53.3 ft^2/ft^3 (175 m^2/m^3) and a void fraction of 0.98, compared to those of 54.3 ft^2/ft^3 (178 m^2/m^3) and 0.97 measured by the FRI. A photograph of the packing is shown in **Figure 1.**

Liquid Distributors – Two DT-S liquid distributors, supplied by Raschig, were used for this test. The distributors are the trough type distributor with a pre-distributor as shown in **Figure 2**. They are identical except the size of the drip holes. There are 142 total drip holes for each distributor so the pour point density is 11.4 points/ft^2 (123 points/m^2). One distributor has a drip hole diameter of 4.3 mm, which was used for the operations with the C_6/C_7 system at 4.5 psia (0.31 bar). Another has a diameter of 5.9 mm for the operations with the C_6/C_7 system at 23.5 psia (1.62 bar) and the o/p xylene system at 14.7 psia (1.0 bar). All 142 drip holes are located 1-9/16 inch (40 mm) above the bottom of the trough. Prior to the installation of distributors in the column, they were water tested outside the column. The water test results, in terms of the ratios of standard deviation to mean, are shown in **Figures 3-6**.

Figures 3 and **4** are the water test results for the distributor with 4.3 mm drip holes. **Figure 3** is the ratio of the standard deviation to the mean flow Cv in terms of the liquid head from the bottom of the trough. And **Figure 4** is plotted vs. the total liquid rate flowing through the distributor. Except the very low head, or the low liquid rate, the distributor performs very well with the Cv's below the 5 percent as shown in **Figures 3** and **4**. Similar water test results were obtained for the distributor with 5.9 mm drip holes as shown in **Figures 5** and **6**. Also included in those figures are the water test results independently obtained by the Raschig before the distributors were shipped to FRI, which are very close to the FRI water test results.

Support Plate - The packing support plate for the tests was supplied by Raschig. It is a gas-injection type support plate.

Samplers – No in-bed sampler was used for this test. The below bed sampler used in this test is the FRI center-draw cross sampler. A description of the sampler and other details are given in Topical Report No. 129[3].

Gamma Ray Scanning Equipment - The gamma ray scanning equipment was the same as that described in the Topical Report No. 166[4].

INSTALLATION OF EQUIPMENT

Figure 7 shows the column configuration, locating the vapor support plate, samplers, packed bed, thermowells, pressure taps, liquid distributor, and other equipment. No vapor distributor was used for this test. The packing support plate was installed 177 inch (4.50 m) above the column head-seam. A cross sampler was installed below the packing support plate to collect the sample of the liquid exiting the bottom of the packed bed. A thermowell was attached to the center of the cross sampler to measure the liquid temperature. A thermowell was installed at 1.5 inch (38.1 mm) below the top of the bed. No mid-bed sampler was installed for this test. A thermowell was installed in the middle of the packed bed. The packing was dry packed to a bed depth of 10 feet (3.05 m). Care was taken to pack the bed without any voids beneath the thermowell and around the support plate. The hold down device was a high open area steel grid placed on the top of the bed and held in place by two rods tack welded to the column wall. The Raschig DT-S distributor was installed 1-9/16 inch (40 mm) above the top of the packed bed. The distributor was suspended with four adjustable rods secured to brackets, carefully centered and leveled with water. The liquid composition of distributor was obtained with a brass tapping inserted in the pan floor and 3/8 inch (9.5 mm) copper withdrawal tubing. The distributor liquid temperature was measured using a thermowell located near the bottom of the DT-S.

Packing pressure drop was measured with three pressure transducers: one for the bottom half bed 0-61 inch (0-1.55 m), a second for the top half bed 61-120 inch (1.55-3.05 m), and a third for the overall bed 0-120 inch (0-3.05 m). All distances are measured from the bottom of the support plate. Pressure drops were also measured across the liquid distributor. A bubbler connected to a pressure transducer was installed in the liquid distributor to measure the liquid level. Each pressure transducer had its own independent leg and column connection. The legs were continuously purged with a constant flow of nitrogen. Installation of the equipment was witnessed and approved by a representative of Raschig. After finishing the tests, the packing and other equipment were unloaded and inspected. The packing did not appear damaged and no irregularities were found for all the equipment.

Gamma Ray - The calibration, operation, and calibration procedures were the same as those described in Topical Report No. 166[4]. Three different bed elevations were scanned: 15, 17 and 20 inches (381, 432 and 508 mm) from the bottom of the support plate. Each run which was scanned was measured at centerline, 10, and 20 inches (254 and 508 mm) off the centerline.

EXPERIMENTAL PROCEDURE

A process flow diagram of the FRI low pressure column as configured for this test is presented in **Figure 8**. The tests were performed with the C_6/C_7 system at 4.5 and 23.5 psia (0.31 and 1.62 bar) column pressures, followed by the o/p xylene at 14.7 psia (1.0 bar bar).

Standard FRI operating procedure is to establish the flood point, decrease operating loads to about 20 per cent of flood to unload the bed, and then run a total reflux efficiency series. A procedure similar to this was followed for most of the data taken. In addition to the total reflux runs, several series

of flood runs at L/V<1 were conducted. For each non total reflux run, the pressure drop data at the constant liquid rate were collected for all three tests systems.

The reflux heater was in the initial plan for all tests to heat the sub-cooled reflux to close to the bubble point. Unfortunately, water leakage was detected inside the reflux heater during the test with the C_6/C_7 system at 4.5 psia (0.31 bar). Efforts were made to fix the reflux heater but without success. Therefore, the reflux heater was not used for the remaining tests. Several conditions with the service of the reflux heater were repeated without using the reflux heater, and the data were compared. The comparison did not show any significant effect of the sub-cooled reflux on the packing performance.

RESULTS

Summary of the Test Results

Results of the RSR No. 0.7 including the gamma scan are presented in Tables I to III. A summary of the run conditions is listed as follows:

Run No.	System	Pressure psia (bar)	Table No.	Run Type
22629-22642	C_6/C_7	4.5 (0.31)	I	Total Reflux
22655-22672	C_6/C_7	4.5 (0.31)	I	Total Reflux
22673-22676	C_6/C_7	4.5 (0.31)	I	L/V<1 Flood
22677-22698	C_6/C_7	4.5 (0.31)	I	L/V<1
22699-22726	C_6/C_7	23.5 (1.62)	II	Total Reflux
22727-22732	C_6/C_7	23.5 (1.62)	II	L/V<1 Flood
22733-22754	C_6/C_7	23.5 (1.62)	II	L/V
22755-22784	o/p xylene	14.7 (1.0)	III	Total Reflux
22785-22790	o/p xylene	14.7 (1.0)	III	L/V<1 Flood
22791-22815	o/p xylene	14.7 (1.0)	III	L/V

This test was video recorded through the observation windows located between the liquid distributor and the top of the packed bed. The video presentation titled " RSR No. 0.7 Tests" includes this recording as well as the distributor water test and the installation. A copy of this videotape is available to the membership on request.

Notes on the Results

In the RSR No. 0.7 test, for all total reflux runs, the below bed C_6 compositions were adjusted so the mid-bed C_6 compositions were around 50% unless specified otherwise.

NOMENCLATURE

C_6	cyclo-hexane
C_7	normal-heptane
C_s	Capacity factor, $u_s(\rho_v/(\rho_L-\rho_v))^{0.5}$, ft/s (m/s)
F_s	Superficial F Factor, $u_s(\rho_v)^{0.5}$, ft/s$(lb/ft^3)^{0.5}$ (m/s$(kg/m^3)^{0.5}$)
HETP	Height equivalent to a theoretical plate, inches (mm)
o/p	ortho/para
u_s	Superficial vapor velocity based on column cross sectional area 12.44 ft^2 (1.16 m^2), ft/s (m/s)
ρ_L	Liquid density, lb/ft^3 (kg/m^3)
ρ_v	Vapor density, lb/ft^3 (kg/m^3)

ABBREVIATIONS

Dist	Distributor
DP	Bed pressure drop
DT-S	DT-S distributor supplied by Raschig
FL	Non-total reflux flood runs
FT	Total reflux flood runs
OHP	Overhead runs (L/V<1)
TF	Top Feed runs (L/V>1)
TR	Total reflux efficiency runs

CONVERSION FACTORS

Parameter	**US Engineering Units**	**x**	**Multiplying Factor**	**=**	**SI Units**
Area	ft^2		0.0929		m^2
Capacity Factor C_s	ft/s		0.3048		m/s
Density	lb/ft^3		16.019		kg/m^3
Duties	M Btu/h		0.2929		MW
Length	ft		0.3048		m
Height	inch		25.4		mm
Liquid flow rate	gpm		0.2271		m^3/h
Liquid flux	gpm/ft^2		2.4448		$m^3/h.m^2$
Mass flow rate	k lb/h		0.126		kg/s
Pressure	psia		0.06895		bar
Pressure drop	inch H_2O/ft		8.167		mbar/m
Superficial F-factor Fs	$ft/s(lb/ft^3)^{0.5}$		1.22		$m/s(kg/m^3)^{0.5}$
Temperature	^oF		(^oF-32)/1.8		^oC

REFERENCES

1. Minute of FRI Technical Advisory Committee Meeting, November, 2005
2. Minute of FRI Technical Advisory Committee Meeting, November, 2003
3. FRI Topical Report 129
4. FRI Topical Report 166

Figure 1. Raschig Super-Ring No. 0.7

Figure 2. Raschig DT-S Liquid Distributor

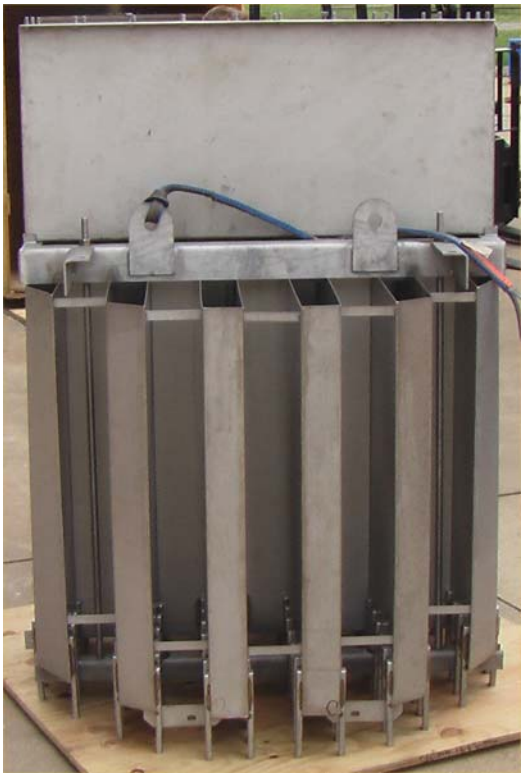

Figure 3. Raschig Liquid Distributor 4.3 mm Water Test Results

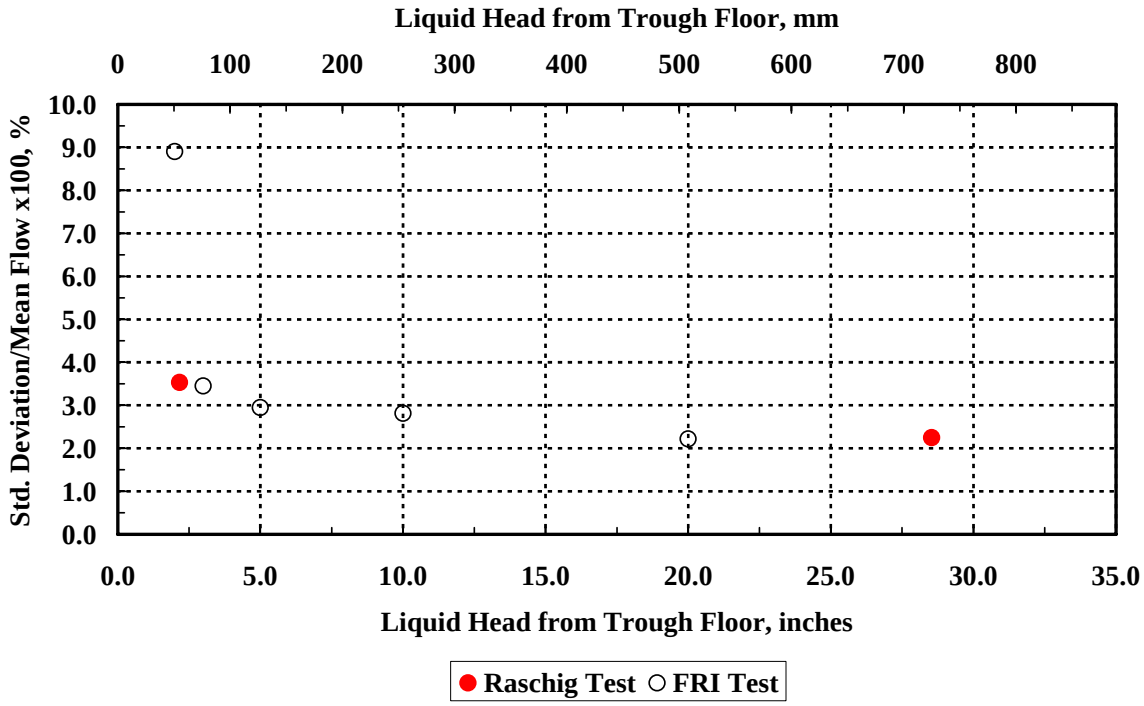

Figure 4. Raschig Liquid Distributor 4.3 mm Water Test Results

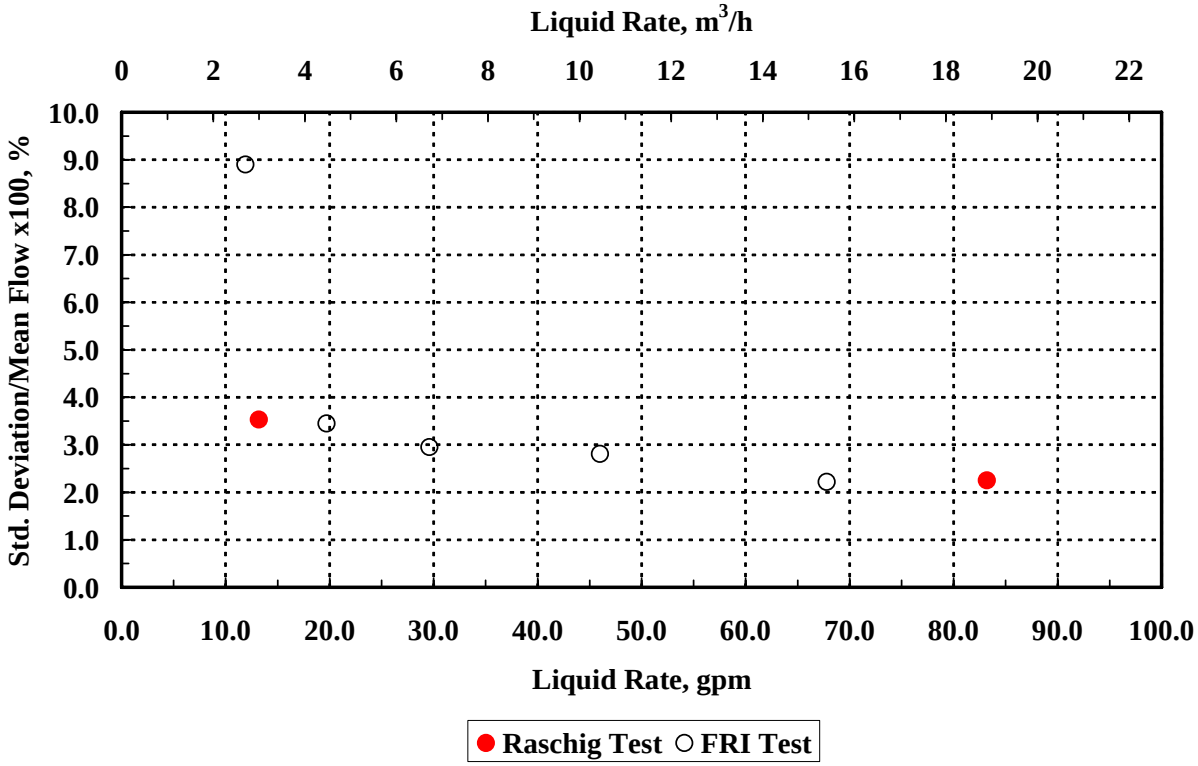

Figure 5. Raschig Liquid Distributor 5.9 mm Water Test Results

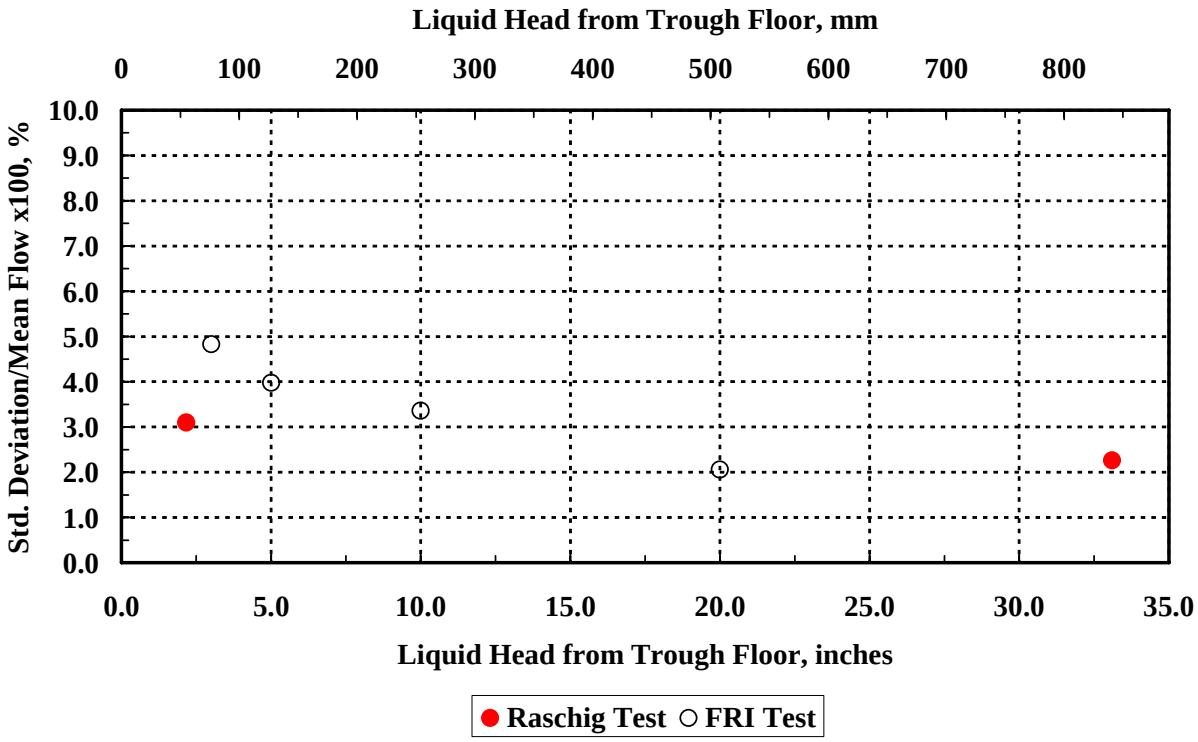

Figure 6. Raschig Liquid Distributor 5.9 mm Water Test Results

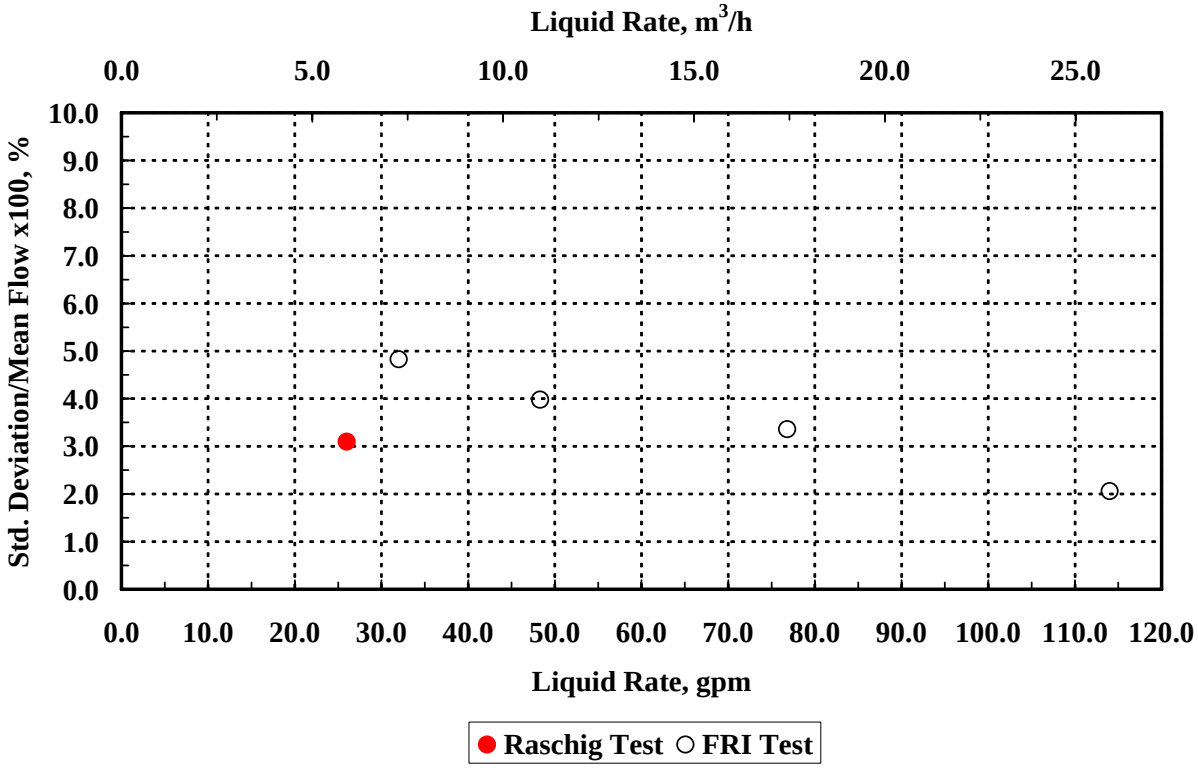

Figure 7. Column Configuration for the RSR #0.7 Test

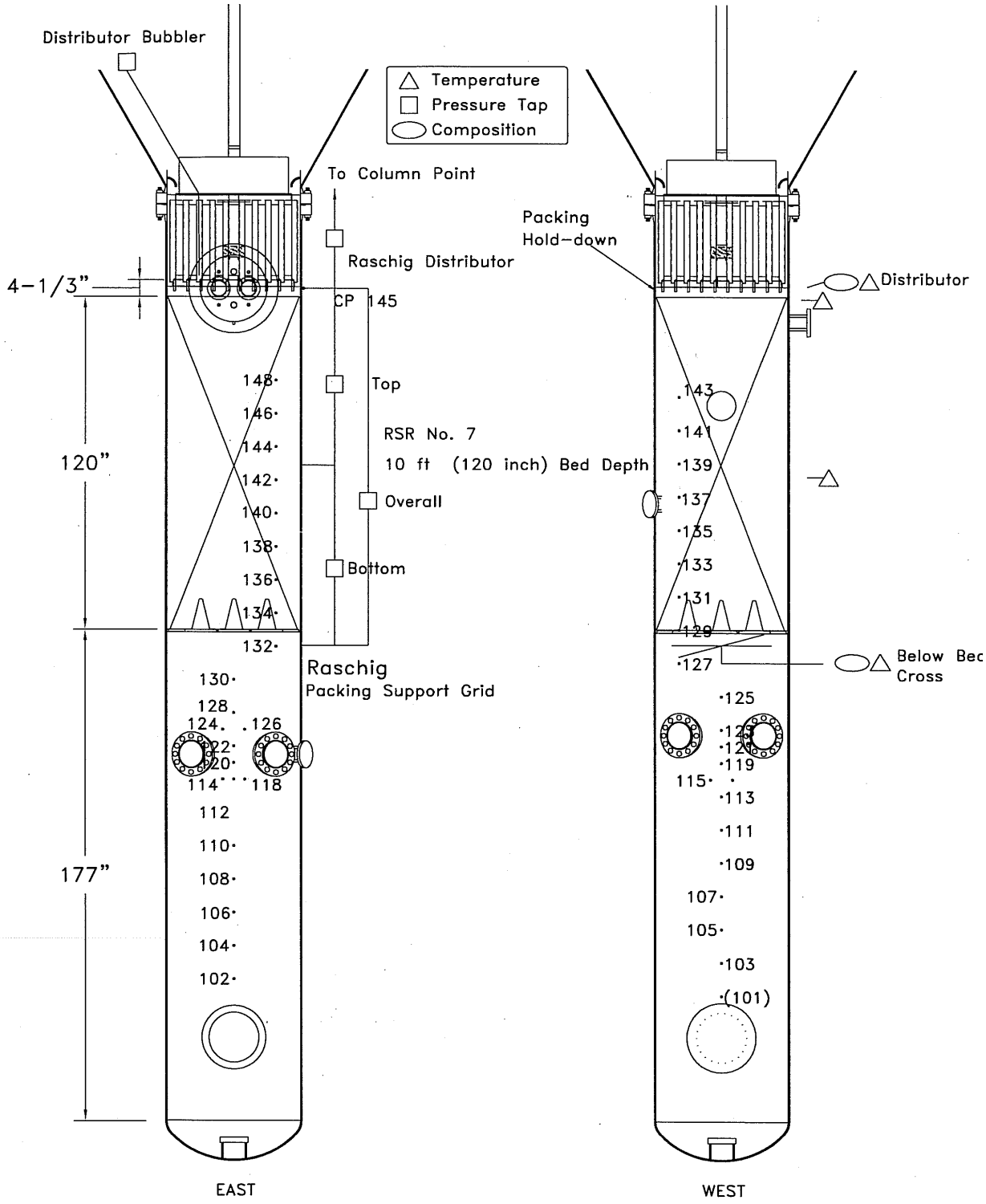

Figure 8. Process Flow Diagram for RSR No. 0.7 Test

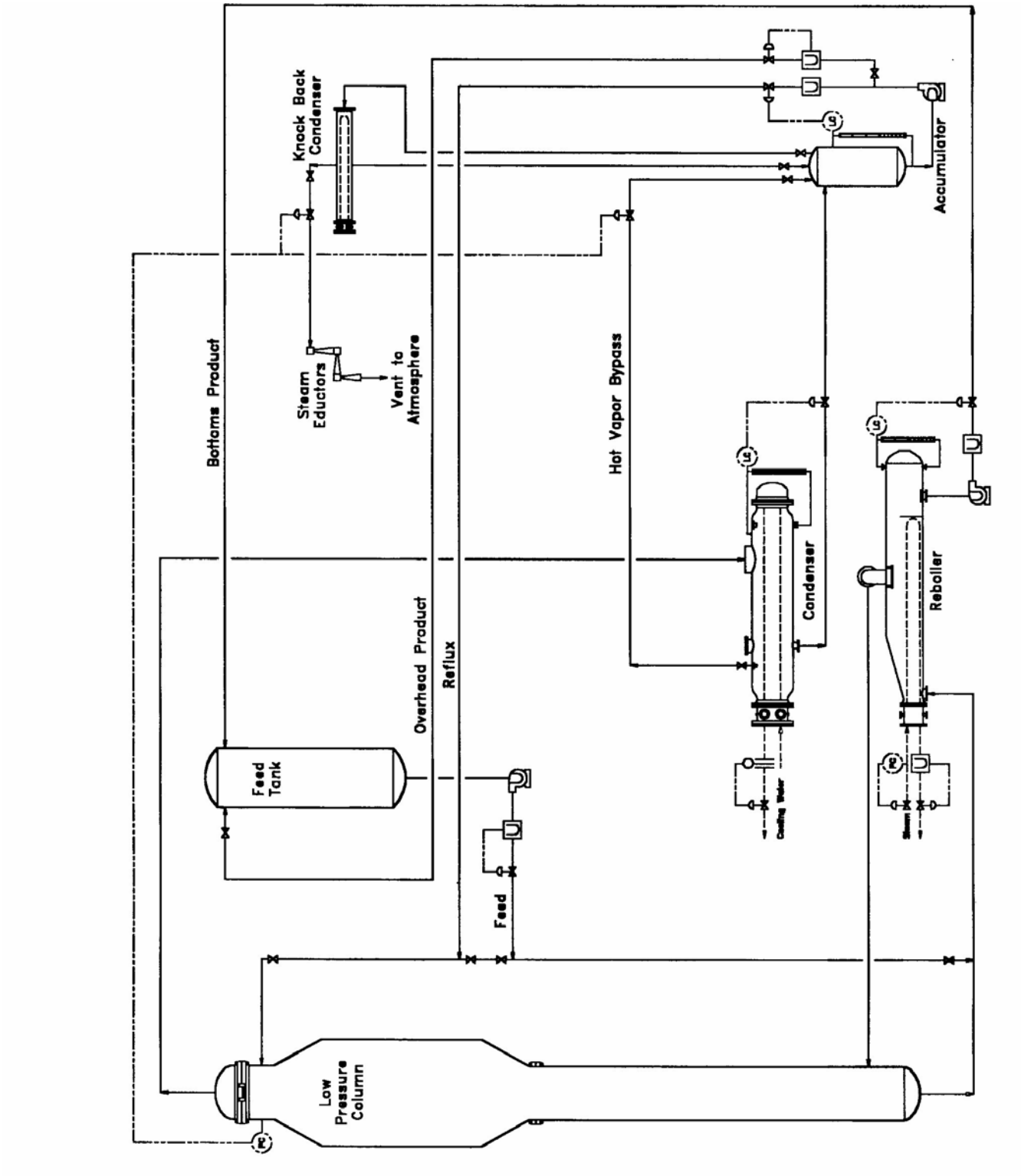

Table I (US Engineering Units)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 4.5 psia

Run Number		22632	22631	22641	22642	22633	22634
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	psia	4.48	4.50	4.46	4.43	4.48	4.48
Reboiler Duty	M Btu/h	1.30	1.32	1.28	1.29	1.61	1.68
Condenser Duty	M Btu/h	1.30	1.32	1.07	1.08	1.56	1.58
Reflux Rate	k lb/h	8.8	9.0	8.2	8.2	10.5	10.8
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.0	30.0	30.0	30.0	30.0	30.0
Pressure Drops:							
Overall	in H_2O / ft	0.04	0.04	0.04	0.04	0.07	0.07
Top	in H_2O / ft	0.05	0.05	0.04	0.04	0.06	0.07
Bottom	in H_2O / ft	0.04	0.04	0.03	0.03	0.06	0.06
Dist. Pressure Drop	in H_2O	0.03	0.03	0.03	0.03	0.03	0.03
Bed Liquid Volume Fraction							
From Gamma Scan				0.03		0.03	
Temperature Profiles	^oF						
LP Column Overhead Vapor		116.3	116.5	119.2	118.8	118.8	118.8
Reflux		112.5	112.8	110.5	110.0	109.4	109.3
Distributor		112.6	113.0	113.1	112.6	111.9	111.8
Top Bed		115.5	115.7	117.3	117.0	117.0	117.0
Mid Bed		119.2	119.5	129.6	129.0	126.9	127.3
Below Bed		128.1	128.4	139.9	139.5	139.7	139.9
Composition of Liquid	Mol % C_6						
Reflux		97.08	97.10	90.24	90.56	91.51	91.36
Distributor		97.10	91.30	89.83	89.83	91.04	91.23
Below Bed		50.64	49.88	12.21	13.16	14.90	14.07
Bottoms		30.09	30.29	6.28	6.35	7.70	7.66
Feed		29.84	29.96	6.05	6.04	7.42	7.30
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % C_6	50.64	49.88	12.21	13.16	14.90	14.07
Temperature	^oF	128.1	128.4	139.9	139.5	139.7	139.9
Liquid Density	lb/ft^3	43.4	43.3	41.0	41.1	41.2	41.1
Vapor Density	lb/ft^3	0.072	0.073	0.074	0.074	0.075	0.075
Vapor Rate	k lb/h	8.4	8.5	8.6	8.6	10.8	11.2
Liquid Rate	gpm	24.1	24.5	26.1	26.2	32.8	34.1
Capacity Factor, Cs	ft/s	0.106	0.107	0.111	0.111	0.138	0.143
Hetp 2 pt	inch						
DIST & below bed		20.8	31.0	17.7	18.0	18.0	17.6
DIST & bottoms		19.3	28.3	17.2	17.2	17.4	17.3
Relative Volatility		1.861	1.861	1.875	1.876	1.872	1.873
Capacity Factor, Cs Top	ft/s	0.104	0.106	0.102	0.103	0.129	0.134
Capacity Factor, Cs mid	ft/s	0.104	0.106	0.104	0.104	0.130	0.135

Table I (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 4.5 psia

Run Number		22636	22635	22671	22656	22672	22655
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	psia	4.48	4.49	4.51	4.48	4.50	4.48
Reboiler Duty	M Btu/h	1.94	1.94	2.27	2.28	2.27	2.27
Condenser Duty	M Btu/h	1.90	1.86	2.40	2.18	2.30	2.17
Reflux Rate	k lb/h	12.7	12.6	14.8	14.3	14.9	14.3
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.0	30.0	30.1	29.1	30.1	29.2
Pressure Drops:							
Overall	in H_2O / ft	0.10	0.10	0.14	0.14	0.14	0.13
Top	in H_2O / ft	0.10	0.09	0.13	0.13	0.13	0.13
Bottom	in H_2O / ft	0.10	0.09	0.12	0.12	0.12	0.12
Dist. Pressure Drop	in H_2O	0.05	0.05	0.15	0.13	0.15	0.13
Bed Liquid Volume Fraction							
From Gamma Scan			0.03	0.04			
Temperature Profiles	^oF						
LP Column Overhead Vapor		118.8	118.8	120.0	119.3	120.1	119.3
Reflux		112.2	111.8	111.8	105.4	111.6	105.4
Distributor		113.1	113.0	114.1	109.9	114.0	109.9
Top Bed		117.0	117.0	118.0	117.3	118.0	117.3
Mid Bed		126.9	127.0	128.4	127.4	128.5	127.4
Below Bed		140.1	140.1	141.0	139.8	141.1	139.8
Composition of Liquid	Mol % C_6						
Reflux		91.05	90.94	89.45	90.69	89.39	90.65
Distributor		90.92	90.74	89.27	88.53	89.22	88.53
Below Bed		15.13	14.27	13.95	16.56	13.20	14.83
Bottoms		6.65	7.37	6.10	7.06	6.04	7.05
Feed		6.48	7.09	5.77	6.70	5.75	6.89
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % C_6	15.13	14.27	13.95	16.56	13.20	14.83
Temperature	^oF	140.1	140.1	141.0	139.8	141.1	139.8
Liquid Density	lb/ft^3	41.2	41.1	41.1	41.2	41.1	41.2
Vapor Density	lb/ft^3	0.076	0.075	0.076	0.076	0.076	0.075
Vapor Rate	k lb/h	13.0	13.0	15.2	15.3	15.3	15.2
Liquid Rate	gpm	39.5	39.5	46.2	46.1	46.3	46.2
Capacity Factor, Cs	ft/s	0.165	0.166	0.192	0.192	0.193	0.194
Hetp 2 pt	inch						
DIST & below bed		18.1	17.9	18.5	20.0	18.3	19.3
DIST & bottoms		16.9	17.4	17.2	18.3	17.2	18.3
Relative Volatility		1.871	1.872	1.869	1.870	1.869	1.872
Capacity Factor, Cs Top	ft/s	0.155	0.155	0.181	0.183	0.181	0.182
Capacity Factor, Cs mid	ft/s	0.156	0.157	0.182	0.184	0.182	0.184

Table I (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 4.5 psia

Run Number		22670	22638	22669	22657	22658	22637
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	psia	4.51	4.48	4.51	4.44	4.45	4.48
Reboiler Duty	M Btu/h	2.59	2.59	2.59	2.59	2.60	2.59
Condenser Duty	M Btu/h	2.67	2.65	2.74	2.42	2.40	2.65
Reflux Rate	k lb/h	16.7	16.8	16.6	16.1	16.1	16.7
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	29.9	29.9	29.7	28.9	29.0	30.0
Pressure Drops:							
Overall	in H_2O / ft	0.18	0.18	0.18	0.18	0.18	0.18
Top	in H_2O / ft	0.18	0.18	0.18	0.17	0.17	0.18
Bottom	in H_2O / ft	0.17	0.18	0.17	0.16	0.16	0.18
Dist. Pressure Drop	in H_2O	0.17	0.08	0.18	0.14	0.14	0.08
Bed Liquid Volume Fraction							
From Gamma Scan				0.04			0.04
Temperature Profiles	^oF						
LP Column Overhead Vapor		119.5	119.2	119.4	119.1	119.2	119.2
Reflux		111.2	112.6	111.0	105.1	105.1	112.7
Distributor		113.7	113.9	113.6	109.1	109.0	113.9
Top Bed		117.6	117.5	117.5	117.0	117.2	117.5
Mid Bed		128.5	129.6	128.4	128.2	128.2	129.4
Below Bed		140.6	141.1	140.5	140.0	140.1	141.1
Composition of Liquid	Mol % C_6						
Reflux		89.94	90.11	89.98	90.16	90.16	90.20
Distributor		89.54	89.98	89.54	90.18	89.95	90.36
Below Bed		15.11	14.16	14.96	15.77	15.61	12.21
Bottoms		6.35	5.63	6.35	6.38	6.40	5.68
Feed		6.09	5.47	6.11	6.04	6.05	5.47
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % C_6	15.11	14.16	14.96	15.77	15.61	12.21
Temperature	^oF	140.6	141.1	140.5	140.0	140.1	141.1
Liquid Density	lb/ft^3	41.2	41.1	41.2	41.2	41.2	41.0
Vapor Density	lb/ft^3	0.076	0.077	0.076	0.076	0.076	0.075
Vapor Rate	k lb/h	17.4	17.4	17.4	17.4	17.4	17.4
Liquid Rate	gpm	52.6	52.8	52.7	52.6	52.7	53.0
Capacity Factor, Cs	ft/s	0.219	0.219	0.220	0.220	0.220	0.222
Hetp 2 pt	inch						
DIST & below bed		18.9	18.3	18.8	18.8	18.8	17.4
DIST & bottoms		17.3	16.6	17.3	17.0	17.1	16.5
Relative Volatility		1.869	1.868	1.869	1.870	1.870	1.871
Capacity Factor, Cs Top	ft/s	0.207	0.207	0.207	0.208	0.208	0.207
Capacity Factor, Cs mid	ft/s	0.208	0.208	0.208	0.209	0.209	0.208

Table I (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 4.5 psia

Run Number		22639	22640	22659	22660	22661	22662	22664
Run Type		TR	TR	TR	TR	TR	TR	TR
Column Pressure	psia	4.49	4.50	4.50	4.51	4.50	4.51	4.50
Reboiler Duty	M Btu/h	2.91	2.91	3.23	3.23	3.56	3.56	3.88
Condenser Duty	M Btu/h	2.94	2.90	3.10	3.18	3.49	3.48	3.77
Reflux Rate	k lb/h	18.7	18.6	20.0	20.0	22.1	22.0	23.8
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.0	29.9	29.7	29.9	30.4	30.5	29.9
Pressure Drops:								
Overall	in H_2O / ft	0.24	0.23	0.30	0.30	0.40	0.40	0.56
Top	in H_2O / ft	0.23	0.22	0.27	0.27	0.36	0.36	0.47
Bottom	in H_2O / ft	0.24	0.23	0.30	0.30	0.41	0.41	0.62
Dist. Pressure Drop	in H_2O	0.07	0.07	0.17	0.18	0.21	0.21	0.19
Bed Liquid Volume Fraction								
From Gamma Scan		0.04		0.05		0.06		
Temperature Profiles	^oF							
LP Column Overhead Vapor		120.0	120.2	121.6	119.7	119.3	119.3	118.2
Reflux		111.3	111.1	107.4	107.0	106.3	106.3	104.4
Distributor		114.0	114.0	111.3	110.7	110.0	109.9	108.0
Top Bed		118.5	118.6	119.4	117.8	117.6	117.6	116.9
Mid Bed		136.2	136.6	132.0	130.0	129.4	129.4	126.2
Below Bed		141.7	141.8	143.3	141.8	142.4	142.4	142.4
Composition of Liquid	Mol % C_6							
Reflux		89.07	88.87	89.56	89.57	90.68	90.57	93.99
Distributor		89.19	88.66	89.38	89.37	90.38	90.34	93.72
Below Bed		13.13	12.55	13.51	13.23	12.64	12.09	15.26
Bottoms		5.55	5.57	5.56	5.52	5.39	5.30	6.82
Feed		5.28	5.29	5.29	5.22	5.06	5.04	6.49
Conditions Below Bed (Based on Reboiler Duty)								
Composition	Mol % C_6	13.13	12.55	13.51	13.23	12.64	12.09	15.26
Temperature	^oF	141.7	141.8	143.3	141.8	142.4	142.4	142.4
Liquid Density	lb/ft^3	41.0	41.0	41.0	41.0	41.0	41.0	41.1
Vapor Density	lb/ft^3	0.077	0.077	0.079	0.077	0.077	0.077	0.079
Vapor Rate	k lb/h	19.6	19.6	21.8	21.8	24.0	24.0	26.1
Liquid Rate	gpm	59.5	59.6	66.2	66.1	72.9	73.0	79.1
Capacity Factor, Cs	ft/s	0.247	0.247	0.270	0.274	0.301	0.301	0.323
HETP 2 pt	inch							
DIST & below bed		18.2	18.3	18.2	18.2	17.5	17.3	16.4
DIST & bottoms		16.8	17.1	16.6	16.7	16.2	16.2	15.4
Relative Volatility		1.867	1.867	1.859	1.866	1.864	1.865	1.861
Capacity Factor, Cs Top	ft/s	0.231	0.231	0.254	0.258	0.283	0.283	0.308
Capacity Factor, Cs mid	ft/s	0.233	0.233	0.255	0.259	0.284	0.284	0.308

Table I (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 4.5 psia

Run Number		22663	22665	22666	22668	22667	22630	22629
Run Type		TR	TR	TR	TR	TR	FT	FT
Column Pressure	psia	4.50	4.51	4.51	4.51	4.49	4.49	4.49
Reboiler Duty	M Btu/h	3.88	4.20	4.19	4.40	4.40	4.35	4.35
Condenser Duty	M Btu/h	3.71	4.04	4.03	4.15	4.20	4.47	4.44
Reflux Rate	k lb/h	23.8	25.8	25.9	27.2	27.2	27.5	27.5
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.0	28.9	28.9	29.0	29.1	30.0	30.0
Pressure Drops:								
Overall	in H_2O / ft	0.56	1.38	1.38	1.50	1.50	1.42	1.43
Top	in H_2O / ft	0.47	1.56	1.55	1.74	1.74	1.58	1.59
Bottom	in H_2O / ft	0.61	1.17	1.17	1.23	1.23	1.23	1.23
Dist. Pressure Drop	in H_2O	0.19	0.34	0.34	1.07	1.11	0.37	0.47
Bed Liquid Volume Fraction								
From Gamma Scan		0.07	0.11			0.11		
Temperature Profiles	^oF							
LP Column Overhead Vapor		118.0	124.2	124.2	129.0	128.9	118.6	119.0
Reflux		104.1	105.2	105.2	106.3	106.2	105.3	105.3
Distributor		107.8	110.2	110.2	113.5	113.5	114.9	115.2
Top Bed		116.8	122.9	122.9	130.2	130.4	119.6	120.5
Mid Bed		126.3	140.2	140.1	134.5	134.7	136.8	136.9
Below Bed		142.2	143.9	143.8	141.2	141.0	133.5	132.6
Composition of Liquid	Mol % C_6							
Reflux		94.13	76.54	77.45	63.59	63.61	91.04	89.49
Distributor		93.75	77.48	77.07	61.71	61.98	90.35	91.80
Below Bed		15.49	25.89	25.06	33.15	32.81	44.51	42.26
Bottoms		6.88	10.57	10.41	17.96	18.08	26.47	27.40
Feed		6.51	10.12	10.04	17.98	17.99	26.81	27.81
Conditions Below Bed (Based on Reboiler Duty)								
Composition	Mol % C_6	15.49	25.89	25.06	33.15	32.81	44.51	42.26
Temperature	^oF	142.2	143.9	143.8	141.2	141.0	133.5	132.6
Liquid Density	lb/ft^3	41.1	41.6	41.5	42.0	42.0	42.8	42.8
Vapor Density	lb/ft^3	0.079	0.087	0.087	0.086	0.086	0.079	0.077
Vapor Rate	k lb/h	26.1	28.0	28.1	29.2	29.2	28.4	28.4
Liquid Rate	gpm	79.1	84.1	84.2	86.6	86.6	82.6	82.8
Capacity Factor, Cs	ft/s	0.324	0.329	0.331	0.343	0.344	0.346	0.351
HETP 2 pt	inch							
DIST & below bed		16.5	31.7	31.5	62.0	60.6	29.5	26.6
DIST & bottoms		15.4	26.2	26.3	52.6	52.5	27.3	26.1
Relative Volatility		1.861	1.840	1.841	1.839	1.841	1.851	1.858
Capacity Factor, Cs Top	ft/s	0.309	0.330	0.331	0.341	0.340	0.341	0.337
Capacity Factor, Cs mid	ft/s	0.309	0.326	0.327	0.340	0.341	0.342	0.342

Table I (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 4.5 psia

Run Number		22673	22674	22675	22676	22677	22678
Run Type		FL OHP	FL OHP	FL OHP	FL OHP	OHP	OHP
Column Pressure	psia	4.50	4.49	4.49	4.50	4.50	4.48
Reboiler Duty	M Btu/h	4.59	4.66	4.61	4.74	4.21	4.21
Condenser Duty	M Btu/h	4.40	4.65	4.49	4.58	4.05	4.00
Reflux Rate	k lb/h	23.48	20.97	18.20	15.28	24.08	21.49
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.00	30.05	30.00	41.99	41.99	42.03
Pressure Drops:							
Overall	in H_2O / ft	1.60	1.71	1.37	1.39	1.25	1.20
Top	in H_2O / ft	1.88	2.17	1.58	1.61	1.32	1.24
Bottom	in H_2O / ft	1.30	1.23	1.13	1.14	1.15	1.11
Dist. Pressure Drop	in H_2O	1.26	1.87	0.62	0.66	0.11	0.10
Bed Liquid Volume Fraction							
From Gamma Scan			0.10	0.10	0.09	0.10	
Temperature Profiles	^oF						
Reflux		109.67	112.15	111.43	110.14	108.99	108.42
Distributor		118.80	121.96	120.99	121.48	113.88	114.53
Top Bed		134.58	136.42	134.66	135.58	125.06	125.78
Mid Bed		139.07	141.50	140.87	140.68	141.50	141.93
Below Bed		142.59	143.73	142.73	142.41	143.95	143.83
Composition of Liquid	Mol % C_6						
Reflux		53.24	48.84	46.93	45.21	65.08	63.58
Distributor		78.39	46.70	44.08	42.69	59.89	63.97
Below Bed		26.12	22.47	21.47	21.45	15.56	14.91
Bottoms		18.21	19.67	20.35	22.31	15.02	14.53
Feed		24.35	28.14	30.34	30.31	19.49	19.87
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % C_6	26.12	22.47	21.47	21.45	15.56	14.91
Temperature	^oF	142.59	143.73	142.73	142.41	143.95	143.83
Liquid Density	lb/ft^3	41.61	41.40	41.38	41.39	41.07	41.04
Vapor Density	lb/ft^3	0.085	0.085	0.083	0.083	0.082	0.081
Vapor Rate	k lb/h	29.9	30.1	29.4	29.8	28.0	27.5
Liquid Rate	gpm	73.5	64.3	55.1	45.3	78.2	68.3
Capacity Factor, Cs	ft/s	0.355	0.358	0.354	0.360	0.342	0.338
L/V		0.82	0.71	0.62	0.51	0.92	0.82
OHP Flow		5.39	8.72	11.11	14.72	2.22	5.08
Capacity Factor, Cs Top	ft/s	0.324	0.351	0.351	0.355	0.338	0.332
Capacity Factor, Cs mid	ft/s	0.338	0.356	0.354	0.359	0.336	0.333

Table I (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 4.5 psia

Run Number		22679	22680	22681	22682	22683	22684
Run Type		OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	psia	4.48	4.50	4.50	4.48	4.49	4.49
Reboiler Duty	M Btu/h	3.89	3.56	3.24	3.57	3.90	4.22
Condenser Duty	M Btu/h	3.74	3.41	3.12	3.43	3.75	4.06
Reflux Rate	k lb/h	21.43	21.34	18.45	18.67	18.80	18.70
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	41.98	41.99	42.03	42.01	41.93	42.00
Pressure Drops:							
Overall	in H_2O / ft	0.60	0.40	0.30	0.40	0.55	0.82
Top	in H_2O / ft	0.52	0.37	0.28	0.38	0.51	0.73
Bottom	in H_2O / ft	0.64	0.41	0.30	0.40	0.56	0.88
Dist. Pressure Drop	in H_2O	0.08	0.06	0.05	0.07	0.08	0.10
Bed Liquid Volume Fraction							
From Gamma Scan				0.05	0.05	0.06	0.09
Temperature Profiles	^oF						
Reflux		108.96	108.04	110.44	110.77	110.86	109.70
Distributor		114.14	112.29	114.39	115.89	116.76	116.80
Top Bed		123.44	120.34	122.15	124.91	127.25	128.81
Mid Bed		139.93	136.42	138.28	139.33	139.80	140.20
Below Bed		142.91	143.12	142.02	141.11	141.05	141.63
Composition of Liquid	Mol % C_6						
Reflux		70.68	81.60	75.26	65.62	59.07	54.89
Distributor		64.12	81.04	76.46	69.55	62.53	57.48
Below Bed		12.48	9.09	11.04	13.29	15.40	16.91
Bottoms		11.64	7.05	10.50	14.37	16.85	18.36
Feed		15.78	8.61	13.52	19.11	22.84	25.16
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % C_6	12.48	9.09	11.04	13.29	15.40	16.91
Temperature	^oF	142.91	143.12	142.02	141.11	141.05	141.63
Liquid Density	lb/ft^3	40.96	40.80	40.93	41.06	41.15	41.21
Vapor Density	lb/ft^3	0.078	0.076	0.076	0.076	0.077	0.079
Vapor Rate	k lb/h	25.7	23.9	21.5	23.4	25.3	27.2
Liquid Rate	gpm	68.4	69.1	58.2	58.0	57.9	57.8
Capacity Factor, Cs	ft/s	0.322	0.303	0.273	0.296	0.317	0.337
L/V		0.87	0.95	0.89	0.82	0.76	0.70
OHP Flow		3.26	1.25	2.40	4.30	6.20	8.08
Capacity Factor, Cs Top	ft/s	0.315	0.284	0.258	0.281	0.304	0.327
Capacity Factor, Cs mid	ft/s	0.315	0.286	0.261	0.286	0.310	0.331

Table I (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 4.5 psia

Run Number		22685	22686	22687	22688	22689	22690	22691
Run Type		OHP	OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	psia	4.49	4.49	4.50	4.50	4.50	4.49	4.51
Reboiler Duty	M Btu/h	4.22	3.90	3.58	3.25	2.94	2.60	5.00
Condenser Duty	M Btu/h	4.03	3.68	3.41	3.11	2.91	2.64	4.83
Reflux Rate	k lb/h	15.89	15.62	15.54	15.49	15.65	15.34	11.51
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	42.02	41.98	42.02	42.01	41.98	41.98	42.03
Pressure Drops:								
Overall	in H_2O / ft	0.67	0.48	0.37	0.29	0.23	0.18	1.33
Top	in H_2O / ft	0.63	0.46	0.35	0.28	0.23	0.18	1.52
Bottom	in H_2O / ft	0.67	0.47	0.36	0.28	0.22	0.17	1.12
Dist. Pressure Drop	in H_2O	0.10	0.09	0.08	0.08	0.07	0.06	0.66
Bed Liquid Volume Fraction								
From Gamma Scan		0.06	0.05	0.05	0.05	0.04	0.04	0.09
Temperature Profiles	^oF							
Reflux		111.2	112.6	113.5	114.2	114.9	114.5	110.5
Distributor		119.3	119.5	119.3	118.9	118.4	117.2	125.3
Top Bed		131.1	130.0	128.9	127.4	124.9	121.7	136.6
Mid Bed		139.1	138.8	138.8	138.7	138.5	137.0	140.4
Below Bed		140.1	139.5	139.4	139.5	140.1	140.8	142.0
Composition of Liquid	Mol % C_6							
Reflux		48.74	50.89	53.71	57.62	64.71	74.92	41.31
Distributor		54.61	54.35	48.03	57.17	60.28	64.39	55.08
Below Bed		19.11	19.01	18.90	17.13	14.82	12.30	19.66
Bottoms		21.03	20.59	19.80	18.32	15.46	11.46	23.38
Feed		28.35	27.25	25.67	23.36	19.51	13.54	32.09
Conditions Below Bed (Based on Reboiler Duty)								
Composition	Mol % C_6	19.11	19.01	18.90	17.13	14.82	12.30	19.66
Temperature	^oF	140.13	139.53	139.41	139.55	140.08	140.85	142.04
Liquid Density	lb/ft^3	41.36	41.37	41.37	41.28	41.16	41.02	41.32
Vapor Density	lb/ft^3	0.078	0.077	0.077	0.076	0.075	0.075	0.081
Vapor Rate	k lb/h	26.9	25.0	23.1	21.1	19.3	17.2	30.9
Liquid Rate	gpm	47.5	47.2	47.4	47.3	47.9	47.3	32.4
Capacity Factor, Cs	ft/s	0.334	0.313	0.289	0.267	0.245	0.220	0.377
L/V		0.59	0.63	0.68	0.74	0.82	0.90	0.35
OHP Flow		11.11	9.30	7.34	5.46	3.50	1.68	20.11
Capacity Factor, Cs Top	ft/s	0.321	0.301	0.286	0.258	0.238	0.214	0.352
Capacity Factor, Cs mid	ft/s	0.328	0.307	0.288	0.262	0.241	0.214	0.365

Table I (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 4.5 psia

Run Number		22692	22693	22694	22695	22696	22697	22698
Run Type		OHP	OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	psia	4.51	4.49	4.51	4.49	4.51	4.50	4.48
Reboiler Duty	M Btu/h	4.23	3.91	3.58	3.26	2.93	2.60	1.95
Condenser Duty	M Btu/h	4.03	3.74	3.41	3.10	2.76	2.44	1.84
Reflux Rate	k lb/h	11.30	11.38	11.33	11.21	11.06	10.89	10.70
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	41.99	41.99	42.01	42.00	42.05	42.02	42.06
Pressure Drops:								
Overall	in H_2O / ft	0.54	0.43	0.34	0.27	0.21	0.17	0.10
Top	in H_2O / ft	0.52	0.42	0.33	0.26	0.21	0.16	0.10
Bottom	in H_2O / ft	0.52	0.41	0.32	0.25	0.20	0.15	0.08
Dist. Pressure Drop	in H_2O	0.10	0.09	0.08	0.06	0.05	0.04	0.02
Bed Liquid Volume Fraction								
From Gamma Scan		0.05	0.04	0.04	0.04	0.04	0.03	0.03
Temperature Profiles	^oF							
Reflux		112.3	113.9	113.9	114.0	114.0	113.3	111.7
Distributor		122.0	122.2	121.8	121.3	121.0	120.1	117.3
Top Bed		133.5	132.5	131.9	130.8	130.1	129.0	124.7
Mid Bed		138.4	138.1	138.0	137.6	137.9	138.0	137.5
Below Bed		139.1	138.6	138.4	137.9	138.2	138.3	138.9
Composition of Liquid	Mol % C_6							
Reflux		42.97	44.43	45.47	47.10	49.51	52.60	64.20
Distributor		39.28	40.24	44.07	45.89	47.99	51.83	63.28
Below Bed		21.52	21.34	21.10	20.91	20.51	19.94	16.71
Bottoms		23.03	22.92	22.76	22.41	21.85	20.96	17.17
Feed		30.56	29.81	29.24	28.29	27.54	25.64	19.70
Conditions Below Bed (Based on Reboiler Duty)								
Composition	Mol % C_6	21.52	21.34	21.10	20.91	20.51	19.94	16.71
Temperature	^oF	139.11	138.60	138.35	137.89	138.16	138.28	138.92
Liquid Density	lb/ft^3	41.50	41.51	41.51	41.51	41.48	41.45	41.28
Vapor Density	lb/ft^3	0.078	0.077	0.076	0.076	0.076	0.076	0.075
Vapor Rate	k lb/h	26.4	24.6	22.6	20.7	18.7	16.7	12.8
Liquid Rate	gpm	31.9	32.0	32.0	31.9	31.6	31.4	31.4
Capacity Factor, Cs	ft/s	0.329	0.307	0.284	0.260	0.235	0.210	0.162
L/V		0.40	0.43	0.47	0.51	0.56	0.63	0.81
OHP Flow		15.78	13.91	11.95	10.02	8.16	6.23	2.36
Capacity Factor, Cs Top	ft/s	0.327	0.306	0.280	0.257	0.232	0.206	0.157
Capacity Factor, Cs mid	ft/s	0.330	0.310	0.284	0.261	0.235	0.210	0.160

Table II (US Engineering Units)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 23.5 psia

Run Number		22702	22701	22708	22707	22709	22710
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	psia	23.5	23.5	23.5	23.5	23.4	23.4
Reboiler Duty	M Btu/h	2.08	2.08	2.65	2.65	3.27	3.26
Condenser Duty	M Btu/h	1.73	1.72	2.38	2.38	2.58	2.54
Reflux Rate	k lb/h	11.6	11.5	15.6	15.6	17.4	17.4
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.0	30.0	30.0	30.0	30.0	30.0
Pressure Drops:							
Overall	in H_2O / ft	0.04	0.04	0.06	0.06	0.08	0.08
Top	in H_2O / ft	0.03	0.03	0.05	0.05	0.07	0.07
Bottom	in H_2O / ft	0.02	0.02	0.03	0.03	0.05	0.05
Dist. Pressure Drop	in H_2O	0.00	0.00	0.15	0.16	0.15	0.15
Bed Liquid Volume Fraction							
From Gamma Scan			0.02		0.03	0.03	
Temperature Profiles	^oF						
LP Column Overhead Vapor		215.8	215.8	216.3	216.3	216.7	216.7
Reflux		158.9	158.3	165.8	166.0	155.7	157.2
Distributor		182.5	182.3	183.5	183.4	176.4	177.1
Top Bed		211.4	211.3	211.4	211.3	211.2	211.2
Mid Bed		224.7	224.7	224.8	224.8	224.9	225.0
Below Bed		236.3	236.2	236.5	236.4	236.3	236.3
Composition of Liquid	Mol % C_6						
Reflux		81.66	81.87	80.11	80.09	78.66	78.69
Distributor		81.68	81.85	79.97	80.06	78.66	78.74
Below Bed		9.50	9.77	9.20	9.08	9.58	8.78
Bottoms		5.18	5.27	4.67	4.69	4.67	4.71
Feed		5.09	5.09	4.59	4.62	4.89	4.65
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % C_6	9.50	9.77	9.20	9.08	9.58	8.78
Temperature	^oF	236.3	236.2	236.5	236.4	236.3	236.3
Liquid Density	lb/ft^3	37.7	37.7	37.6	37.6	37.7	37.6
Vapor Density	lb/ft^3	0.341	0.341	0.342	0.341	0.342	0.340
Vapor Rate	k lb/h	15.4	15.4	19.8	19.9	23.8	23.7
Liquid Rate	gpm	50.8	50.8	65.7	65.8	78.7	78.6
Capacity Factor, Cs	ft/s	0.096	0.096	0.124	0.124	0.149	0.149
HETP 2 pt	inch						
DIST & below bed		14.3	14.3	14.6	14.5	15.1	14.7
DIST & bottoms		13.5	13.5	13.5	13.5	13.8	13.8
Relative Volatility		1.563	1.564	1.563	1.563	1.563	1.564
Capacity Factor, Cs Top	ft/s	0.088	0.088	0.114	0.114	0.137	0.137
Capacity Factor, Cs mid	ft/s	0.090	0.091	0.117	0.117	0.141	0.141

Table II (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 23.5 psia

Run Number		22704	22703	22712	22711	22714	22713
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	psia	23.5	23.5	23.5	23.5	23.5	23.5
Reboiler Duty	M Btu/h	3.84	3.85	4.12	4.16	4.74	4.74
Condenser Duty	M Btu/h	3.44	3.42	3.49	3.42	4.10	4.14
Reflux Rate	k lb/h	21.6	21.5	23.8	23.6	27.5	27.8
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.0	30.0	30.0	30.0	30.0	30.0
Pressure Drops:							
Overall	in H_2O / ft	0.12	0.12	0.13	0.13	0.18	0.18
Top	in H_2O / ft	0.11	0.11	0.11	0.11	0.16	0.16
Bottom	in H_2O / ft	0.10	0.10	0.11	0.12	0.17	0.17
Dist. Pressure Drop	in H_2O	0.17	0.18	0.17	0.17	0.17	0.17
Bed Liquid Volume Fraction							
From Gamma Scan			0.04		0.04		0.05
Temperature Profiles	^oF						
LP Column Overhead Vapor		217.0	216.9	217.9	217.8	218.2	218.2
Reflux		160.2	159.6	180.7	178.8	179.8	180.4
Distributor		177.4	177.0	189.3	188.0	187.6	188.0
Top Bed		211.5	211.4	213.0	212.9	212.9	212.9
Mid Bed		226.0	225.9	227.6	227.7	227.7	227.8
Below Bed		236.4	236.4	237.0	236.9	236.9	236.9
Composition of Liquid	Mol % C_6						
Reflux		77.85	78.12	76.71	76.80	75.62	75.27
Distributor		77.95	78.22	76.77	76.66	75.61	75.44
Below Bed		9.70	9.50	8.06	8.39	8.27	8.02
Bottoms		4.84	4.87	4.57	4.52	4.46	4.43
Feed		4.80	4.86	4.47	4.47	4.37	4.41
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % C_6	9.70	9.50	8.06	8.39	8.27	8.02
Temperature	^oF	236.4	236.4	237.0	236.9	236.9	236.9
Liquid Density	lb/ft^3	37.7	37.7	37.6	37.6	37.6	37.6
Vapor Density	lb/ft^3	0.342	0.342	0.342	0.342	0.342	0.342
Vapor Rate	k lb/h	28.6	28.6	30.3	30.5	35.0	35.1
Liquid Rate	gpm	94.7	94.7	100.4	101.0	116.2	116.4
Capacity Factor, Cs	ft/s	0.179	0.179	0.189	0.190	0.219	0.220
HETP 2 pt	inch						
DIST & below bed		15.3	15.1	14.7	14.9	15.1	15.0
DIST & bottoms		14.1	14.1	14.1	14.1	14.3	14.3
Relative Volatility		1.563	1.563	1.562	1.562	1.562	1.562
Capacity Factor, Cs Top	ft/s	0.165	0.165	0.173	0.174	0.201	0.201
Capacity Factor, Cs mid	ft/s	0.169	0.169	0.178	0.180	0.207	0.207

Table II (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 23.5 psia

Run Number		22716	22715	22717	22718	22705	22706
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	psia	23.5	23.5	23.5	23.5	23.5	23.5
Reboiler Duty	M Btu/h	5.28	5.35	5.62	5.64	5.89	5.91
Condenser Duty	M Btu/h	4.76	4.81	5.03	5.08	5.38	5.42
Reflux Rate	k lb/h	30.5	30.7	31.8	32.0	34.4	34.7
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.0	30.0	30.0	30.0	30.0	30.0
Pressure Drops:							
Overall	in H_2O / ft	0.26	0.27	0.31	0.32	0.39	0.40
Top	in H_2O / ft	0.22	0.23	0.26	0.27	0.32	0.33
Bottom	in H_2O / ft	0.26	0.27	0.33	0.34	0.42	0.43
Dist. Pressure Drop	in H_2O	0.19	0.20	0.23	0.22	0.21	0.21
Bed Liquid Volume Fraction							
From Gamma Scan			0.06	0.07		0.07	
Temperature Profiles	^oF						
LP Column Overhead Vapor		218.7	218.7	218.8	218.9	218.2	218.3
Reflux		165.9	166.0	160.5	160.4	170.6	171.0
Distributor		176.9	176.8	172.8	172.5	179.0	179.2
Top Bed		212.4	212.4	212.5	212.5	213.0	213.1
Mid Bed		228.1	228.2	228.8	228.9	229.1	229.1
Below Bed		237.1	237.1	237.4	237.4	237.4	237.5
Composition of Liquid	Mol % C_6						
Reflux		74.19	74.16	73.74	73.60	74.56	74.57
Distributor		74.25	74.20	73.77	73.66	75.01	74.66
Below Bed		7.96	7.88	7.58	7.24	7.73	7.28
Bottoms		4.32	4.27	4.10	4.11	4.12	4.08
Feed		4.26	4.27	4.16	4.12	4.08	4.09
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % C_6	7.96	7.88	7.58	7.24	7.73	7.28
Temperature	^oF	237.1	237.1	237.4	237.4	237.4	237.5
Liquid Density	lb/ft^3	37.6	37.6	37.5	37.5	37.5	37.5
Vapor Density	lb/ft^3	0.342	0.342	0.343	0.342	0.343	0.343
Vapor Rate	k lb/h	39.5	40.0	42.1	42.3	44.2	44.4
Liquid Rate	gpm	131.0	132.9	139.7	140.4	146.7	147.7
Capacity Factor, Cs	ft/s	0.247	0.250	0.263	0.264	0.276	0.278
HETP 2 pt	inch						
DIST & below bed		15.2	15.2	15.1	14.9	14.9	14.7
DIST & bottoms		14.4	14.4	14.3	14.3	14.1	14.1
Relative Volatility		1.562	1.562	1.562	1.562	1.561	1.561
Capacity Factor, Cs Top	ft/s	0.228	0.231	0.243	0.244	0.254	0.255
Capacity Factor, Cs mid	ft/s	0.234	0.237	0.249	0.250	0.261	0.263

Table II (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 23.5 psia

Run Number		**22720**	**22719**	**22722**	**22721**	**22700**
Run Type		**TR**	**TR**	**TR**	**TR**	**TR**
Column Pressure	**psia**	**23.5**	**23.5**	**23.4**	**23.5**	**23.5**
Reboiler Duty	**M Btu/h**	**6.18**	**6.22**	**6.51**	**6.50**	**6.97**
Condenser Duty	**M Btu/h**	**5.69**	**5.75**	**5.98**	**5.99**	**6.51**
Reflux Rate	**k lb/h**	**36.5**	**36.7**	**38.5**	**38.5**	**41.3**
Feed Location		**Bottom**	**Bottom**	**Bottom**	**Bottom**	**Bottom**
Mass Feed Flow Rate	**k lb/h**	**30.0**	**30.0**	**30.0**	**30.0**	**30.0**
Pressure Drops:						
Overall	**in H_2O / ft**	**0.51**	**0.53**	**0.95**	**0.94**	**1.37**
Top	**in H_2O / ft**	**0.39**	**0.40**	**0.80**	**0.78**	**1.61**
Bottom	**in H_2O / ft**	**0.58**	**0.61**	**1.05**	**1.05**	**1.09**
Dist. Pressure Drop	**in H_2O**	**0.26**	**0.26**	**0.25**	**0.25**	**0.40**
Bed Liquid Volume Fraction						
From Gamma Scan			**0.09**		**0.12**	
Temperature Profiles	**^oF**					
LP Column Overhead Vapor		**219.0**	**219.0**	**220.0**	**220.0**	**225.3**
Reflux		**174.0**	**174.3**	**173.2**	**173.6**	**174.1**
Distributor		**181.4**	**181.7**	**180.8**	**181.1**	**182.4**
Top Bed		**213.6**	**214.2**	**214.4**	**214.4**	**223.2**
Mid Bed		**230.4**	**230.7**	**236.2**	**236.0**	**229.1**
Below Bed		**238.3**	**238.4**	**237.6**	**237.8**	**230.7**
Composition of Liquid	**Mol % C_6**					
Reflux		**73.59**	**73.51**	**70.06**	**70.04**	**54.82**
Distributor		**73.63**	**73.66**	**70.13**	**70.96**	**54.93**
Below Bed		**5.92**	**5.72**	**8.23**	**7.55**	**34.43**
Bottoms		**3.43**	**3.38**	**5.09**	**5.10**	**18.08**
Feed		**3.46**	**3.45**	**4.98**	**4.97**	**18.00**
Conditions Below Bed (Based on Reboiler Duty)						
Composition	**Mol % C_6**	**5.92**	**5.72**	**8.23**	**7.55**	**34.43**
Temperature	**^oF**	**238.3**	**238.4**	**237.6**	**237.8**	**230.7**
Liquid Density	**lb/ft^3**	**37.4**	**37.4**	**37.6**	**37.5**	**39.0**
Vapor Density	**lb/ft^3**	**0.344**	**0.344**	**0.345**	**0.345**	**0.352**
Vapor Rate	**k lb/h**	**46.4**	**46.7**	**48.9**	**48.9**	**50.9**
Liquid Rate	**gpm**	**154.4**	**155.6**	**162.4**	**162.6**	**162.6**
Capacity Factor, Cs	**ft/s**	**0.290**	**0.292**	**0.305**	**0.305**	**0.308**
HETP 2 pt	**inch**					
DIST & below bed		**14.1**	**13.9**	**16.4**	**15.7**	**63.6**
DIST & bottoms		**13.6**	**13.6**	**16.0**	**15.8**	**42.4**
Relative Volatility		**1.560**	**1.560**	**1.561**	**1.560**	**1.564**
Capacity Factor, Cs Top	**ft/s**	**0.266**	**0.267**	**0.282**	**0.282**	**0.301**
Capacity Factor, Cs mid	**ft/s**	**0.273**	**0.275**	**0.290**	**0.289**	**0.304**

Table II (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 23.5 psia

Run Number		22723	22699	22724	22725	22726
Run Type		TR	TR	TR	FT	FT
Column Pressure	psia	23.5	23.4	23.5	23.5	23.5
Reboiler Duty	M Btu/h	6.83	6.97	6.80	6.94	6.95
Condenser Duty	M Btu/h	6.14	6.53	6.13	6.27	6.27
Reflux Rate	k lb/h	40.3	41.4	40.3	40.1	40.1
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.0	29.7	30.0	30.0	30.0
Pressure Drops:						
Overall	in H_2O / ft	1.26	1.36	1.26	1.37	1.36
Top	in H_2O / ft	1.44	1.61	1.45	1.64	1.64
Bottom	in H_2O / ft	1.03	1.08	1.03	1.06	1.06
Dist. Pressure Drop	in H_2O	0.27	0.41	0.27	0.41	0.41
Bed Liquid Volume Fraction						
From Gamma Scan		0.10	0.10		0.10	
Temperature Profiles	^oF					
LP Column Overhead Vapor		224.3	225.2	224.2	226.6	226.7
Reflux		175.8	174.5	176.8	170.5	170.3
Distributor		183.1	182.7	183.8	179.7	179.1
Top Bed		221.7	223.4	221.1	225.5	225.3
Mid Bed		234.0	229.4	234.4	230.8	230.8
Below Bed		234.4	230.6	234.7	232.4	232.3
Composition of Liquid	Mol % C_6					
Reflux		58.41	54.91	58.61	51.19	50.68
Distributor		59.43	54.72	58.24	50.64	50.90
Below Bed		20.82	31.67	17.81	28.13	24.52
Bottoms		11.58	18.10	11.71	14.92	15.04
Feed		11.00	17.31	11.19	14.39	14.61
Conditions Below Bed (Based on Reboiler Duty)						
Composition	Mol % C_6	20.82	31.67	17.81	28.13	24.52
Temperature	^oF	234.4	230.6	234.7	232.4	232.3
Liquid Density	lb/ft^3	38.2	38.9	38.1	38.6	38.5
Vapor Density	lb/ft^3	0.352	0.349	0.349	0.353	0.347
Vapor Rate	k lb/h	50.6	51.0	50.5	51.0	51.2
Liquid Rate	gpm	165.0	163.7	165.4	164.4	165.8
Capacity Factor, Cs	ft/s	0.310	0.311	0.311	0.310	0.314
HETP 2 pt	inch					
DIST & below bed		31.1	56.0	28.8	55.6	46.2
DIST & bottoms		27.2	42.9	28.1	40.6	40.6
Relative Volatility		1.563	1.565	1.563	1.563	1.566
Capacity Factor, Cs Top	ft/s	0.293	0.301	0.294	0.299	0.300
Capacity Factor, Cs mid	ft/s	0.300	0.306	0.301	0.304	0.306

Table II (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 23.5 psia

Run Number		22727	22728	22729	22730	22731	22732
Run Type		FL OHP	FL OHP	FL OHP	FL OHP	FL OHP	FL OHP
Column Pressure	psia	23.44	23.45	23.45	23.47	23.47	23.49
Reboiler Duty	M Btu/h	9.42	7.14	7.30	7.87	8.48	9.40
Condenser Duty	M Btu/h	8.59	6.51	6.77	7.13	7.92	8.69
Reflux Rate	k lb/h	17.70	34.61	30.07	25.38	21.59	12.17
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	59.96	60.01	59.99	60.06	60.00	59.93
Pressure Drops:							
Overall	in H_2O / ft	1.29	1.32	1.27	1.24	1.29	1.10
Top	in H_2O / ft	1.49	1.60	1.51	1.47	1.54	1.26
Bottom	in H_2O / ft	1.06	1.01	1.00	0.97	1.01	0.91
Dist. Pressure Drop	in H_2O	0.67	0.42	0.36	0.43	0.51	0.44
Bed Liquid Volume Fraction							
From Gamma Scan		0.09	0.11	0.10	0.10	0.09	0.07
Temperature Profiles	^oF						
Reflux		164.1	166.7	169.2	177.4	177.6	178.4
Distributor		192.1	178.1	183.7	192.9	195.5	202.7
Top Bed		230.4	228.0	227.9	229.8	230.3	231.0
Mid Bed		232.4	233.3	233.5	232.9	232.4	232.3
Below Bed		232.8	233.5	233.8	233.2	232.7	232.5
Composition of Liquid	Mol % C_6						
Reflux		34.27	48.41	43.61	38.36	36.09	33.11
Distributor		34.36	45.94	44.21	38.76	36.14	33.28
Below Bed		21.43	20.72	19.18	20.08	21.15	21.73
Bottoms		21.35	15.77	17.65	20.10	21.36	22.26
Feed		29.32	18.79	23.14	26.75	28.97	30.57
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % C_6	21.43	20.72	19.18	20.08	21.15	21.73
Temperature	^oF	232.8	233.5	233.8	233.2	232.7	232.5
Liquid Density	lb/ft^3	38.32	38.26	38.18	38.24	38.31	38.34
Vapor Density	lb/ft^3	0.345	0.348	0.347	0.345	0.344	0.344
Vapor Rate	k lb/h	58.1	51.1	50.4	52.6	55.0	57.6
Liquid Rate	gpm	72.0	146.4	123.3	101.1	81.4	41.2
Capacity Factor, Cs	ft/s	0.359	0.314	0.311	0.325	0.340	0.356
L/V		0.38	0.88	0.75	0.59	0.45	0.22
OHP Flow		36.00	6.18	12.63	21.57	29.97	44.98
Capacity Factor, Cs Top	ft/s	0.348	0.294	0.293	0.309	0.328	0.352
Capacity Factor, Cs mid	ft/s	0.354	0.301	0.300	0.315	0.334	0.357

Table II (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 23.5 psia

Run Number		22733	22734	22735	22736	22737	22738
Run Type		OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	psia	23.48	23.47	23.47	23.46	23.47	23.48
Reboiler Duty	M Btu/h	8.08	7.49	5.96	4.76	3.87	7.17
Condenser Duty	M Btu/h	7.55	7.02	5.50	4.39	3.51	6.70
Reflux Rate	k lb/h	18.14	18.29	17.64	17.19	17.38	21.09
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	60.01	60.01	60.05	60.00	59.99	59.99
Pressure Drops:							
Overall	in H_2O / ft	0.70	0.48	0.24	0.15	0.11	0.47
Top	in H_2O / ft	0.65	0.46	0.23	0.15	0.10	0.44
Bottom	in H_2O / ft	0.71	0.47	0.22	0.13	0.08	0.46
Dist. Pressure Drop	in H_2O	0.27	0.26	0.23	0.18	0.15	0.20
Bed Liquid Volume Fraction							
From Gamma Scan		0.08	0.06	0.04	0.04	0.04	0.06
Temperature Profiles	^oF						
Reflux		182.3	182.3	180.2	173.6	168.5	181.6
Distributor		197.9	197.6	195.9	191.7	188.0	195.8
Top Bed		228.3	227.7	226.2	223.8	220.9	227.0
Mid Bed		232.2	232.0	231.9	231.9	231.8	232.3
Below Bed		232.4	232.1	231.9	232.1	233.0	232.4
Composition of Liquid	Mol % C_6						
Reflux		35.35	36.22	38.81	43.11	50.17	37.97
Distributor		35.70	36.39	38.91	42.73	48.84	90.63
Below Bed		21.20	21.12	21.08	20.09	17.60	20.43
Bottoms		21.66	21.60	21.49	20.37	17.89	20.78
Feed		29.04	28.51	26.90	24.54	20.79	27.47
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % C_6	21.20	21.12	21.08	20.09	17.60	20.43
Temperature	^oF	232.4	232.1	231.9	232.1	233.0	232.4
Liquid Density	lb/ft^3	38.32	38.33	38.33	38.28	38.14	38.29
Vapor Density	lb/ft^3	0.343	0.342	0.340	0.340	0.340	0.342
Vapor Rate	k lb/h	52.2	48.8	39.5	32.1	27.1	47.5
Liquid Rate	gpm	69.0	69.4	68.3	68.0	70.3	80.0
Capacity Factor, Cs	ft/s	0.323	0.302	0.245	0.200	0.168	0.294
L/V		0.41	0.44	0.53	0.65	0.79	0.52
OHP Flow		31.03	27.44	18.47	11.20	5.56	22.89
Capacity Factor, Cs Top	ft/s	0.315	0.295	0.237	0.193	0.162	0.249
Capacity Factor, Cs mid	ft/s	0.319	0.298	0.240	0.196	0.164	0.269

Table II (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 23.5 psia

Run Number		22739	22740	22741	22742	22743	22744
Run Type		OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	psia	23.48	23.48	23.48	23.49	23.48	23.47
Reboiler Duty	M Btu/h	5.97	4.78	3.88	7.17	5.96	5.34
Condenser Duty	M Btu/h	5.51	4.34	5.48	6.60	5.43	4.84
Reflux Rate	k lb/h	20.70	19.92	19.18	25.54	25.19	24.75
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	59.98	59.98	60.02	60.03	59.99	59.97
Pressure Drops:							
Overall	in H_2O / ft	0.26	0.16	0.10	0.61	0.30	0.23
Top	in H_2O / ft	0.25	0.15	0.10	0.55	0.28	0.21
Bottom	in H_2O / ft	0.25	0.14	0.08	0.63	0.29	0.21
Dist. Pressure Drop	in H_2O	0.17	0.16	0.15	0.20	0.18	0.17
Bed Liquid Volume Fraction							
From Gamma Scan		0.05	0.04	0.04	0.08	0.06	0.05
Temperature Profiles	^oF						
Reflux		180.2	173.7	177.2	180.6	178.9	175.8
Distributor		194.3	189.8	191.2	192.6	190.8	188.5
Top Bed		225.5	222.5	224.1	225.8	223.3	221.3
Mid Bed		232.2	232.2	232.4	232.7	232.3	232.1
Below Bed		232.2	232.7	232.8	232.9	232.9	233.4
Composition of Liquid	Mol % C_6						
Reflux		40.67	46.25	57.32	40.75	45.32	49.82
Distributor		40.68	46.10	56.92	40.74	45.36	49.91
Below Bed		20.00	18.49	14.79	19.13	17.87	16.37
Bottoms		20.36	18.87	14.53	19.48	18.26	16.65
Feed		25.80	22.79	16.78	25.87	23.23	20.60
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % C_6	20.00	18.49	14.79	19.13	17.87	16.37
Temperature	^oF	232.2	232.7	232.8	232.9	232.9	233.4
Liquid Density	lb/ft^3	38.27	38.19	38.02	38.21	38.15	38.07
Vapor Density	lb/ft^3	0.340	0.340	0.335	0.342	0.340	0.340
Vapor Rate	k lb/h	40.2	33.0	28.0	48.6	41.4	37.7
Liquid Rate	gpm	79.2	79.7	80.9	99.6	99.7	99.3
Capacity Factor, Cs	ft/s	0.250	0.205	0.176	0.301	0.258	0.235
L/V		0.60	0.74	0.88	0.63	0.74	0.80
OHP Flow		15.88	8.62	3.31	18.08	10.86	7.34
Capacity Factor, Cs Top	ft/s	0.242	0.197	0.146	0.291	0.246	0.223
Capacity Factor, Cs mid	ft/s	0.245	0.200	0.152	0.296	0.250	0.227

Table II (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 23.5 psia

Run Number		22745	22746	22747	22748	22749
Run Type		OHP	OHP	OHP	OHP	OHP
Column Pressure	psia	23.47	23.49	23.48	23.47	23.47
Reboiler Duty	M Btu/h	4.75	6.54	5.65	6.53	8.41
Condenser Duty	M Btu/h	4.28	6.00	5.16	5.91	7.73
Reflux Rate	k lb/h	24.55	30.51	30.11	36.07	10.75
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	59.98	60.02	59.99	60.00	59.98
Pressure Drops:						
Overall	in H_2O / ft	0.18	0.52	0.30	0.72	0.48
Top	in H_2O / ft	0.16	0.45	0.27	0.51	0.47
Bottom	in H_2O / ft	0.16	0.55	0.30	0.87	0.46
Dist. Pressure Drop	in H_2O	0.15	0.19	0.17	0.18	0.24
Bed Liquid Volume Fraction						
From Gamma Scan		0.05	0.08	0.06	0.10	0.05
Temperature Profiles	^oF					
Reflux		172.5	180.1	178.0	178.5	176.9
Distributor		185.4	188.3	186.4	184.8	201.1
Top Bed		218.2	221.9	218.6	217.2	229.9
Mid Bed		231.1	232.9	231.7	232.6	231.7
Below Bed		234.2	234.0	234.6	236.5	231.8
Composition of Liquid	Mol % C_6					
Reflux		57.17	48.94	56.07	62.15	33.26
Distributor		57.16	49.01	56.13	62.25	33.33
Below Bed		13.96	15.70	13.68	10.08	21.69
Bottoms		13.90	15.94	13.71	9.49	22.06
Feed		16.24	20.97	16.53	11.90	29.73
Conditions Below Bed (Based on Reboiler Duty)						
Composition	Mol % C_6	13.96	15.70	13.68	10.08	21.69
Temperature	^oF	234.2	234.0	234.6	236.5	231.8
Liquid Density	lb/ft^3	37.93	38.02	37.90	37.68	38.37
Vapor Density	lb/ft^3	0.340	0.342	0.341	0.344	0.341
Vapor Rate	k lb/h	34.4	46.2	41.1	48.1	51.4
Liquid Rate	gpm	100.6	120.9	121.3	148.5	37.5
Capacity Factor, Cs	ft/s	0.215	0.288	0.256	0.300	0.319
L/V		0.89	0.80	0.90	0.93	0.22
OHP Flow		3.76	9.37	4.18	3.24	39.84
Capacity Factor, Cs Top	ft/s	0.202	0.274	0.241	0.278	0.317
Capacity Factor, Cs mid	ft/s	0.206	0.279	0.246	0.285	0.322

Table II (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 23.5 psia

Run Number		22750	22751	22752	22753	22754
Run Type		OHP	OHP	OHP	OHP	OHP
Column Pressure	psia	23.47	23.47	23.47	23.48	23.48
Reboiler Duty	M Btu/h	7.51	6.00	4.80	3.90	3.00
Condenser Duty	M Btu/h	6.73	5.29	4.18	3.39	2.58
Reflux Rate	k lb/h	10.55	9.82	9.22	9.46	9.44
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	59.93	60.02	60.00	60.01	60.03
Pressure Drops:						
Overall	in H_2O / ft	0.33	0.19	0.12	0.08	0.06
Top	in H_2O / ft	0.32	0.18	0.11	0.08	0.06
Bottom	in H_2O / ft	0.31	0.16	0.09	0.06	0.03
Dist. Pressure Drop	in H_2O	0.22	0.21	0.19	0.18	0.18
Bed Liquid Volume Fraction						
From Gamma Scan		0.04	0.04	0.03	0.03	0.03
Temperature Profiles	^oF					
Reflux		178.0	175.9	169.1	166.5	162.6
Distributor		201.3	199.8	198.3	196.5	194.7
Top Bed		229.2	228.3	227.4	226.1	224.8
Mid Bed		231.6	231.6	231.4	231.4	231.4
Below Bed		231.5	231.5	231.3	231.2	231.4
Composition of Liquid	Mol % C_6					
Reflux		33.91	35.38	36.63	38.94	41.69
Distributor		34.06	35.45	36.77	38.80	41.49
Below Bed		22.03	22.41	22.64	22.35	22.30
Bottoms		22.13	22.44	22.69	22.45	22.02
Feed		29.16	28.06	27.08	26.11	24.49
Conditions Below Bed (Based on Reboiler Duty)						
Composition	Mol % C_6	22.03	22.41	22.64	22.35	22.30
Temperature	^oF	231.5	231.5	231.3	231.2	231.4
Liquid Density	lb/ft^3	38.39	38.41	38.43	38.42	38.41
Vapor Density	lb/ft^3	0.340	0.340	0.340	0.339	0.340
Vapor Rate	k lb/h	46.2	37.1	29.8	24.7	19.7
Liquid Rate	gpm	37.7	36.9	36.5	38.1	39.2
Capacity Factor, Cs	ft/s	0.287	0.230	0.185	0.153	0.122
L/V		0.25	0.31	0.38	0.48	0.61
OHP Flow		34.62	25.72	18.51	12.94	7.60
Capacity Factor, Cs Top	ft/s	0.285	0.227	0.181	0.149	0.117
Capacity Factor, Cs mid	ft/s	0.288	0.230	0.183	0.151	0.119

Table III (US Engineering Units)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 14.7 psia

Run Number		22757	22758	22781	22782	22760	22759
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	psia	14.70	14.70	14.71	14.71	14.70	14.70
Reboiler Duty	M Btu/h	1.35	1.37	2.03	2.04	2.70	2.71
Condenser Duty	M Btu/h	0.77	0.79	1.51	1.50	1.97	2.00
Reflux Rate	k lb/h	6.3	6.4	10.3	10.3	12.7	12.8
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.0	30.0	30.0	30.0	30.0	30.0
Pressure Drops:							
Overall	in H_2O / ft	0.02	0.02	0.04	0.04	0.06	0.06
Top	in H_2O / ft	0.02	0.02	0.03	0.03	0.06	0.06
Bottom	in H_2O / ft	0.01	0.01	0.03	0.03	0.05	0.06
Dist. Pressure Drop	in H_2O	0.19	0.18	0.00	0.00	0.17	0.17
Bed Liquid Volume Fraction							
From Gamma Scan		0.02		0.03			0.03
Temperature Profiles	^oF						
LP Column Overhead Vapor		286.8	286.7	286.7	286.7	286.6	286.6
Reflux		220.7	221.6	208.2	208.4	197.2	196.9
Distributor		267.7	267.1	251.5	251.7	238.3	238.2
Top Bed		284.8	284.8	283.8	283.8	282.0	281.9
Mid Bed		287.2	287.1	286.5	286.5	286.4	286.4
Below Bed		287.8	287.9	288.1	288.2	288.0	288.0
Composition of Liquid	Mol % p-xylene						
Reflux		66.12	66.55	69.67	69.70	69.27	69.19
Distributor		65.70	66.18	69.64	69.65	69.24	69.15
Below Bed		37.52	37.43	37.38	37.44	38.05	37.98
Bottoms		33.64	33.54	31.74	31.75	31.98	32.01
Feed		33.56	33.42	31.53	31.55	31.75	31.80
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % p-xylene	37.52	37.43	37.38	37.44	38.05	37.98
Temperature	^oF	287.8	287.9	288.1	288.2	288.0	288.0
Liquid Density	lb/ft^3	47.5	47.5	47.5	47.5	47.5	47.5
Vapor Density	lb/ft^3	0.202	0.202	0.203	0.203	0.202	0.202
Vapor Rate	k lb/h	8.5	8.7	13.3	13.4	17.6	17.7
Liquid Rate	gpm	22.4	22.8	35.0	35.2	46.1	46.5
Capacity Factor, Cs	ft/s	0.062	0.063	0.096	0.097	0.127	0.128
HETP 2 pt	inch						
DIST & below bed		15.7	15.3	13.5	13.5	14.0	14.0
DIST & bottoms		15.4	15.1	12.6	12.6	12.9	12.9
Relative Volatility		1.163	1.163	1.163	1.163	1.163	1.163
Capacity Factor, Cs Top	ft/s	0.064	0.065	0.101	0.101	0.134	0.135
Capacity Factor, Cs mid	ft/s	0.063	0.064	0.098	0.099	0.130	0.131

Table III (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 14.7 psia

Run Number		22779	22780	22761	22762	22778	22777
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	psia	14.71	14.71	14.70	14.70	14.70	14.70
Reboiler Duty	M Btu/h	3.32	3.32	4.05	4.06	4.66	4.67
Condenser Duty	M Btu/h	2.77	2.77	3.22	3.21	4.06	4.09
Reflux Rate	k lb/h	16.3	16.4	19.2	19.4	22.9	22.7
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.1	30.0	30.0	30.0	30.0	30.0
Pressure Drops:							
Overall	in H_2O / ft	0.10	0.10	0.15	0.14	0.22	0.22
Top	in H_2O / ft	0.10	0.10	0.14	0.14	0.20	0.21
Bottom	in H_2O / ft	0.09	0.09	0.14	0.14	0.21	0.21
Dist. Pressure Drop	in H_2O	0.03	0.03	0.19	0.19	0.05	0.06
Bed Liquid Volume Fraction							
From Gamma Scan		0.03		0.04			
Temperature Profiles	^oF						
LP Column Overhead Vapor		286.8	286.8	286.7	286.7	286.7	286.7
Reflux		186.5	186.5	190.0	189.8	182.5	182.4
Distributor		228.0	227.9	224.6	224.5	217.8	217.8
Top Bed		282.0	282.0	281.7	281.7	282.1	282.1
Mid Bed		286.3	286.4	286.5	286.5	286.5	286.5
Below Bed		288.1	288.1	288.2	288.2	288.3	288.3
Composition of Liquid	Mol % p-xylene						
Reflux		68.70	68.71	68.64	68.62	67.72	67.53
Distributor		68.66	68.67	68.62	68.62	67.67	67.47
Below Bed		38.02	37.88	37.76	37.82	37.78	37.67
Bottoms		31.53	31.53	31.60	31.58	31.40	31.45
Feed		31.34	31.32	31.31	31.30	31.22	31.32
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % p-xylene	38.02	37.88	37.76	37.82	37.78	37.67
Temperature	^oF	288.1	288.1	288.2	288.2	288.3	288.3
Liquid Density	lb/ft^3	47.5	47.5	47.5	47.5	47.5	47.5
Vapor Density	lb/ft^3	0.202	0.203	0.203	0.203	0.203	0.203
Vapor Rate	k lb/h	22.1	22.2	26.7	26.7	31.2	31.2
Liquid Rate	gpm	58.2	58.2	70.1	70.2	81.9	82.0
Capacity Factor, Cs	ft/s	0.160	0.160	0.193	0.193	0.225	0.225
HETP 2 pt	inch						
DIST & below bed		14.3	14.2	14.2	14.2	14.7	14.7
DIST & bottoms		12.9	12.9	13.0	12.9	13.3	13.4
Relative Volatility		1.163	1.163	1.163	1.163	1.163	1.163
Capacity Factor, Cs Top	ft/s	0.168	0.169	0.203	0.204	0.237	0.237
Capacity Factor, Cs mid	ft/s	0.164	0.164	0.198	0.198	0.231	0.231

Table III (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 14.7 psia

Run Number		22763	22764	22784	22783	22765	22766
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	psia	14.70	14.70	14.71	14.71	14.70	14.70
Reboiler Duty	M Btu/h	5.38	5.40	5.72	5.72	6.06	6.07
Condenser Duty	M Btu/h	4.54	4.54	5.09	5.09	5.19	5.20
Reflux Rate	k lb/h	26.5	26.5	28.2	28.2	30.2	30.3
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.0	30.0	30.0	30.0	30.0	30.0
Pressure Drops:							
Overall	in H_2O / ft	0.31	0.31	0.40	0.41	0.48	0.48
Top	in H_2O / ft	0.29	0.29	0.38	0.38	0.45	0.45
Bottom	in H_2O / ft	0.31	0.31	0.41	0.41	0.48	0.49
Dist. Pressure Drop	in H_2O	0.21	0.21	0.04	0.04	0.23	0.23
Bed Liquid Volume Fraction							
From Gamma Scan		0.05			0.06	0.07	
Temperature Profiles	^oF						
LP Column Overhead Vapor		286.7	286.7	286.9	286.9	286.7	286.7
Reflux		193.6	193.4	178.3	178.3	195.6	196.0
Distributor		221.3	221.1	210.5	210.5	219.8	219.9
Top Bed		282.1	282.2	282.8	282.7	282.5	282.5
Mid Bed		286.8	286.8	287.0	287.0	287.1	287.1
Below Bed		288.5	288.5	288.9	288.8	288.9	288.9
Composition of Liquid	Mol % p-xylene						
Reflux		67.97	67.96	67.98	67.99	68.07	68.07
Distributor		67.95	67.94	67.94	67.95	68.05	68.04
Below Bed		37.00	37.15	36.48	36.54	36.34	36.22
Bottoms		31.15	31.11	30.71	30.71	30.78	30.73
Feed		30.88	30.87	30.48	30.47	30.48	30.50
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % p-xylene	37.00	37.15	36.48	36.54	36.34	36.22
Temperature	^oF	288.5	288.5	288.9	288.8	288.9	288.9
Liquid Density	lb/ft^3	47.5	47.5	47.5	47.5	47.5	47.5
Vapor Density	lb/ft^3	0.204	0.204	0.205	0.205	0.205	0.205
Vapor Rate	k lb/h	35.9	36.0	38.5	38.5	40.6	40.7
Liquid Rate	gpm	94.3	94.6	101.1	101.2	106.5	106.8
Capacity Factor, Cs	ft/s	0.258	0.259	0.276	0.277	0.291	0.291
HETP 2 pt	inch						
DIST & below bed		14.2	14.2	13.9	13.9	13.8	13.7
DIST & bottoms		13.0	13.0	12.8	12.8	12.8	12.8
Relative Volatility		1.163	1.163	1.163	1.163	1.163	1.163
Capacity Factor, Cs Top	ft/s	0.273	0.273	0.291	0.291	0.307	0.308
Capacity Factor, Cs mid	ft/s	0.265	0.266	0.284	0.284	0.299	0.300

Table III (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 14.7 psia

Run Number		22767	22768	22770	22769	22772	22771
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	psia	14.70	14.70	14.71	14.71	14.71	14.71
Reboiler Duty	M Btu/h	6.22	6.22	6.38	6.39	6.55	6.55
Condenser Duty	M Btu/h	5.50	5.47	5.65	5.63	5.87	5.93
Reflux Rate	k lb/h	31.4	31.2	31.3	31.3	32.2	32.3
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.0	30.0	30.0	30.0	30.0	30.0
Pressure Drops:							
Overall	in H_2O / ft	0.56	0.54	0.67	0.67	0.85	0.86
Top	in H_2O / ft	0.52	0.51	0.62	0.62	0.79	0.79
Bottom	in H_2O / ft	0.57	0.56	0.69	0.68	0.88	0.89
Dist. Pressure Drop	in H_2O	0.11	0.10	0.04	0.05	0.03	0.04
Bed Liquid Volume Fraction							
From Gamma Scan		0.07			0.08		0.09
Temperature Profiles	^oF						
LP Column Overhead Vapor		286.6	286.6	286.8	286.8	286.7	286.6
Reflux		198.1	197.5	178.8	178.8	176.1	176.5
Distributor		220.7	220.3	208.1	208.0	206.1	206.4
Top Bed		282.3	282.3	282.4	282.5	282.2	282.2
Mid Bed		287.1	287.0	287.2	287.2	287.4	287.4
Below Bed		289.0	289.0	289.3	289.4	289.8	289.8
Composition of Liquid	Mol % p-xylene						
Reflux		68.61	68.58	69.17	69.08	70.17	70.20
Distributor		68.56	68.58	69.09	69.05	70.15	70.16
Below Bed		36.06	36.22	36.02	36.01	35.00	35.46
Bottoms		30.39	30.39	30.22	31.43	29.68	29.68
Feed		30.10	30.12	29.97	29.95	29.40	29.40
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % p-xylene	36.06	36.22	36.02	36.01	35.00	35.46
Temperature	^oF	289.0	289.0	289.3	289.4	289.8	289.8
Liquid Density	lb/ft^3	47.5	47.5	47.5	47.5	47.5	47.5
Vapor Density	lb/ft^3	0.206	0.205	0.206	0.207	0.208	0.208
Vapor Rate	k lb/h	41.7	41.7	42.9	42.9	44.2	44.3
Liquid Rate	gpm	109.4	109.4	112.7	112.8	116.1	116.3
Capacity Factor, Cs	ft/s	0.298	0.299	0.307	0.307	0.315	0.315
HETP 2 pt	inch						
DIST & below bed		13.4	13.5	13.2	13.2	12.3	12.5
DIST & bottoms		12.5	12.5	12.2	12.7	11.6	11.6
Relative Volatility		1.163	1.163	1.163	1.163	1.162	1.162
Capacity Factor, Cs Top	ft/s	0.316	0.316	0.325	0.325	0.335	0.336
Capacity Factor, Cs mid	ft/s	0.307	0.307	0.316	0.316	0.325	0.325

Table III (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 14.7 psia

Run Number		22774	22773	22755	22756	22775	22776
Run Type		TR	TR	FT	FT	FT	FT
Column Pressure	psia	14.71	14.71	14.70	14.70	14.70	14.70
Reboiler Duty	M Btu/h	6.70	6.73	6.89	6.90	7.12	7.11
Condenser Duty	M Btu/h	6.03	6.07	6.12	6.12	6.44	6.42
Reflux Rate	k lb/h	32.8	32.9	34.3	34.3	34.6	34.5
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	30.0	30.0	30.0	30.0	30.0	30.0
Pressure Drops:							
Overall	in H_2O / ft	1.16	1.32	1.73	1.71	1.86	1.73
Top	in H_2O / ft	1.08	1.35	2.09	2.05	2.23	2.00
Bottom	in H_2O / ft	1.20	1.26	1.30	1.29	1.46	1.44
Dist. Pressure Drop	in H_2O	0.03	0.03	0.54	0.52	0.46	0.43
Bed Liquid Volume Fraction							
From Gamma Scan			0.11	0.11		0.11	
Temperature Profiles	^oF						
LP Column Overhead Vapor		286.7	286.8	288.1	288.1	288.6	288.6
Reflux		174.1	174.5	189.0	189.3	179.4	179.6
Distributor		204.5	204.8	214.1	214.3	208.9	208.3
Top Bed		282.6	282.8	286.6	286.6	286.7	286.6
Mid Bed		288.1	288.5	289.2	289.2	289.4	289.2
Below Bed		290.4	290.6	290.6	290.5	290.7	290.4
Composition of Liquid	Mol % p-xylene						
Reflux		68.85	68.10	53.93	53.58	50.88	50.47
Distributor		68.86	68.16	54.06	53.53	51.51	50.46
Below Bed		34.48	35.78	40.84	40.73	42.04	43.23
Bottoms		29.87	29.97	35.28	35.59	35.88	36.10
Feed		29.70	29.95	34.97	35.19	35.80	35.89
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % p-xylene	34.48	35.78	40.84	40.73	42.04	43.23
Temperature	^oF	290.4	290.6	290.6	290.5	290.7	290.4
Liquid Density	lb/ft^3	47.5	47.4	47.4	47.4	47.3	47.3
Vapor Density	lb/ft^3	0.210	0.210	0.208	0.208	0.208	0.207
Vapor Rate	k lb/h	45.3	45.5	46.4	46.5	47.9	47.9
Liquid Rate	gpm	119.0	119.5	122.2	122.4	126.3	126.1
Capacity Factor, Cs	ft/s	0.321	0.322	0.331	0.332	0.342	0.342
HETP 2 pt	inch						
DIST & below bed		12.6	13.5	33.9	35.0	47.3	62.1
DIST & bottoms		12.1	12.4	29.2	30.9	36.8	41.2
Relative Volatility		1.162	1.162	1.162	1.162	1.162	1.162
Capacity Factor, Cs Top	ft/s	0.342	0.343	0.341	0.341	0.351	0.351
Capacity Factor, Cs mid	ft/s	0.331	0.332	0.336	0.336	0.346	0.346

Table III (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 14.7 psia

Run Number		22785	22786	22787	22788	22789	22790
Run Type		FL OHP	FL OHP	FL OHP	FL OHP	FL OHP	FL OHP
Column Pressure	psia	14.71	14.71	14.71	14.71	14.71	14.71
Reboiler Duty	M Btu/h	7.41	8.00	8.62	9.31	9.91	10.27
Condenser Duty	M Btu/h	6.64	7.13	7.77	8.46	8.98	9.49
Reflux Rate	k lb/h	29.80	24.28	20.08	16.25	13.07	10.71
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	60.00	59.95	59.92	59.93	59.95	71.90
Pressure Drops:							
Overall	in H_2O / ft	1.67	1.50	1.52	1.41	1.42	1.36
Top	in H_2O / ft	1.84	1.59	1.64	1.47	1.48	1.41
Bottom	in H_2O / ft	1.22	1.13	1.13	1.09	1.08	1.04
Dist. Pressure Drop	in H_2O	0.22	0.13	0.31	0.34	0.41	0.44
Bed Liquid Volume Fraction							
From Gamma Scan		0.11	0.10	0.10	0.09	0.08	0.08
Temperature Profiles	^oF						
Reflux		177.2	179.0	182.6	186.0	187.7	188.0
Distributor		209.1	215.1	223.3	233.1	241.2	247.3
Top Bed		287.2	287.7	287.9	287.8	287.9	287.9
Mid Bed		289.6	289.7	289.8	289.6	289.7	289.5
Below Bed		290.7	290.6	290.6	290.4	290.4	290.2
Composition of Liquid	Mol % p-xylene						
Reflux		49.78	47.48	44.96	43.63	42.98	42.93
Distributor		49.58	47.56	45.11	43.58	42.96	42.88
Below Bed		38.51	36.53	36.95	37.45	37.50	37.84
Bottoms		35.34	35.82	36.68	37.09	37.29	37.72
Feed		37.10	38.74	39.88	40.49	40.89	40.84
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % p-xylene	38.51	36.53	36.95	37.45	37.50	37.84
Temperature	^oF	290.7	290.6	290.6	290.4	290.4	290.2
Liquid Density	lb/ft^3	47.38	47.41	47.41	47.41	47.41	47.41
Vapor Density	lb/ft^3	0.209	0.210	0.210	0.209	0.209	0.208
Vapor Rate	k lb/h	48.8	50.8	53.7	57.7	61.4	64.0
Liquid Rate	gpm	111.0	94.2	81.4	71.2	63.7	57.8
Capacity Factor, Cs	ft/s	0.347	0.361	0.381	0.410	0.437	0.456
L/V		0.86	0.70	0.58	0.47	0.39	0.34
OHP Flow		6.59	15.00	22.78	30.60	37.19	41.99
Capacity Factor, Cs Top	ft/s	0.346	0.350	0.361	0.378	0.392	0.400
Capacity Factor, Cs mid	ft/s	0.341	0.346	0.357	0.374	0.389	0.397

Table III (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 14.7 psia

Run Number		22791	22792	22793	22794	22795	22796
Run Type		OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	psia	14.71	14.71	14.71	14.71	14.71	14.71
Reboiler Duty	M Btu/h	7.01	6.71	7.58	7.03	6.46	6.18
Condenser Duty	M Btu/h	6.33	6.06	6.94	6.36	5.83	5.54
Reflux Rate	k lb/h	29.73	29.89	24.98	25.05	25.42	25.47
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	72.00	72.07	71.97	72.04	71.94	71.95
Pressure Drops:							
Overall	in H_2O / ft	1.01	0.78	0.95	0.63	0.49	0.43
Top	in H_2O / ft	0.80	0.60	0.75	0.47	0.33	0.28
Bottom	in H_2O / ft	0.93	0.69	0.87	0.53	0.38	0.32
Dist. Pressure Drop	in H_2O	0.01	0.01	0.03	0.01	0.01	0.00
Bed Liquid Volume Fraction							
From Gamma Scan		0.10	0.08	0.09	0.07	0.06	0.06
Temperature Profiles	^oF						
Reflux		176.5	176.1	178.6	176.4	176.4	175.9
Distributor		207.2	206.5	213.6	211.6	210.9	210.2
Top Bed		284.0	283.5	285.5	285.0	284.5	284.1
Mid Bed		288.7	288.2	288.9	288.5	288.2	288.0
Below Bed		290.1	289.7	289.7	289.2	289.0	288.9
Composition of Liquid	Mol % p-xylene						
Reflux		58.12	60.69	49.41	51.22	54.14	56.39
Distributor		58.08	60.74	49.38	51.18	54.11	56.35
Below Bed		34.30	34.37	35.95	35.74	35.47	35.46
Bottoms		32.70	31.95	35.63	35.13	34.30	33.66
Feed		34.25	33.13	38.01	37.26	36.03	35.08
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % p-xylene	34.30	34.37	35.95	35.74	35.47	35.46
Temperature	^oF	290.1	289.7	289.7	289.2	289.0	288.9
Liquid Density	lb/ft^3	47.47	47.48	47.45	47.48	47.49	47.49
Vapor Density	lb/ft^3	0.209	0.208	0.208	0.206	0.206	0.206
Vapor Rate	k lb/h	46.5	44.9	48.5	45.5	42.4	40.9
Liquid Rate	gpm	109.5	109.0	94.1	94.1	94.3	94.4
Capacity Factor, Cs	ft/s	0.331	0.320	0.346	0.325	0.304	0.293
L/V		0.90	0.92	0.74	0.79	0.85	0.88
OHP Flow		4.85	3.40	12.70	9.63	6.48	4.94
Capacity Factor, Cs Top	ft/s	0.339	0.330	0.342	0.323	0.305	0.296
Capacity Factor, Cs mid	ft/s	0.331	0.322	0.336	0.317	0.299	0.290

Table III (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 14.7 psia

Run Number		22797	22798	22799	22800	22801	22802
Run Type		OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	psia	14.71	14.71	14.71	14.71	14.71	14.71
Reboiler Duty	M Btu/h	5.89	5.63	6.21	6.75	7.33	7.90
Condenser Duty	M Btu/h	5.24	4.92	5.50	6.07	6.61	7.17
Reflux Rate	k lb/h	25.38	20.89	20.90	20.51	20.50	20.27
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	72.07	71.99	71.94	72.04	72.00	72.09
Pressure Drops:							
Overall	in H_2O / ft	0.38	0.29	0.35	0.43	0.55	0.74
Top	in H_2O / ft	0.23	0.14	0.34	0.41	0.52	0.70
Bottom	in H_2O / ft	0.27	0.16	0.36	0.43	0.56	0.76
Dist. Pressure Drop	in H_2O	0.00	0.00	0.01	0.03	0.03	0.05
Bed Liquid Volume Fraction							
From Gamma Scan		0.06	0.05	0.05	0.05	0.06	0.07
Temperature Profiles	^oF						
Reflux		175.1	174.6	176.7	177.8	179.5	182.3
Distributor		209.7	214.6	216.0	218.1	219.8	222.0
Top Bed		283.7	284.2	285.1	285.6	286.0	286.6
Mid Bed		287.8	288.1	288.3	288.4	288.7	288.9
Below Bed		288.9	288.7	288.7	288.8	289.1	289.4
Composition of Liquid	Mol % p-xylene						
Reflux		58.87	55.58	50.65	48.65	47.31	46.29
Distributor		58.82	55.47	50.85	48.70	47.42	46.36
Below Bed		35.53	35.34	36.17	36.46	36.68	36.91
Bottoms		32.97	33.92	35.53	36.12	36.47	36.71
Feed		34.03	35.60	37.48	38.29	38.84	39.29
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % p-xylene	35.53	35.34	36.17	36.46	36.68	36.91
Temperature	^oF	288.9	288.7	288.7	288.8	289.1	289.4
Liquid Density	lb/ft^3	47.49	47.50	47.49	47.48	47.47	47.45
Vapor Density	lb/ft^3	0.205	0.205	0.205	0.205	0.206	0.206
Vapor Rate	k lb/h	39.3	36.8	40.0	43.0	46.3	49.6
Liquid Rate	gpm	94.1	79.9	79.9	79.0	79.9	79.8
Capacity Factor, Cs	ft/s	0.281	0.264	0.287	0.309	0.332	0.355
L/V		0.91	0.83	0.76	0.70	0.66	0.61
OHP Flow		3.41	6.41	9.60	12.90	15.88	19.19
Capacity Factor, Cs Top	ft/s	0.286	0.262	0.281	0.299	0.319	0.339
Capacity Factor, Cs mid	ft/s	0.280	0.257	0.277	0.295	0.315	0.335

Table III (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 14.7 psia

Run Number		22803	22804	22805	22806	22807	22808
Run Type		OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	psia	14.71	14.71	14.71	14.71	14.71	14.71
Reboiler Duty	M Btu/h	8.19	8.47	7.92	6.77	5.62	5.06
Condenser Duty	M Btu/h	7.49	7.72	7.18	6.10	4.94	4.37
Reflux Rate	k lb/h	20.50	17.26	17.21	17.65	17.84	18.10
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	71.91	72.02	72.01	72.07	72.01	72.07
Pressure Drops:							
Overall	in H_2O / ft	0.92	0.80	0.59	0.38	0.25	0.21
Top	in H_2O / ft	0.86	0.76	0.56	0.36	0.24	0.20
Bottom	in H_2O / ft	0.96	0.82	0.60	0.38	0.25	0.21
Dist. Pressure Drop	in H_2O	0.05	0.06	0.04	0.03	0.00	0.00
Bed Liquid Volume Fraction							
From Gamma Scan		0.08	0.07	0.06	0.00	0.00	0.00
Temperature Profiles	^oF						
Reflux		184.1	184.4	181.3	180.0	177.9	177.1
Distributor		223.4	229.3	227.8	225.0	222.3	221.3
Top Bed		286.6	287.0	286.8	286.2	285.1	284.5
Mid Bed		288.9	288.8	288.7	288.5	288.3	288.1
Below Bed		289.6	289.4	289.0	288.7	288.5	288.5
Composition of Liquid	Mol % p-xylene						
Reflux		45.86	44.76	45.16	46.51	49.09	51.76
Distributor		45.87	44.74	45.09	46.45	49.04	51.49
Below Bed		37.01	37.34	37.37	37.18	36.81	36.47
Bottoms		36.88	37.25	37.29	37.08	36.38	35.66
Feed		39.51	39.89	39.67	39.10	38.07	37.07
Conditions Below Bed (Based on Reboiler Duty)							
Composition	Mol % p-xylene	37.01	37.34	37.37	37.18	36.81	36.47
Temperature	^oF	289.6	289.4	289.0	288.7	288.5	288.5
Liquid Density	lb/ft^3	47.44	47.45	47.46	47.47	47.49	47.49
Vapor Density	lb/ft^3	0.207	0.206	0.205	0.204	0.204	0.204
Vapor Rate	k lb/h	51.3	52.6	49.4	42.8	36.2	33.0
Liquid Rate	gpm	80.4	71.6	71.4	70.2	69.5	69.5
Capacity Factor, Cs	ft/s	0.366	0.377	0.354	0.307	0.260	0.238
L/V		0.60	0.52	0.55	0.63	0.73	0.80
OHP Flow		20.69	25.38	22.23	16.01	9.68	6.56
Capacity Factor, Cs Top	ft/s	0.349	0.350	0.329	0.290	0.250	0.232
Capacity Factor, Cs mid	ft/s	0.345	0.347	0.326	0.287	0.247	0.228

Table III (US Engineering Units) (cont'd)
FRI Distillation Unit Experimental Data
4.0 ft. Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **10.0 ft** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 14.7 psia

Run Number		22809	22810	22811	22812	22813	22814	22815
Run Type		OHP	OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	psia	14.71	14.71	14.71	14.71	14.71	14.71	14.71
Reboiler Duty	M Btu/h	4.50	4.52	5.64	6.80	7.36	8.48	9.06
Condenser Duty	M Btu/h	3.83	3.89	4.95	6.10	6.63	7.45	8.26
Reflux Rate	k lb/h	18.63	15.82	15.16	14.59	14.24	13.82	13.99
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	k lb/h	71.93	71.99	72.01	71.97	71.91	72.01	71.79
Pressure Drops:								
Overall	in H_2O / ft	0.17	0.16	0.23	0.34	0.41	0.62	0.84
Top	in H_2O / ft	0.17	0.15	0.22	0.32	0.39	0.60	0.80
Bottom	in H_2O / ft	0.17	0.16	0.23	0.34	0.41	0.63	0.86
Dist. Pressure Drop	in H_2O	0.00	0.00	0.00	0.02	0.03	0.05	0.06
Bed Liquid Volume Fraction								
From Gamma Scan		0.04	0.04	0.04	0.04	0.04	0.06	0.07
Temperature Profiles	^oF							
Reflux		179.2	179.0	178.6	179.9	180.7	183.1	185.4
Distributor		221.1	226.9	228.1	231.5	233.4	234.8	236.3
Top Bed		283.8	284.3	285.5	286.3	286.7	287.0	287.3
Mid Bed		287.8	288.1	288.4	288.4	288.5	288.7	288.9
Below Bed		288.5	288.5	288.5	288.6	288.7	289.1	289.4
Composition of Liquid	Mol % p-xylene							
Reflux		55.92	53.02	47.93	45.48	44.89	44.08	43.81
Distributor		55.21	53.64	48.10	45.46	44.84	44.01	43.74
Below Bed		36.54	36.07	37.02	37.54	37.64	37.68	37.65
Bottoms		34.65	35.36	36.74	37.44	37.50	37.57	37.69
Feed		35.43	36.61	38.46	39.47	39.73	40.16	40.35
Conditions Below Bed (Based on Reboiler Duty)								
Composition	Mol % p-xylene	36.54	36.07	37.02	37.54	37.64	37.68	37.65
Temperature	^oF	288.5	288.5	288.5	288.6	288.7	289.1	289.4
Liquid Density	lb/ft^3	47.49	47.50	47.48	47.47	47.47	47.45	47.44
Vapor Density	lb/ft^3	0.204	0.204	0.204	0.204	0.204	0.205	0.206
Vapor Rate	k lb/h	30.0	29.5	35.9	42.7	46.0	52.6	56.0
Liquid Rate	gpm	70.1	60.8	61.0	61.9	62.1	62.8	63.7
Capacity Factor, Cs	ft/s	0.215	0.212	0.258	0.307	0.330	0.377	0.401
L/V		0.89	0.79	0.65	0.55	0.51	0.45	0.43
OHP Flow		3.27	6.34	12.67	19.11	22.33	28.67	31.82
Capacity Factor, Cs Top	ft/s	0.214	0.206	0.244	0.283	0.302	0.346	0.363
Capacity Factor, Cs mid	ft/s	0.210	0.203	0.241	0.281	0.300	0.343	0.360

Table I (SI Units)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 0.31 bar

Run Number		22632	22631	22641	22642	22633	22634
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	bar	0.31	0.31	0.31	0.31	0.31	0.31
Reboiler Duty	MW	0.38	0.39	0.38	0.38	0.47	0.49
Condenser Duty	MW	0.38	0.39	0.31	0.32	0.46	0.46
Reflux Rate	kg/s	1.11	1.13	1.03	1.03	1.33	1.36
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.78	3.78	3.78	3.77	3.78	3.78
Pressure Drops							
Overall	mbar/m	0.35	0.36	0.35	0.35	0.54	0.58
Top	mbar/m	0.37	0.39	0.32	0.32	0.53	0.57
Bottom	mbar/m	0.32	0.33	0.23	0.23	0.49	0.52
Dist. Pressure Drop	mbar	0.07	0.07	0.07	0.07	0.07	0.07
Bed Liquid Volume Fraction							
From Gamma Scan				0.03		0.03	
Temperature Profiles	°C						
Overhead Vapor		46.8	47.0	48.4	48.2	48.2	48.2
Reflux		44.7	44.9	43.6	43.3	43.0	43.0
Distributor		44.8	45.0	45.0	44.8	44.4	44.3
Top Bed		46.4	46.5	47.4	47.2	47.2	47.2
Mid Bed		48.5	48.6	54.2	53.9	52.7	53.0
Below Bed		53.4	53.6	60.0	59.7	59.9	60.0
Composition of Liquid	Mol % C_6						
Reflux		97.08	97.10	90.24	90.56	91.51	91.36
Distributor		97.10	91.30	89.83	89.83	91.04	91.23
Below Bed		50.64	49.88	12.21	13.16	14.90	14.07
Bottoms		30.09	30.29	6.28	6.35	7.70	7.66
Feed		29.84	29.96	6.05	6.04	7.42	7.30
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % C_6	50.64	49.88	12.21	13.16	14.90	14.07
Temperature	°C	53.4	53.6	60.0	59.7	59.9	60.0
Liquid Density	kg/m^3	694.6	693.8	657.5	658.4	659.5	658.8
Vapor Density	kg/m^3	1.16	1.16	1.18	1.18	1.20	1.20
Vapor Rate	kg/s	1.06	1.07	1.08	1.09	1.36	1.42
Liquid Rate	m^3/h	5.5	5.6	5.9	6.0	7.4	7.7
Fs	m/s $(kg/m^3)^{0.5}$	0.848	0.860	0.863	0.867	1.077	1.120
Capacity Factor, Cs	m/s	0.032	0.033	0.034	0.034	0.042	0.044
HETP 2 pt							
DIST & below bed	mm	528	787	448	458	457	447
DIST & bottoms		491	720	436	438	443	440
Relative Volatility		1.861	1.861	1.875	1.876	1.872	1.873
Capacity Factor, Cs Top	m/s	0.032	0.032	0.031	0.031	0.039	0.041
Capacity Factor, Cs mid	m/s	0.032	0.032	0.032	0.032	0.040	0.041

Table I (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 0.31 bar

Run Number		22636	22635	22671	22656	22672	22655
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	bar	0.31	0.31	0.31	0.31	0.31	0.31
Reboiler Duty	MW	0.57	0.57	0.66	0.67	0.66	0.67
Condenser Duty	MW	0.56	0.54	0.70	0.64	0.67	0.64
Reflux Rate	kg/s	1.60	1.59	1.86	1.81	1.87	1.80
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.78	3.78	3.80	3.67	3.79	3.67
Pressure Drops							
Overall	mbar/m	0.82	0.81	1.14	1.11	1.14	1.10
Top	mbar/m	0.78	0.77	1.09	1.05	1.08	1.04
Bottom	mbar/m	0.78	0.77	1.00	0.95	0.99	0.94
Dist. Pressure Drop	mbar	0.12	0.12	0.38	0.32	0.37	0.32
Bed Liquid Volume Fraction							
From Gamma Scan			0.03	0.04			
Temperature Profiles	°C						
Overhead Vapor		48.2	48.2	48.9	48.5	48.9	48.5
Reflux		44.6	44.3	44.3	40.8	44.2	40.8
Distributor		45.1	45.0	45.6	43.3	45.6	43.3
Top Bed		47.2	47.2	47.8	47.4	47.8	47.4
Mid Bed		52.7	52.8	53.6	53.0	53.6	53.0
Below Bed		60.0	60.1	60.5	59.9	60.6	59.9
Composition of Liquid	Mol % C_6						
Reflux		91.05	90.94	89.45	90.69	89.39	90.65
Distributor		90.92	90.74	89.27	88.53	89.22	88.53
Below Bed		15.13	14.27	13.95	16.56	13.20	14.83
Bottoms		6.65	7.37	6.10	7.06	6.04	7.05
Feed		6.48	7.09	5.77	6.70	5.75	6.89
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % C_6	15.13	14.27	13.95	16.56	13.20	14.83
Temperature	°C	60.0	60.1	60.5	59.9	60.6	59.9
Liquid Density	kg/m^3	659.5	658.9	658.2	660.8	657.6	659.5
Vapor Density	kg/m^3	1.21	1.21	1.22	1.22	1.22	1.20
Vapor Rate	kg/s	1.64	1.64	1.92	1.92	1.92	1.92
Liquid Rate	m^3/h	9.0	9.0	10.5	10.5	10.5	10.5
Fs	$m/s\ (kg/m^3)^{0.5}$	1.291	1.295	1.502	1.507	1.509	1.516
Capacity Factor, Cs	m/s	0.050	0.051	0.059	0.059	0.059	0.059
HETP 2 pt							
DIST & below bed	mm	461	456	471	508	464	491
DIST & bottoms		428	442	437	464	437	464
Relative Volatility		1.871	1.872	1.869	1.870	1.869	1.872
Capacity Factor, Cs Top	m/s	0.047	0.047	0.055	0.056	0.055	0.056
Capacity Factor, Cs mid	m/s	0.048	0.048	0.055	0.056	0.056	0.056

Table I (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 0.31 bar

Run Number		22670	22638	22669	22657	22658	22637
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	bar	0.31	0.31	0.31	0.31	0.31	0.31
Reboiler Duty	MW	0.76	0.76	0.76	0.76	0.76	0.76
Condenser Duty	MW	0.78	0.78	0.80	0.71	0.70	0.78
Reflux Rate	kg/s	2.10	2.11	2.09	2.03	2.02	2.10
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.77	3.77	3.74	3.65	3.66	3.78
Pressure Drops							
Overall	mbar/m	1.51	1.50	1.51	1.45	1.44	1.49
Top	mbar/m	1.44	1.46	1.45	1.37	1.36	1.45
Bottom	mbar/m	1.40	1.49	1.40	1.31	1.30	1.47
Dist. Pressure Drop	mbar	0.43	0.20	0.45	0.35	0.35	0.20
Bed Liquid Volume Fraction							
From Gamma Scan				0.04			0.04
Temperature Profiles	°C						
Overhead Vapor		48.6	48.4	48.5	48.4	48.5	48.4
Reflux		44.0	44.8	43.9	40.6	40.6	44.8
Distributor		45.4	45.5	45.3	42.8	42.8	45.5
Top Bed		47.6	47.5	47.5	47.2	47.3	47.5
Mid Bed		53.6	54.2	53.5	53.4	53.5	54.1
Below Bed		60.3	60.6	60.3	60.0	60.0	60.6
Composition of Liquid	Mol % C_6						
Reflux		89.94	90.11	89.98	90.16	90.16	90.20
Distributor		89.54	89.98	89.54	90.18	89.95	90.36
Below Bed		15.11	14.16	14.96	15.77	15.61	12.21
Bottoms		6.35	5.63	6.35	6.38	6.40	5.68
Feed		6.09	5.47	6.11	6.04	6.05	5.47
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % C_6	15.11	14.16	14.96	15.77	15.61	12.21
Temperature	°C	60.3	60.6	60.3	60.0	60.0	60.6
Liquid Density	kg/m^3	659.3	658.3	659.2	660.1	659.9	656.9
Vapor Density	kg/m^3	1.22	1.23	1.22	1.22	1.22	1.21
Vapor Rate	kg/s	2.19	2.19	2.19	2.19	2.19	2.20
Liquid Rate	m^3/h	12.0	12.0	12.0	11.9	12.0	12.0
Fs	m/s $(kg/m^3)^{0.5}$	1.712	1.714	1.716	1.719	1.721	1.731
Capacity Factor, Cs	m/s	0.067	0.067	0.067	0.067	0.067	0.068
HETP 2 pt							
DIST & below bed	mm	479	464	478	477	479	441
DIST & bottoms		439	421	439	432	435	418
Relative Volatility		1.869	1.868	1.869	1.870	1.870	1.871
Capacity Factor, Cs Top	m/s	0.063	0.063	0.063	0.063	0.063	0.063
Capacity Factor, Cs mid	m/s	0.063	0.063	0.063	0.064	0.064	0.064

Table I (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 0.31 bar

Run Number		22639	22640	22659	22660	22661	22662	22664
Run Type		TR	TR	TR	TR	TR	TR	TR
Column Pressure	bar	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Reboiler Duty	MW	0.85	0.85	0.95	0.95	1.04	1.04	1.14
Condenser Duty	MW	0.86	0.85	0.91	0.93	1.02	1.02	1.10
Reflux Rate	kg/s	2.35	2.34	2.52	2.52	2.78	2.77	3.00
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.78	3.77	3.74	3.77	3.84	3.84	3.77
Pressure Drops								
Overall	mbar/m	1.93	1.90	2.46	2.46	3.29	3.27	4.59
Top	mbar/m	1.85	1.82	2.24	2.25	2.95	2.94	3.86
Bottom	mbar/m	1.92	1.90	2.43	2.43	3.38	3.36	5.03
Dist. Pressure Drop	mbar	0.18	0.17	0.43	0.44	0.52	0.52	0.47
Bed Liquid Volume Fraction								
From Gamma Scan		0.04		0.05		0.06		
Temperature Profiles	°C							
Overhead Vapor		48.9	49.0	49.8	48.7	48.5	48.5	47.9
Reflux		44.0	43.9	41.9	41.7	41.3	41.3	40.2
Distributor		45.5	45.5	44.1	43.7	43.4	43.3	42.2
Top Bed		48.0	48.1	48.5	47.7	47.6	47.6	47.2
Mid Bed		57.9	58.1	55.5	54.5	54.1	54.1	52.3
Below Bed		60.9	61.0	61.8	61.0	61.3	61.3	61.3
Composition of Liquid	Mol % C_6							
Reflux		89.07	88.87	89.56	89.57	90.68	90.57	93.99
Distributor		89.19	88.66	89.38	89.37	90.38	90.34	93.72
Below Bed		13.13	12.55	13.51	13.23	12.64	12.09	15.26
Bottoms		5.55	5.57	5.56	5.52	5.39	5.30	6.82
Feed		5.28	5.29	5.29	5.22	5.06	5.04	6.49
Conditions at Bottom (Based on Reboiler Duty)								
Composition	Mol % C_6	13.13	12.55	13.51	13.23	12.64	12.09	15.26
Temperature	°C	60.9	61.0	61.8	61.0	61.3	61.3	61.3
Liquid Density	kg/m^3	657.3	656.8	656.7	657.3	656.5	656.1	658.4
Vapor Density	kg/m^3	1.23	1.23	1.27	1.23	1.24	1.24	1.27
Vapor Rate	kg/s	2.47	2.47	2.74	2.74	3.02	3.02	3.29
Liquid Rate	m^3/h	13.5	13.5	15.0	15.0	16.6	16.6	18.0
Fs	$m/s\ (kg/m^3)^{0.5}$	1.927	1.930	2.105	2.137	2.345	2.351	2.525
Capacity Factor, Cs	m/s	0.075	0.075	0.082	0.083	0.092	0.092	0.098
HETP 2 pt								
DIST & below bed	mm	463	464	462	462	443	439	418
DIST & bottoms		427	433	423	425	412	410	391
Relative Volatility		1.867	1.867	1.859	1.866	1.864	1.865	1.861
Capacity Factor, Cs Top	m/s	0.070	0.070	0.078	0.079	0.086	0.086	0.094
Capacity Factor, Cs mid	m/s	0.071	0.071	0.078	0.079	0.087	0.087	0.094

Table I (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 0.31 bar

Run Number		22663	22665	22666	22668	22667	22630	22629
Run Type		TR	TR	TR	TR	TR	FT	FT
Column Pressure	bar	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Reboiler Duty	MW	1.14	1.23	1.23	1.29	1.29	1.27	1.27
Condenser Duty	MW	1.09	1.18	1.18	1.22	1.23	1.31	1.30
Reflux Rate	kg/s	3.00	3.26	3.26	3.42	3.42	3.46	3.47
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.77	3.64	3.64	3.66	3.67	3.77	3.77
Pressure Drops								
Overall	mbar/m	4.59	11.29	11.28	12.28	12.28	11.57	11.66
Top	mbar/m	3.86	12.72	12.69	14.19	14.20	12.87	13.02
Bottom	mbar/m	5.01	9.55	9.57	10.07	10.07	10.04	10.08
Dist. Pressure Drop	mbar	0.47	0.85	0.85	2.67	2.76	0.91	1.18
Bed Liquid Volume Fraction								
From Gamma Scan		0.07	0.11			0.11		
Temperature Profiles	°C							
Overhead Vapor		47.8	51.2	51.2	53.9	53.8	48.1	48.3
Reflux		40.0	40.7	40.6	41.3	41.2	40.7	40.7
Distributor		42.1	43.4	43.5	45.3	45.3	46.1	46.2
Top Bed		47.1	50.5	50.5	54.6	54.6	48.6	49.2
Mid Bed		52.4	60.1	60.1	57.0	57.0	58.2	58.3
Below Bed		61.2	62.2	62.1	60.6	60.5	56.4	55.9
Composition of Liquid	Mol % C_6							
Reflux		94.13	76.54	77.45	63.59	63.61	91.04	89.49
Distributor		93.75	77.48	77.07	61.71	61.98	90.35	91.80
Below Bed		15.49	25.89	25.06	33.15	32.81	44.51	42.26
Bottoms		6.88	10.57	10.41	17.96	18.08	26.47	27.40
Feed		6.51	10.12	10.04	17.98	17.99	26.81	27.81
Conditions at Bottom (Based on Reboiler Duty)								
Composition	Mol % C_6	15.49	25.89	25.06	33.15	32.81	44.51	42.26
Temperature	°C	61.2	62.2	62.1	60.6	60.5	56.4	55.9
Liquid Density	kg/m^3	658.7	665.7	665.1	672.9	672.7	686.4	684.9
Vapor Density	kg/m^3	1.26	1.40	1.39	1.38	1.37	1.26	1.23
Vapor Rate	kg/s	3.29	3.53	3.53	3.68	3.68	3.58	3.58
Liquid Rate	m^3/h	18.0	19.1	19.1	19.7	19.7	18.8	18.8
Fs	$m/s\ (kg/m^3)^{0.5}$	2.530	2.587	2.595	2.707	2.715	2.759	2.795
Capacity Factor, Cs	m/s	0.099	0.100	0.101	0.104	0.105	0.105	0.107
HETP 2 pt								
DIST & below bed	mm	419	805	799	1574	1539	750	676
DIST & bottoms		392	666	668	1337	1334	694	662
Relative Volatility		1.861	1.840	1.841	1.839	1.841	1.851	1.858
Capacity Factor, Cs Top	m/s	0.094	0.101	0.101	0.104	0.104	0.104	0.103
Capacity Factor, Cs mid	m/s	0.094	0.099	0.100	0.104	0.104	0.104	0.104

Table I (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 0.31 bar

Run Number		22673	22674	22675	22676	22677	22678
Run Type		FL OHP	FL OHP	FL OHP	FL OHP	OHP	OHP
Column Pressure	bar	0.31	0.31	0.31	0.31	0.31	0.31
Reboiler Duty	MW	1.35	1.36	1.35	1.39	1.23	1.23
Condenser Duty	MW	1.29	1.36	1.31	1.34	1.19	1.17
Reflux Rate	kg/s	2.96	2.64	2.29	1.93	3.03	2.71
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.78	3.79	3.78	5.29	5.29	5.30
Pressure Drops							
Overall	mbar/m	13.10	13.98	11.21	11.38	10.24	9.77
Top	mbar/m	15.34	17.69	12.94	13.17	10.80	10.17
Bottom	mbar/m	10.59	10.07	9.21	9.33	9.36	9.05
Dist. Pressure Drop	mbar	3.15	4.67	1.56	1.65	0.27	0.26
Bed Liquid Volume Fraction							
From Gamma Scan			0.10	0.10	0.09	0.10	
Temperature Profiles	°C						
Overhead Vapor		55.6	56.2	56.6	56.9	53.3	53.8
Reflux		43.2	44.5	44.1	43.4	42.8	42.5
Distributor		48.2	50.0	49.4	49.7	45.5	45.9
Top Bed		57.0	58.0	57.0	57.5	51.7	52.1
Mid Bed		59.5	60.8	60.5	60.4	60.8	61.1
Below Bed		61.4	62.1	61.5	61.3	62.2	62.1
Composition of Liquid	Mol % C_6						
Reflux		53.24	48.84	46.93	45.21	65.08	63.58
Distributor		78.39	46.70	44.08	42.69	59.89	63.97
Below Bed		26.12	22.47	21.47	21.45	15.56	14.91
Bottoms		18.21	19.67	20.35	22.31	15.02	14.53
Feed		24.35	28.14	30.34	30.31	19.49	19.87
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % C_6	26.12	22.47	21.47	21.45	15.56	14.91
Temperature	°C	61.4	62.1	61.5	61.3	62.2	62.1
Liquid Density	kg/m^3	666.6	663.2	662.9	663.1	657.9	657.4
Vapor Density	kg/m^3	1.37	1.36	1.33	1.32	1.31	1.30
Vapor Rate	kg/s	3.77	3.79	3.70	3.75	3.53	3.47
Liquid Rate	m^3/h	16.7	14.6	12.5	10.3	17.8	15.5
Fs	$m/s\ (kg/m^3)^{0.5}$	2.791	2.806	2.777	2.820	2.668	2.636
Capacity Factor, Cs	m/s	0.108	0.109	0.108	0.110	0.104	0.103
L/V		0.82	0.71	0.62	0.51	0.92	0.82
OHP Flow		0.68	1.10	1.40	1.85	0.28	0.64
Capacity Factor, Cs Top	m/s	0.099	0.107	0.107	0.108	0.103	0.101
Capacity Factor, Cs mid	m/s	0.103	0.108	0.108	0.109	0.102	0.101

Table I (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 0.31 bar

Run Number		22679	22680	22681	22682	22683	22684
Run Type		OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	bar	0.31	0.31	0.31	0.31	0.31	0.31
Reboiler Duty	MW	1.14	1.04	0.95	1.05	1.14	1.24
Condenser Duty	MW	1.10	1.00	0.91	1.00	1.10	1.19
Reflux Rate	kg/s	2.70	2.69	2.33	2.35	2.37	2.36
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	5.29	5.29	5.30	5.29	5.28	5.29
Pressure Drops							
Overall	mbar/m	4.89	3.30	2.47	3.28	4.46	6.71
Top	mbar/m	4.25	2.98	2.33	3.07	4.13	5.93
Bottom	mbar/m	5.24	3.38	2.41	3.27	4.55	7.17
Dist. Pressure Drop	mbar	0.20	0.15	0.13	0.17	0.20	0.25
Bed Liquid Volume Fraction							
From Gamma Scan				0.05	0.05	0.06	0.09
Temperature Profiles	°C						
Overhead Vapor		52.4	50.5	51.8	53.4	54.7	55.4
Reflux		42.8	42.2	43.6	43.8	43.8	43.2
Distributor		45.6	44.6	45.8	46.6	47.1	47.1
Top Bed		50.8	49.1	50.1	51.6	52.9	53.8
Mid Bed		60.0	58.0	59.0	59.6	59.9	60.1
Below Bed		61.6	61.7	61.1	60.6	60.6	60.9
Composition of Liquid	Mol % C_6						
Reflux		70.68	81.60	75.26	65.62	59.07	54.89
Distributor		64.12	81.04	76.46	69.55	62.53	57.48
Below Bed		12.48	9.09	11.04	13.29	15.40	16.91
Bottoms		11.64	7.05	10.50	14.37	16.85	18.36
Feed		15.78	8.61	13.52	19.11	22.84	25.16
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % C_6	12.48	9.09	11.04	13.29	15.40	16.91
Temperature	°C	61.6	61.7	61.1	60.6	60.6	60.9
Liquid Density	kg/m^3	656.2	653.6	655.6	657.7	659.2	660.1
Vapor Density	kg/m^3	1.25	1.22	1.22	1.22	1.24	1.26
Vapor Rate	kg/s	3.24	3.01	2.71	2.95	3.19	3.43
Liquid Rate	m^3/h	15.5	15.7	13.2	13.2	13.2	13.1
Fs	$m/s\ (kg/m^3)^{0.5}$	2.509	2.355	2.127	2.312	2.482	2.636
Capacity Factor, Cs	m/s	0.098	0.092	0.083	0.090	0.097	0.103
L/V		0.87	0.95	0.89	0.82	0.76	0.70
OHP Flow		0.41	0.16	0.30	0.54	0.78	1.02
Capacity Factor, Cs Top	m/s	0.096	0.087	0.079	0.086	0.093	0.100
Capacity Factor, Cs mid	m/s	0.096	0.087	0.080	0.087	0.094	0.101

Table I (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 0.31 bar

Run Number		22685	22686	22687	22688	22689	22690	22691
Run Type		OHP	OHP	OHP	OHP	OHP	OHP	FL OHP
Column Pressure	bar	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Reboiler Duty	MW	1.24	1.14	1.05	0.95	0.86	0.76	1.47
Condenser Duty	MW	1.18	1.08	1.00	0.91	0.85	0.77	1.41
Reflux Rate	kg/s	2.00	1.97	1.96	1.95	1.97	1.93	1.45
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	5.29	5.29	5.30	5.29	5.29	5.29	5.30
Pressure Drops								
Overall	mbar/m	5.48	3.91	2.99	2.36	1.90	1.49	10.90
Top	mbar/m	5.17	3.73	2.87	2.27	1.85	1.44	12.42
Bottom	mbar/m	5.51	3.85	2.90	2.25	1.79	1.36	9.14
Dist. Pressure Drop	mbar	0.25	0.22	0.20	0.19	0.18	0.15	1.64
Bed Liquid Volume Fraction								
From Gamma Scan		0.06	0.05	0.05	0.05	0.04	0.04	0.09
Temperature Profiles	°C							
Overhead Vapor		56.3	56.0	55.5	54.8	53.4	51.4	57.5
Reflux		44.0	44.8	45.3	45.7	46.0	45.9	43.6
Distributor		48.5	48.6	48.5	48.3	48.0	47.3	51.8
Top Bed		55.0	54.5	53.8	53.0	51.6	49.8	58.1
Mid Bed		59.5	59.4	59.3	59.3	59.2	58.3	60.2
Below Bed		60.1	59.7	59.7	59.7	60.0	60.5	61.1
Composition of Liquid	Mol % C_6							
Reflux		48.74	50.89	53.71	57.62	64.71	74.92	41.31
Distributor		54.61	54.35	48.03	57.17	60.28	64.39	55.08
Below Bed		19.11	19.01	18.90	17.13	14.82	12.30	19.66
Bottoms		21.03	20.59	19.80	18.32	15.46	11.46	23.38
Feed		28.35	27.25	25.67	23.36	19.51	13.54	32.09
Conditions at Bottom (Based on Reboiler Duty)								
Composition	Mol % C_6	19.11	19.01	18.90	17.13	14.82	12.30	19.66
Temperature	°C	60.1	59.7	59.7	59.7	60.0	60.5	61.1
Liquid Density	kg/m^3	662.5	662.7	662.7	661.3	659.3	657.1	661.9
Vapor Density	kg/m^3	1.25	1.23	1.23	1.22	1.21	1.20	1.30
Vapor Rate	kg/s	3.39	3.15	2.91	2.66	2.43	2.17	3.89
Liquid Rate	m^3/h	10.8	10.7	10.8	10.7	10.9	10.7	7.4
Fs	m/s $(kg/m^3)^{0.5}$	2.621	2.451	2.267	2.088	1.915	1.714	2.951
Capacity Factor, Cs	m/s	0.102	0.095	0.088	0.081	0.075	0.067	0.115
L/V		0.59	0.63	0.68	0.74	0.82	0.90	0.35
OHP Flow		1.40	1.17	0.93	0.69	0.44	0.21	2.53
Capacity Factor, Cs Top	m/s	0.098	0.092	0.087	0.079	0.073	0.065	0.107
Capacity Factor, Cs mid	m/s	0.100	0.094	0.088	0.080	0.073	0.065	0.111

Table I (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 0.31 bar

Run Number		22692	22693	22694	22695	22696	22697	22698
Run Type		OHP	OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	bar	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Reboiler Duty	MW	1.24	1.15	1.05	0.95	0.86	0.76	0.57
Condenser Duty	MW	1.18	1.10	1.00	0.91	0.81	0.72	0.54
Reflux Rate	kg/s	1.42	1.43	1.43	1.41	1.39	1.37	1.35
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	5.29	5.29	5.29	5.29	5.30	5.30	5.30
Pressure Drops								
Overall	mbar/m	4.37	3.50	2.75	2.21	1.75	1.38	0.80
Top	mbar/m	4.26	3.42	2.69	2.16	1.71	1.35	0.78
Bottom	mbar/m	4.25	3.37	2.60	2.06	1.60	1.23	0.65
Dist. Pressure Drop	mbar	0.25	0.22	0.19	0.15	0.12	0.10	0.05
Bed Liquid Volume Fraction								
From Gamma Scan		0.05	0.04	0.04	0.04	0.04	0.03	0.03
Temperature Profiles	°C							
Overhead Vapor		57.3	57.1	56.9	56.5	56.3	55.8	53.4
Reflux		44.6	45.5	45.5	45.5	45.6	45.2	44.3
Distributor		50.0	50.1	49.9	49.6	49.5	49.0	47.4
Top Bed		56.4	55.9	55.5	54.9	54.5	53.9	51.5
Mid Bed		59.1	58.9	58.9	58.7	58.8	58.9	58.6
Below Bed		59.5	59.2	59.1	58.8	59.0	59.0	59.4
Composition of Liquid	Mol % C_6							
Reflux		42.97	44.43	45.47	47.10	49.51	52.60	64.20
Distributor		39.28	40.24	44.07	45.89	47.99	51.83	63.28
Below Bed		21.52	21.34	21.10	20.91	20.51	19.94	16.71
Bottoms		23.03	22.92	22.76	22.41	21.85	20.96	17.17
Feed		30.56	29.81	29.24	28.29	27.54	25.64	19.70
Conditions at Bottom (Based on Reboiler Duty)								
Composition	Mol % C_6	21.52	21.34	21.10	20.91	20.51	19.94	16.71
Temperature	°C	59.5	59.2	59.1	58.8	59.0	59.0	59.4
Liquid Density	kg/m^3	664.8	664.9	664.9	665.0	664.5	664.0	661.3
Vapor Density	kg/m^3	1.25	1.23	1.22	1.21	1.22	1.21	1.20
Vapor Rate	kg/s	3.33	3.10	2.85	2.60	2.35	2.10	1.61
Liquid Rate	m^3/h	7.2	7.3	7.3	7.3	7.2	7.1	7.1
Fs	$m/s\ (kg/m^3)^{0.5}$	2.579	2.413	2.227	2.045	1.847	1.650	1.269
Capacity Factor, Cs	m/s	0.100	0.094	0.086	0.079	0.072	0.064	0.049
L/V		0.40	0.43	0.47	0.51	0.56	0.63	0.81
OHP Flow		1.99	1.75	1.51	1.26	1.03	0.79	0.30
Capacity Factor, Cs Top	m/s	0.100	0.093	0.085	0.078	0.071	0.063	0.048
Capacity Factor, Cs mid	m/s	0.101	0.094	0.087	0.079	0.072	0.064	0.049

Table II (SI Units)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 1.62 bar

Run Number		22702	22701	22708	22707	22709	22710
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	bar	1.62	1.62	1.62	1.62	1.61	1.61
Reboiler Duty	MW	0.61	0.61	0.78	0.78	0.96	0.96
Condenser Duty	MW	0.51	0.50	0.70	0.70	0.76	0.74
Reflux Rate	kg/s	1.46	1.45	1.97	1.97	2.19	2.19
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.78	3.78	3.78	3.78	3.78	3.78
Pressure Drops							
Overall	mbar/m	0.31	0.31	0.47	0.47	0.62	0.62
Top	mbar/m	0.26	0.26	0.42	0.42	0.55	0.55
Bottom	mbar/m	0.13	0.12	0.28	0.28	0.44	0.44
Dist. Pressure Drop	mbar	0.00	0.00	0.37	0.39	0.37	0.37
Bed Liquid Volume Fraction							
From Gamma Scan			0.02		0.03	0.03	
Temperature Profiles	^oC						
Overhead Vapor		102.1	102.1	102.4	102.4	102.6	102.6
Reflux		70.5	70.2	74.3	74.4	68.7	69.6
Distributor		83.6	83.5	84.2	84.1	80.2	80.6
Top Bed		99.6	99.6	99.6	99.6	99.6	99.6
Mid Bed		107.1	107.1	107.1	107.1	107.2	107.2
Below Bed		113.5	113.4	113.6	113.6	113.5	113.5
Composition of Liquid	Mol % C_6						
Reflux		81.66	81.87	80.11	80.09	78.66	78.69
Distributor		81.68	81.85	79.97	80.06	78.66	78.74
Below Bed		9.50	9.77	9.20	9.08	9.58	8.78
Bottoms		5.18	5.27	4.67	4.69	4.67	4.71
Feed		5.09	5.09	4.59	4.62	4.89	4.65
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % C_6	9.50	9.77	9.20	9.08	9.58	8.78
Temperature	^oC	113.5	113.4	113.6	113.6	113.5	113.5
Liquid Density	kg/m^3	603.3	603.5	603.0	602.9	603.3	602.8
Vapor Density	kg/m^3	5.47	5.47	5.47	5.47	5.47	5.45
Vapor Rate	kg/s	1.93	1.94	2.50	2.50	3.00	2.99
Liquid Rate	m^3/h	11.5	11.5	14.9	15.0	17.9	17.9
Fs	$m/s\ (kg/m^3)^{0.5}$	0.716	0.716	0.925	0.927	1.108	1.109
Capacity Factor, Cs	m/s	0.029	0.029	0.038	0.038	0.045	0.045
HETP 2 pt							
DIST & below bed	mm	362	364	370	368	383	372
DIST & bottoms		343	344	343	343	351	351
Relative Volatility		1.563	1.564	1.563	1.563	1.563	1.564
Capacity Factor, Cs Top	m/s	0.027	0.027	0.035	0.035	0.042	0.042
Capacity Factor, Cs mid	m/s	0.028	0.028	0.036	0.036	0.043	0.043

Table II (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 1.62 bar

Run Number		22704	22703	22712	22711	22714	22713
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	bar	1.62	1.62	1.62	1.62	1.62	1.62
Reboiler Duty	MW	1.13	1.13	1.21	1.22	1.39	1.39
Condenser Duty	MW	1.01	1.00	1.02	1.00	1.20	1.21
Reflux Rate	kg/s	2.72	2.70	2.99	2.98	3.47	3.50
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.78	3.78	3.78	3.78	3.78	3.78
Pressure Drops							
Overall	mbar/m	0.95	0.94	1.06	1.06	1.48	1.50
Top	mbar/m	0.86	0.86	0.93	0.93	1.31	1.33
Bottom	mbar/m	0.80	0.80	0.94	0.94	1.39	1.43
Dist. Pressure Drop	mbar	0.43	0.45	0.43	0.42	0.41	0.42
Bed Liquid Volume Fraction							
From Gamma Scan			0.04		0.04		0.05
Temperature Profiles	°C						
Overhead Vapor		102.8	102.7	103.3	103.2	103.4	103.4
Reflux		71.2	70.9	82.6	81.5	82.1	82.5
Distributor		80.8	80.6	87.4	86.7	86.4	86.7
Top Bed		99.7	99.7	100.6	100.5	100.5	100.5
Mid Bed		107.8	107.7	108.7	108.7	108.7	108.8
Below Bed		113.5	113.6	113.9	113.9	113.8	113.8
Composition of Liquid	Mol % C_6						
Reflux		77.85	78.12	76.71	76.80	75.62	75.27
Distributor		77.95	78.22	76.77	76.66	75.61	75.44
Below Bed		9.70	9.50	8.06	8.39	8.27	8.02
Bottoms		4.84	4.87	4.57	4.52	4.46	4.43
Feed		4.80	4.86	4.47	4.47	4.37	4.41
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % C_6	9.70	9.50	8.06	8.39	8.27	8.02
Temperature	°C	113.5	113.6	113.9	113.9	113.8	113.8
Liquid Density	kg/m^3	603.3	603.2	601.9	602.1	602.1	601.9
Vapor Density	kg/m^3	5.48	5.48	5.48	5.48	5.48	5.47
Vapor Rate	kg/s	3.61	3.61	3.81	3.84	4.41	4.42
Liquid Rate	m^3/h	21.5	21.5	22.8	22.9	26.4	26.4
Fs	$m/s\ (kg/m^3)^{0.5}$	1.332	1.333	1.409	1.418	1.631	1.635
Capacity Factor, Cs	m/s	0.054	0.055	0.058	0.058	0.067	0.067
HETP 2 pt							
DIST & below bed	mm	389	385	374	379	384	381
DIST & bottoms		358	357	358	358	362	362
Relative Volatility		1.563	1.563	1.562	1.562	1.562	1.562
Capacity Factor, Cs Top	m/s	0.050	0.050	0.053	0.053	0.061	0.061
Capacity Factor, Cs mid	m/s	0.052	0.052	0.054	0.055	0.063	0.063

Table II (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 1.62 bar

Run Number		22716	22715	22717	22718	22705	22706
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	bar	1.62	1.62	1.62	1.62	1.62	1.62
Reboiler Duty	MW	1.55	1.57	1.64	1.65	1.72	1.73
Condenser Duty	MW	1.39	1.41	1.47	1.49	1.57	1.59
Reflux Rate	kg/s	3.84	3.87	4.01	4.03	4.34	4.38
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.78	3.78	3.78	3.78	3.78	3.78
Pressure Drops							
Overall	mbar/m	2.10	2.18	2.57	2.64	3.15	3.26
Top	mbar/m	1.81	1.87	2.16	2.20	2.60	2.67
Bottom	mbar/m	2.11	2.19	2.67	2.75	3.39	3.54
Dist. Pressure Drop	mbar	0.48	0.51	0.58	0.56	0.52	0.52
Bed Liquid Volume Fraction							
From Gamma Scan			0.06	0.07		0.07	
Temperature Profiles	^oC						
Overhead Vapor		103.7	103.7	103.8	103.8	103.5	103.5
Reflux		74.4	74.5	71.4	71.3	77.0	77.2
Distributor		80.5	80.4	78.2	78.0	81.7	81.8
Top Bed		100.2	100.2	100.3	100.3	100.6	100.6
Mid Bed		108.9	109.0	109.3	109.4	109.5	109.5
Below Bed		113.9	114.0	114.1	114.1	114.1	114.2
Composition of Liquid	Mol % C_6						
Reflux		74.19	74.16	73.74	73.60	74.56	74.57
Distributor		74.25	74.20	73.77	73.66	75.01	74.66
Below Bed		7.96	7.88	7.58	7.24	7.73	7.28
Bottoms		4.32	4.27	4.10	4.11	4.12	4.08
Feed		4.26	4.27	4.16	4.12	4.08	4.09
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % C_6	7.96	7.88	7.58	7.24	7.73	7.28
Temperature	^oC	113.9	114.0	114.1	114.1	114.1	114.2
Liquid Density	kg/m^3	601.8	601.7	601.3	601.1	601.4	601.0
Vapor Density	kg/m^3	5.48	5.48	5.49	5.48	5.50	5.49
Vapor Rate	kg/s	4.97	5.04	5.30	5.32	5.57	5.60
Liquid Rate	m^3/h	29.8	30.2	31.7	31.9	33.3	33.5
Fs	$m/s\ (kg/m^3)^{0.5}$	1.838	1.864	1.956	1.967	2.053	2.068
Capacity Factor, Cs	m/s	0.075	0.076	0.080	0.081	0.084	0.085
HETP 2 pt							
DIST & below bed	mm	387	386	384	379	379	374
DIST & bottoms		366	365	363	364	357	358
Relative Volatility		1.562	1.562	1.562	1.562	1.561	1.561
Capacity Factor, Cs Top	m/s	0.069	0.070	0.074	0.074	0.077	0.078
Capacity Factor, Cs mid	m/s	0.071	0.072	0.076	0.076	0.080	0.080

Table II (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 1.62 bar

Run Number		**22720**	**22719**	**22722**	**22721**	**22700**
Run Type		**TR**	**TR**	**TR**	**TR**	**TR**
Column Pressure	**bar**	**1.62**	**1.62**	**1.62**	**1.62**	**1.62**
Reboiler Duty	**MW**	**1.81**	**1.82**	**1.91**	**1.90**	**2.04**
Condenser Duty	**MW**	**1.67**	**1.68**	**1.75**	**1.75**	**1.91**
Reflux Rate	**kg/s**	**4.60**	**4.62**	**4.85**	**4.85**	**5.21**
Feed Location		**Bottom**	**Bottom**	**Bottom**	**Bottom**	**Bottom**
Mass Feed Flow Rate	**kg/s**	**3.78**	**3.78**	**3.78**	**3.78**	**3.78**
Pressure Drops						
Overall	**mbar/m**	**4.15**	**4.32**	**7.78**	**7.70**	**11.18**
Top	**mbar/m**	**3.20**	**3.28**	**6.55**	**6.37**	**13.14**
Bottom	**mbar/m**	**4.77**	**5.01**	**8.58**	**8.61**	**8.93**
Dist. Pressure Drop	**mbar**	**0.65**	**0.65**	**0.61**	**0.62**	**1.01**
Bed Liquid Volume Fraction						
From Gamma Scan			**0.09**		**0.12**	
Temperature Profiles	**°C**					
Overhead Vapor		**103.9**	**103.9**	**104.4**	**104.4**	**107.4**
Reflux		**78.9**	**79.1**	**78.5**	**78.7**	**79.0**
Distributor		**83.0**	**83.2**	**82.7**	**82.9**	**83.6**
Top Bed		**100.9**	**101.2**	**101.3**	**101.3**	**106.2**
Mid Bed		**110.2**	**110.4**	**113.4**	**113.4**	**109.5**
Below Bed		**114.6**	**114.6**	**114.2**	**114.3**	**110.4**
Composition of Liquid	**Mol % C_6**					
Reflux		**73.59**	**73.51**	**70.06**	**70.04**	**54.82**
Distributor		**73.63**	**73.66**	**70.13**	**70.96**	**54.93**
Below Bed		**5.92**	**5.72**	**8.23**	**7.55**	**34.43**
Bottoms		**3.43**	**3.38**	**5.09**	**5.10**	**18.08**
Feed		**3.46**	**3.45**	**4.98**	**4.97**	**18.00**
Conditions at Bottom (Based on Reboiler Duty)						
Composition	**Mol % C_6**	**5.92**	**5.72**	**8.23**	**7.55**	**34.43**
Temperature	**°C**	**114.6**	**114.6**	**114.2**	**114.3**	**110.4**
Liquid Density	**kg/m^3**	**599.7**	**599.5**	**601.6**	**601.0**	**625.0**
Vapor Density	**kg/m^3**	**5.51**	**5.51**	**5.53**	**5.52**	**5.64**
Vapor Rate	**kg/s**	**5.84**	**5.89**	**6.17**	**6.17**	**6.41**
Liquid Rate	**m^3/h**	**35.1**	**35.3**	**36.9**	**36.9**	**36.9**
Fs	**m/s (kg/m^3)$^{0.5}$**	**2.154**	**2.170**	**2.269**	**2.270**	**2.335**
Capacity Factor, Cs	**m/s**	**0.088**	**0.089**	**0.093**	**0.093**	**0.094**
HETP 2 pt						
DIST & below bed	**mm**	**357**	**354**	**416**	**399**	**1616**
DIST & bottoms		**346**	**344**	**407**	**402**	**1078**
Relative Volatility		**1.560**	**1.560**	**1.561**	**1.560**	**1.564**
Capacity Factor, Cs Top	**m/s**	**0.081**	**0.081**	**0.086**	**0.086**	**0.092**
Capacity Factor, Cs mid	**m/s**	**0.083**	**0.084**	**0.088**	**0.088**	**0.093**

Table II (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 1.62 bar

Run Number		**22723**	**22699**	**22724**	**22725**	**22726**
Run Type		**TR**	**TR**	**TR**	**FT**	**FT**
Column Pressure	**bar**	**1.62**	**1.62**	**1.62**	**1.62**	**1.62**
Reboiler Duty	**MW**	**2.00**	**2.04**	**1.99**	**2.03**	**2.04**
Condenser Duty	**MW**	**1.80**	**1.91**	**1.80**	**1.84**	**1.84**
Reflux Rate	**kg/s**	**5.08**	**5.21**	**5.08**	**5.06**	**5.05**
Feed Location		**Bottom**	**Bottom**	**Bottom**	**Bottom**	**Bottom**
Mass Feed Flow Rate	**kg/s**	**3.78**	**3.75**	**3.78**	**3.78**	**3.78**
Pressure Drops						
Overall	**mbar/m**	**10.28**	**11.11**	**10.27**	**11.16**	**11.15**
Top	**mbar/m**	**11.80**	**13.11**	**11.82**	**13.42**	**13.37**
Bottom	**mbar/m**	**8.44**	**8.83**	**8.41**	**8.63**	**8.65**
Dist. Pressure Drop	**mbar**	**0.66**	**1.01**	**0.67**	**1.02**	**1.01**
Bed Liquid Volume Fraction						
From Gamma Scan		**0.10**	**0.10**		**0.10**	
Temperature Profiles	**^oC**					
Overhead Vapor		**106.8**	**107.3**	**106.8**	**108.1**	**108.1**
Reflux		**79.9**	**79.2**	**80.4**	**76.9**	**76.9**
Distributor		**83.9**	**83.7**	**84.3**	**82.0**	**81.7**
Top Bed		**105.4**	**106.3**	**105.1**	**107.5**	**107.4**
Mid Bed		**112.2**	**109.7**	**112.4**	**110.4**	**110.5**
Below Bed		**112.4**	**110.4**	**112.6**	**111.3**	**111.3**
Composition of Liquid	**Mol % C_6**					
Reflux		**58.41**	**54.91**	**58.61**	**51.19**	**50.68**
Distributor		**59.43**	**54.72**	**58.24**	**50.64**	**50.90**
Below Bed		**20.82**	**31.67**	**17.81**	**28.13**	**24.52**
Bottoms		**11.58**	**18.10**	**11.71**	**14.92**	**15.04**
Feed		**11.00**	**17.31**	**11.19**	**14.39**	**14.61**
Conditions at Bottom (Based on Reboiler Duty)						
Composition	**Mol % C_6**	**20.82**	**31.67**	**17.81**	**28.13**	**24.52**
Temperature	**^oC**	**112.4**	**110.4**	**112.6**	**111.3**	**111.3**
Liquid Density	**kg/m^3**	**612.4**	**622.8**	**610.0**	**619.1**	**616.4**
Vapor Density	**kg/m^3**	**5.63**	**5.59**	**5.59**	**5.65**	**5.57**
Vapor Rate	**kg/s**	**6.37**	**6.43**	**6.37**	**6.42**	**6.45**
Liquid Rate	**m^3/h**	**37.5**	**37.2**	**37.6**	**37.3**	**37.7**
Fs	**m/s $(kg/m^3)^{0.5}$**	**2.324**	**2.354**	**2.331**	**2.337**	**2.364**
Capacity Factor, Cs	**m/s**	**0.094**	**0.095**	**0.095**	**0.094**	**0.096**
HETP 2 pt						
DIST & below bed	**mm**	**791**	**1422**	**731**	**1412**	**1174**
DIST & bottoms		**690**	**1088**	**714**	**1031**	**1032**
Relative Volatility		**1.563**	**1.565**	**1.563**	**1.563**	**1.566**
Capacity Factor, Cs Top	**m/s**	**0.089**	**0.092**	**0.090**	**0.091**	**0.091**
Capacity Factor, Cs mid	**m/s**	**0.091**	**0.093**	**0.092**	**0.093**	**0.093**

Table II (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 1.62 bar

Run Number		22727	22728	22729	22730	22731	22732
Run Type		FL OHP	FL OHP	FL OHP	FL OHP	FL OHP	FL OHP
Column Pressure	bar	1.62	1.62	1.62	1.62	1.62	1.62
Reboiler Duty	MW	2.76	2.09	2.14	2.30	2.48	2.75
Condenser Duty	MW	2.52	1.91	1.98	2.09	2.32	2.55
Reflux Rate	kg/s	2.23	4.36	3.79	3.20	2.72	1.53
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	7.55	7.56	7.56	7.57	7.56	7.55
Pressure Drops							
Overall	mbar/m	10.54	10.77	10.37	10.11	10.54	9.00
Top	mbar/m	12.18	13.03	12.32	12.01	12.58	10.29
Bottom	mbar/m	8.62	8.28	8.17	7.95	8.22	7.40
Dist. Pressure Drop	mbar	1.67	1.04	0.91	1.07	1.27	1.10
Bed Liquid Volume Fraction							
From Gamma Scan		0.09	0.11	0.10	0.10	0.09	0.07
Temperature Profiles	°C						
Overhead Vapor		110.8	108.5	109.1	110.1	110.5	111.0
Reflux		73.4	74.8	76.2	80.8	80.9	81.3
Distributor		88.9	81.2	84.3	89.4	90.8	94.8
Top Bed		110.2	108.9	108.8	109.9	110.1	110.6
Mid Bed		111.4	111.8	111.9	111.6	111.3	111.3
Below Bed		111.5	112.0	112.1	111.8	111.5	111.4
Composition of Liquid	Mol % C_6						
Reflux		34.27	48.41	43.61	38.36	36.09	33.11
Distributor		34.36	45.94	44.21	38.76	36.14	33.28
Below Bed		21.43	20.72	19.18	20.08	21.15	21.73
Bottoms		21.35	15.77	17.65	20.10	21.36	22.26
Feed		29.32	18.79	23.14	26.75	28.97	30.57
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % C_6	21.43	20.72	19.18	20.08	21.15	21.73
Temperature	°C	111.5	112.0	112.1	111.8	111.5	111.4
Liquid Density	kg/m^3	613.8	612.8	611.5	612.6	613.6	614.2
Vapor Density	kg/m^3	5.53	5.57	5.55	5.53	5.52	5.51
Vapor Rate	kg/s	7.33	6.44	6.35	6.63	6.93	7.26
Liquid Rate	m^3/h	16.4	33.2	28.0	23.0	18.5	9.4
Fs	$m/s\ (kg/m^3)^{0.5}$	2.696	2.361	2.330	2.438	2.552	2.677
Capacity Factor, Cs	m/s	0.109	0.096	0.095	0.099	0.103	0.108
L/V		0.38	0.88	0.75	0.59	0.45	0.22
OHP Flow		4.54	0.78	1.59	2.72	3.78	5.67
Capacity Factor, Cs Top	m/s	0.106	0.090	0.089	0.094	0.100	0.107
Capacity Factor, Cs mid	m/s	0.108	0.092	0.091	0.096	0.102	0.109

Table II (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 1.62 bar

Run Number		22733	22734	22735	22736	22737	22738
Run Type		OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	bar	1.62	1.62	1.62	1.62	1.62	1.62
Reboiler Duty	MW	2.37	2.19	1.75	1.39	1.13	2.10
Condenser Duty	MW	2.21	2.06	1.61	1.28	1.03	1.96
Reflux Rate	kg/s	2.29	2.30	2.22	2.17	2.19	2.66
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	7.56	7.56	7.57	7.56	7.56	7.56
Pressure Drops							
Overall	mbar/m	5.69	3.95	1.95	1.22	0.86	3.82
Top	mbar/m	5.28	3.75	1.88	1.19	0.83	3.62
Bottom	mbar/m	5.78	3.87	1.79	1.03	0.66	3.80
Dist. Pressure Drop	mbar	0.67	0.65	0.56	0.45	0.37	0.50
Bed Liquid Volume Fraction							
From Gamma Scan		0.08	0.06	0.04	0.04	0.04	0.06
Temperature Profiles	^oC						
Overhead Vapor		110.7	110.5	110.1	109.3	108.0	110.2
Reflux		83.5	83.5	82.4	78.7	75.8	83.1
Distributor		92.1	92.0	91.1	88.7	86.7	91.0
Top Bed		109.0	108.7	107.9	106.6	105.0	108.4
Mid Bed		111.2	111.1	111.1	111.1	111.0	111.3
Below Bed		111.3	111.2	111.1	111.2	111.7	111.3
Composition of Liquid	Mol % C_6						
Reflux		35.35	36.22	38.81	43.11	50.17	37.97
Distributor		35.70	36.39	38.91	42.73	48.84	90.63
Below Bed		21.20	21.12	21.08	20.09	17.60	20.43
Bottoms		21.66	21.60	21.49	20.37	17.89	20.78
Feed		29.04	28.51	26.90	24.54	20.79	27.47
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % C_6	21.20	21.12	21.08	20.09	17.60	20.43
Temperature	^oC	111.3	111.2	111.1	111.2	111.7	111.3
Liquid Density	kg/m^3	613.9	614.0	614.1	613.2	610.9	613.3
Vapor Density	kg/m^3	5.49	5.47	5.45	5.44	5.45	5.47
Vapor Rate	kg/s	6.58	6.15	4.97	4.04	3.41	5.98
Liquid Rate	m^3/h	15.7	15.8	15.5	15.5	16.0	18.2
Fs	$m/s\ (kg/m^3)^{0.5}$	2.430	2.274	1.842	1.499	1.263	2.212
Capacity Factor, Cs	m/s	0.099	0.092	0.075	0.061	0.051	0.090
L/V		0.41	0.44	0.53	0.65	0.79	0.52
OHP Flow		3.91	3.46	2.33	1.41	0.70	2.88
Capacity Factor, Cs Top	m/s	0.096	0.090	0.072	0.059	0.049	0.076
Capacity Factor, Cs mid	m/s	0.097	0.091	0.073	0.060	0.050	0.082

Table II (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 1.62 bar

Run Number		22739	22740	22741	22742	22743	22744
Run Type		OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	bar	1.62	1.62	1.62	1.62	1.62	1.62
Reboiler Duty	MW	1.75	1.40	1.14	2.10	1.74	1.56
Condenser Duty	MW	1.61	1.27	1.60	1.93	1.59	1.42
Reflux Rate	kg/s	2.61	2.51	2.42	3.22	3.17	3.12
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	7.56	7.56	7.56	7.56	7.56	7.56
Pressure Drops							
Overall	mbar/m	2.15	1.31	0.86	4.97	2.44	1.86
Top	mbar/m	2.04	1.24	0.82	4.46	2.26	1.71
Bottom	mbar/m	2.00	1.13	0.67	5.15	2.36	1.74
Dist. Pressure Drop	mbar	0.43	0.40	0.37	0.50	0.44	0.42
Bed Liquid Volume Fraction							
From Gamma Scan		0.05	0.04	0.04	0.08	0.06	0.05
Temperature Profiles	^oC						
Overhead Vapor		109.8	108.8	109.3	109.8	108.9	108.1
Reflux		82.3	78.7	80.7	82.6	81.6	79.9
Distributor		90.2	87.7	88.4	89.2	88.2	86.9
Top Bed		107.5	105.8	106.7	107.6	106.3	105.1
Mid Bed		111.2	111.2	111.4	111.5	111.3	111.2
Below Bed		111.2	111.5	111.6	111.6	111.6	111.9
Composition of Liquid	Mol % C_6						
Reflux		40.67	46.25	57.32	40.75	45.32	49.82
Distributor		40.68	46.10	56.92	40.74	45.36	49.91
Below Bed		20.00	18.49	14.79	19.13	17.87	16.37
Bottoms		20.36	18.87	14.53	19.48	18.26	16.65
Feed		25.80	22.79	16.78	25.87	23.23	20.60
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % C_6	20.00	18.49	14.79	19.13	17.87	16.37
Temperature	^oC	111.2	111.5	111.6	111.6	111.6	111.9
Liquid Density	kg/m^3	613.1	611.7	609.0	612.0	611.1	609.8
Vapor Density	kg/m^3	5.45	5.45	5.36	5.48	5.45	5.44
Vapor Rate	kg/s	5.06	4.16	3.53	6.12	5.21	4.74
Liquid Rate	m^3/h	18.0	18.1	18.4	22.6	22.6	22.5
Fs	$m/s\ (kg/m^3)^{0.5}$	1.877	1.542	1.317	2.262	1.932	1.759
Capacity Factor, Cs	m/s	0.076	0.063	0.054	0.092	0.078	0.072
L/V		0.60	0.74	0.88	0.63	0.74	0.80
OHP Flow		2.00	1.09	0.42	2.28	1.37	0.93
Capacity Factor, Cs Top	m/s	0.074	0.060	0.044	0.089	0.075	0.068
Capacity Factor, Cs mid	m/s	0.075	0.061	0.046	0.090	0.076	0.069

Table II (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 1.62 bar

Run Number		**22745**	**22746**	**22747**	**22748**	**22749**
Run Type		**OHP**	**OHP**	**OHP**	**OHP**	**OHP**
Column Pressure	**bar**	**1.62**	**1.62**	**1.62**	**1.62**	**1.62**
Reboiler Duty	**MW**	**1.39**	**1.92**	**1.66**	**1.91**	**2.46**
Condenser Duty	**MW**	**1.25**	**1.76**	**1.51**	**1.73**	**2.26**
Reflux Rate	**kg/s**	**3.09**	**3.84**	**3.79**	**4.54**	**1.35**
Feed Location		**Bottom**	**Bottom**	**Bottom**	**Bottom**	**Bottom**
Mass Feed Flow Rate	**kg/s**	**7.56**	**7.56**	**7.56**	**7.56**	**7.56**
Pressure Drops						
Overall	**mbar/m**	**1.46**	**4.24**	**2.47**	**5.87**	**3.93**
Top	**mbar/m**	**1.34**	**3.66**	**2.20**	**4.20**	**3.81**
Bottom	**mbar/m**	**1.32**	**4.48**	**2.44**	**7.11**	**3.77**
Dist. Pressure Drop	**mbar**	**0.37**	**0.47**	**0.42**	**0.45**	**0.60**
Bed Liquid Volume Fraction						
From Gamma Scan		**0.05**	**0.08**	**0.06**	**0.10**	**0.05**
Temperature Profiles	**^oC**					
Overhead Vapor		**106.6**	**108.3**	**106.8**	**105.8**	**111.0**
Reflux		**78.0**	**82.3**	**81.1**	**81.4**	**80.5**
Distributor		**85.2**	**86.8**	**85.8**	**84.9**	**94.0**
Top Bed		**103.5**	**105.5**	**103.7**	**102.9**	**109.9**
Mid Bed		**110.6**	**111.6**	**110.9**	**111.4**	**111.0**
Below Bed		**112.3**	**112.2**	**112.6**	**113.6**	**111.0**
Composition of Liquid	**Mol % C_6**					
Reflux		**57.17**	**48.94**	**56.07**	**62.15**	**33.26**
Distributor		**57.16**	**49.01**	**56.13**	**62.25**	**33.33**
Below Bed		**13.96**	**15.70**	**13.68**	**10.08**	**21.69**
Bottoms		**13.90**	**15.94**	**13.71**	**9.49**	**22.06**
Feed		**16.24**	**20.97**	**16.53**	**11.90**	**29.73**
Conditions at Bottom (Based on Reboiler Duty)						
Composition	**Mol % C_6**	**13.96**	**15.70**	**13.68**	**10.08**	**21.69**
Temperature	**^oC**	**112.3**	**112.2**	**112.6**	**113.6**	**111.0**
Liquid Density	**kg/m^3**	**607.6**	**609.0**	**607.1**	**603.5**	**614.6**
Vapor Density	**kg/m^3**	**5.44**	**5.47**	**5.47**	**5.51**	**5.46**
Vapor Rate	**kg/s**	**4.33**	**5.83**	**5.17**	**6.06**	**6.47**
Liquid Rate	**m^3/h**	**22.8**	**27.5**	**27.6**	**33.7**	**8.5**
Fs	**m/s (kg/m^3)$^{0.5}$**	**1.605**	**2.156**	**1.915**	**2.236**	**2.398**
Capacity Factor, Cs	**m/s**	**0.065**	**0.088**	**0.078**	**0.091**	**0.097**
L/V		**0.89**	**0.80**	**0.90**	**0.93**	**0.22**
OHP Flow		**0.47**	**1.18**	**0.53**	**0.41**	**5.02**
Capacity Factor, Cs Top	**m/s**	**0.061**	**0.083**	**0.073**	**0.085**	**0.097**
Capacity Factor, Cs mid	**m/s**	**0.063**	**0.085**	**0.075**	**0.087**	**0.098**

Table II (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
C_6/C_7 System 1.62 bar

Run Number		**22750**	**22751**	**22752**	**22753**	**22754**
Run Type		**OHP**	**OHP**	**OHP**	**OHP**	**OHP**
Column Pressure	**bar**	**1.62**	**1.62**	**1.62**	**1.62**	**1.62**
Reboiler Duty	**MW**	**2.20**	**1.76**	**1.41**	**1.14**	**0.88**
Condenser Duty	**MW**	**1.97**	**1.55**	**1.22**	**0.99**	**0.75**
Reflux Rate	**kg/s**	**1.33**	**1.24**	**1.16**	**1.19**	**1.19**
Feed Location		**Bottom**	**Bottom**	**Bottom**	**Bottom**	**Bottom**
Mass Feed Flow Rate	**kg/s**	**7.55**	**7.56**	**7.56**	**7.56**	**7.56**
Pressure Drops						
Overall	**mbar/m**	**2.70**	**1.53**	**0.96**	**0.68**	**0.46**
Top	**mbar/m**	**2.62**	**1.50**	**0.94**	**0.67**	**0.46**
Bottom	**mbar/m**	**2.52**	**1.33**	**0.74**	**0.46**	**0.24**
Dist. Pressure Drop	**mbar**	**0.55**	**0.51**	**0.47**	**0.46**	**0.45**
Bed Liquid Volume Fraction						
From Gamma Scan		**0.04**	**0.04**	**0.03**	**0.03**	**0.03**
Temperature Profiles	**°C**					
Overhead Vapor		**110.9**	**110.7**	**110.5**	**110.1**	**109.4**
Reflux		**81.1**	**80.0**	**76.2**	**74.7**	**72.6**
Distributor		**94.0**	**93.2**	**92.4**	**91.4**	**90.4**
Top Bed		**109.6**	**109.0**	**108.5**	**107.8**	**107.1**
Mid Bed		**110.9**	**110.9**	**110.8**	**110.8**	**110.8**
Below Bed		**110.8**	**110.8**	**110.7**	**110.7**	**110.8**
Composition of Liquid	**Mol % C_6**					
Reflux		**33.91**	**35.38**	**36.63**	**38.94**	**41.69**
Distributor		**34.06**	**35.45**	**36.77**	**38.80**	**41.49**
Below Bed		**22.03**	**22.41**	**22.64**	**22.35**	**22.30**
Bottoms		**22.13**	**22.44**	**22.69**	**22.45**	**22.02**
Feed		**29.16**	**28.06**	**27.08**	**26.11**	**24.49**
Conditions at Bottom (Based on Reboiler Duty)						
Composition	**Mol % C_6**	**22.03**	**22.41**	**22.64**	**22.35**	**22.30**
Temperature	**°C**	**110.8**	**110.8**	**110.7**	**110.7**	**110.8**
Liquid Density	**kg/m^3**	**615.0**	**615.3**	**615.6**	**615.4**	**615.3**
Vapor Density	**kg/m^3**	**5.45**	**5.45**	**5.44**	**5.43**	**5.44**
Vapor Rate	**kg/s**	**5.83**	**4.67**	**3.75**	**3.11**	**2.48**
Liquid Rate	**m^3/h**	**8.6**	**8.4**	**8.3**	**8.7**	**8.9**
Fs	**m/s (kg/m^3)$^{0.5}$**	**2.160**	**1.732**	**1.391**	**1.155**	**0.919**
Capacity Factor, Cs	**m/s**	**0.087**	**0.070**	**0.056**	**0.047**	**0.037**
L/V		**0.25**	**0.31**	**0.38**	**0.48**	**0.61**
OHP Flow		**4.36**	**3.24**	**2.33**	**1.63**	**0.96**
Capacity Factor, Cs Top	**m/s**	**0.087**	**0.069**	**0.055**	**0.045**	**0.036**
Capacity Factor, Cs mid	**m/s**	**0.088**	**0.070**	**0.056**	**0.046**	**0.036**

Table III (SI Units)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 1.0 bar

Run Number		22757	22758	22781	22782	22760	22759
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	bar	1.01	1.01	1.01	1.01	1.01	1.01
Reboiler Duty	MW	0.39	0.40	0.59	0.60	0.79	0.79
Condenser Duty	MW	0.23	0.23	0.44	0.44	0.58	0.58
Reflux Rate	kg/s	0.79	0.81	1.30	1.30	1.60	1.62
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.78	3.78	3.78	3.78	3.78	3.78
Pressure Drops							
Overall	mbar/m	0.16	0.16	0.34	0.34	0.50	0.51
Top	mbar/m	0.14	0.14	0.28	0.28	0.45	0.46
Bottom	mbar/m	0.12	0.11	0.25	0.25	0.44	0.45
Dist. Pressure Drop	mbar	0.47	0.45	0.00	0.01	0.42	0.42
Bed Liquid Volume Fraction							
From Gamma Scan		0.02		0.03			0.03
Temperature Profiles	^{o}C						
Overhead Vapor		141.5	141.5	141.5	141.5	141.4	141.4
Reflux		104.8	105.3	97.9	98.0	91.8	91.6
Distributor		130.9	130.6	121.9	122.1	114.6	114.6
Top Bed		140.5	140.4	139.9	139.9	138.9	138.8
Mid Bed		141.8	141.7	141.4	141.4	141.3	141.3
Below Bed		142.1	142.1	142.3	142.3	142.2	142.2
Composition of Liquid	Mol % p-xylene						
Reflux		66.12	66.55	69.67	69.70	69.27	69.19
Distributor		65.70	66.18	69.64	69.65	69.24	69.15
Below Bed		37.52	37.43	37.38	37.44	38.05	37.98
Bottoms		33.64	33.54	31.74	31.75	31.98	32.01
Feed		33.56	33.42	31.53	31.55	31.75	31.80
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % p-xylene	37.52	37.43	37.38	37.44	38.05	37.98
Temperature	^{o}C	142.1	142.1	142.3	142.3	142.2	142.2
Liquid Density	kg/m^3	760.9	760.9	760.7	760.7	760.6	760.6
Vapor Density	kg/m^3	3.23	3.23	3.25	3.25	3.24	3.24
Vapor Rate	kg/s	1.08	1.09	1.68	1.69	2.21	2.23
Liquid Rate	m^3/h	5.1	5.2	8.0	8.0	10.5	10.6
Fs	m/s (kg/m^3)$^{0.5}$	0.518	0.526	0.808	0.811	1.064	1.073
Capacity Factor, Cs	m/s	0.019	0.019	0.029	0.029	0.039	0.039
HETP 2 pt							
DIST & below bed	mm	398	390	343	344	356	356
DIST & bottoms		392	384	320	320	326	328
Relative Volatility		1.163	1.163	1.163	1.163	1.163	1.163
Capacity Factor, Cs Top	m/s	0.019	0.020	0.031	0.031	0.041	0.041
Capacity Factor, Cs mid	m/s	0.019	0.019	0.030	0.030	0.040	0.040

Table III (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 1.0 bar

Run Number		22779	22780	22761	22762	22778	22777
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	bar	1.01	1.01	1.01	1.01	1.01	1.01
Reboiler Duty	MW	0.97	0.97	1.19	1.19	1.36	1.37
Condenser Duty	MW	0.81	0.81	0.94	0.94	1.19	1.20
Reflux Rate	kg/s	2.06	2.06	2.42	2.44	2.88	2.86
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.79	3.78	3.78	3.77	3.78	3.78
Pressure Drops							
Overall	mbar/m	0.84	0.84	1.19	1.18	1.78	1.78
Top	mbar/m	0.78	0.78	1.11	1.10	1.67	1.68
Bottom	mbar/m	0.77	0.77	1.13	1.13	1.74	1.74
Dist. Pressure Drop	mbar	0.07	0.07	0.47	0.47	0.12	0.14
Bed Liquid Volume Fraction							
From Gamma Scan		0.03		0.04			
Temperature Profiles	^{o}C						
Overhead Vapor		141.5	141.5	141.5	141.5	141.5	141.5
Reflux		85.8	85.8	87.8	87.7	83.6	83.5
Distributor		108.9	108.9	107.0	106.9	103.2	103.2
Top Bed		138.9	138.9	138.7	138.7	138.9	138.9
Mid Bed		141.3	141.3	141.4	141.4	141.4	141.4
Below Bed		142.3	142.3	142.3	142.3	142.4	142.4
Composition of Liquid	Mol % p-xylene						
Reflux		68.70	68.71	68.64	68.62	67.72	67.53
Distributor		68.66	68.67	68.62	68.62	67.67	67.47
Below Bed		38.02	37.88	37.76	37.82	37.78	37.67
Bottoms		31.53	31.53	31.60	31.58	31.40	31.45
Feed		31.34	31.32	31.31	31.30	31.22	31.32
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % p-xylene	38.02	37.88	37.76	37.82	37.78	37.67
Temperature	^{o}C	142.3	142.3	142.3	142.3	142.4	142.4
Liquid Density	kg/m^3	760.6	760.6	760.6	760.6	760.6	760.6
Vapor Density	kg/m^3	3.24	3.24	3.25	3.25	3.25	3.25
Vapor Rate	kg/s	2.79	2.80	3.37	3.37	3.93	3.94
Liquid Rate	m^3/h	13.2	13.2	15.9	16.0	18.6	18.6
Fs	m/s (kg/m^3)$^{0.5}$	1.341	1.343	1.616	1.618	1.887	1.889
Capacity Factor, Cs	m/s	0.049	0.049	0.059	0.059	0.069	0.069
HETP 2 pt							
DIST & below bed	mm	363	361	360	361	373	374
DIST & bottoms		328	328	329	329	337	340
Relative Volatility		1.163	1.163	1.163	1.163	1.163	1.163
Capacity Factor, Cs Top	m/s	0.051	0.051	0.062	0.062	0.072	0.072
Capacity Factor, Cs mid	m/s	0.050	0.050	0.060	0.060	0.070	0.070

Table III (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 1.0 bar

Run Number		22763	22764	22784	22783	22765	22766
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	bar	1.01	1.01	1.01	1.01	1.01	1.01
Reboiler Duty	MW	1.58	1.58	1.67	1.68	1.77	1.78
Condenser Duty	MW	1.33	1.33	1.49	1.49	1.52	1.52
Reflux Rate	kg/s	3.34	3.34	3.55	3.55	3.81	3.82
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.78	3.78	3.78	3.78	3.78	3.78
Pressure Drops							
Overall	mbar/m	2.51	2.52	3.30	3.32	3.90	3.94
Top	mbar/m	2.35	2.36	3.09	3.10	3.65	3.69
Bottom	mbar/m	2.50	2.52	3.32	3.34	3.95	4.00
Dist. Pressure Drop	mbar	0.52	0.52	0.10	0.10	0.56	0.57
Bed Liquid Volume Fraction							
From Gamma Scan		0.05			0.06	0.07	
Temperature Profiles	^{o}C						
Overhead Vapor		141.5	141.5	141.6	141.6	141.5	141.5
Reflux		89.8	89.7	81.3	81.3	90.9	91.1
Distributor		105.2	105.0	99.1	99.2	104.3	104.4
Top Bed		139.0	139.0	139.3	139.3	139.1	139.1
Mid Bed		141.5	141.6	141.7	141.7	141.7	141.7
Below Bed		142.5	142.5	142.7	142.7	142.7	142.7
Composition of Liquid	Mol % p-xylene						
Reflux		67.97	67.96	67.98	67.99	68.07	68.07
Distributor		67.95	67.94	67.94	67.95	68.05	68.04
Below Bed		37.00	37.15	36.48	36.54	36.34	36.22
Bottoms		31.15	31.11	30.71	30.71	30.78	30.73
Feed		30.88	30.87	30.48	30.47	30.48	30.50
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % p-xylene	37.00	37.15	36.48	36.54	36.34	36.22
Temperature	^{o}C	142.5	142.5	142.7	142.7	142.7	142.7
Liquid Density	kg/m^3	760.6	760.5	760.5	760.5	760.5	760.6
Vapor Density	kg/m^3	3.26	3.27	3.28	3.28	3.29	3.29
Vapor Rate	kg/s	4.53	4.54	4.85	4.86	5.11	5.12
Liquid Rate	m^3/h	21.4	21.5	23.0	23.0	24.2	24.2
Fs	m/s (kg/m^3)$^{0.5}$	2.168	2.173	2.317	2.319	2.440	2.445
Capacity Factor, Cs	m/s	0.079	0.079	0.084	0.084	0.089	0.089
HETP 2 pt							
DIST & below bed	mm	359	361	353	354	350	349
DIST & bottoms		331	331	326	326	326	325
Relative Volatility		1.163	1.163	1.163	1.163	1.163	1.163
Capacity Factor, Cs Top	m/s	0.083	0.083	0.089	0.089	0.094	0.094
Capacity Factor, Cs mid	m/s	0.081	0.081	0.086	0.087	0.091	0.091

Table III (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 1.0 bar

Run Number		22767	22768	22770	22769	22772	22771
Run Type		TR	TR	TR	TR	TR	TR
Column Pressure	bar	1.01	1.01	1.01	1.01	1.01	1.01
Reboiler Duty	MW	1.82	1.82	1.87	1.87	1.92	1.92
Condenser Duty	MW	1.61	1.60	1.66	1.65	1.72	1.74
Reflux Rate	kg/s	3.96	3.93	3.94	3.95	4.06	4.08
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.78	3.78	3.78	3.78	3.78	3.78
Pressure Drops							
Overall	mbar/m	4.55	4.45	5.46	5.43	6.96	7.04
Top	mbar/m	4.27	4.17	5.08	5.06	6.43	6.49
Bottom	mbar/m	4.64	4.54	5.60	5.57	7.21	7.30
Dist. Pressure Drop	mbar	0.27	0.26	0.10	0.12	0.08	0.10
Bed Liquid Volume Fraction							
From Gamma Scan		0.07			0.08		0.09
Temperature Profiles	^{o}C						
Overhead Vapor		141.4	141.4	141.5	141.5	141.5	141.5
Reflux		92.3	92.0	81.6	81.6	80.1	80.3
Distributor		104.9	104.6	97.8	97.8	96.7	96.9
Top Bed		139.0	139.0	139.1	139.2	139.0	139.0
Mid Bed		141.7	141.7	141.8	141.8	141.9	141.9
Below Bed		142.8	142.8	143.0	143.0	143.2	143.2
Composition of Liquid	Mol % p-xylene						
Reflux		68.61	68.58	69.17	69.08	70.17	70.20
Distributor		68.56	68.58	69.09	69.05	70.15	70.16
Below Bed		36.06	36.22	36.02	36.01	35.00	35.46
Bottoms		30.39	30.39	30.22	31.43	29.68	29.68
Feed		30.10	30.12	29.97	29.95	29.40	29.40
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % p-xylene	36.06	36.22	36.02	36.01	35.00	35.46
Temperature	^{o}C	142.8	142.8	143.0	143.0	143.2	143.2
Liquid Density	kg/m^3	760.5	760.5	760.3	760.3	760.3	760.2
Vapor Density	kg/m^3	3.29	3.29	3.31	3.31	3.33	3.33
Vapor Rate	kg/s	5.25	5.25	5.40	5.41	5.57	5.58
Liquid Rate	m^3/h	24.8	24.8	25.6	25.6	26.4	26.4
Fs	m/s (kg/m^3)$^{0.5}$	2.503	2.504	2.571	2.573	2.640	2.645
Capacity Factor, Cs	m/s	0.091	0.091	0.093	0.094	0.096	0.096
HETP 2 pt							
DIST & below bed	mm	341	343	334	335	313	317
DIST & bottoms		317	316	309	322	294	294
Relative Volatility		1.163	1.163	1.163	1.163	1.162	1.162
Capacity Factor, Cs Top	m/s	0.096	0.096	0.099	0.099	0.102	0.102
Capacity Factor, Cs mid	m/s	0.094	0.094	0.096	0.096	0.099	0.099

Table III (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 1.0 bar

Run Number		22774	22773	22755	22756	22775	22776
Run Type		TR	TR	FT	FT	FT	FT
Column Pressure	bar	1.01	1.01	1.01	1.01	1.01	1.01
Reboiler Duty	MW	1.96	1.97	2.02	2.02	2.09	2.08
Condenser Duty	MW	1.76	1.78	1.79	1.79	1.89	1.88
Reflux Rate	kg/s	4.13	4.15	4.32	4.32	4.35	4.34
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	3.78	3.78	3.78	3.79	3.78	3.78
Pressure Drops							
Overall	mbar/m	9.45	10.82	14.14	13.96	15.15	14.17
Top	mbar/m	8.79	11.01	17.06	16.76	18.21	16.35
Bottom	mbar/m	9.77	10.30	10.62	10.57	11.89	11.75
Dist. Pressure Drop	mbar	0.07	0.07	1.34	1.30	1.16	1.08
Bed Liquid Volume Fraction							
From Gamma Scan			0.11	0.11		0.11	
Temperature Profiles	^{o}C						
Overhead Vapor		141.5	141.6	142.3	142.3	142.6	142.6
Reflux		78.9	79.2	87.2	87.4	81.9	82.0
Distributor		95.9	96.0	101.2	101.3	98.3	98.0
Top Bed		139.2	139.4	141.4	141.4	141.5	141.4
Mid Bed		142.3	142.5	142.9	142.9	143.0	142.9
Below Bed		143.5	143.7	143.6	143.6	143.7	143.6
Composition of Liquid	Mol % p-xylene						
Reflux		68.85	68.10	53.93	53.58	50.88	50.47
Distributor		68.86	68.16	54.06	53.53	51.51	50.46
Below Bed		34.48	35.78	40.84	40.73	42.04	43.23
Bottoms		29.87	29.97	35.28	35.59	35.88	36.10
Feed		29.70	29.95	34.97	35.19	35.80	35.89
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % p-xylene	34.48	35.78	40.84	40.73	42.04	43.23
Temperature	^{o}C	143.5	143.7	143.6	143.6	143.7	143.6
Liquid Density	kg/m^3	760.1	759.7	758.5	758.6	758.2	758.1
Vapor Density	kg/m^3	3.36	3.36	3.34	3.33	3.33	3.32
Vapor Rate	kg/s	5.71	5.73	5.85	5.86	6.04	6.03
Liquid Rate	m^3/h	27.0	27.1	27.8	27.8	28.7	28.6
Fs	m/s (kg/m^3)$^{0.5}$	2.694	2.702	2.771	2.778	2.863	2.865
Capacity Factor, Cs	m/s	0.098	0.098	0.101	0.101	0.104	0.104
HETP 2 pt							
DIST & below bed	mm	321	342	861	889	1202	1578
DIST & bottoms		308	315	742	786	935	1046
Relative Volatility		1.162	1.162	1.162	1.162	1.162	1.162
Capacity Factor, Cs Top	m/s	0.104	0.105	0.104	0.104	0.107	0.107
Capacity Factor, Cs mid	m/s	0.101	0.101	0.102	0.103	0.106	0.106

Table III (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 1.0 bar

Run Number		22785	22786	22787	22788	22789	22790
Run Type		FL OHP	FL OHP	FL OHP	FL OHP	FL OHP	FL OHP
Column Pressure	bar	1.01	1.01	1.01	1.01	1.01	1.01
Reboiler Duty	MW	2.17	2.34	2.53	2.73	2.90	3.01
Condenser Duty	MW	1.94	2.09	2.27	2.48	2.63	2.78
Reflux Rate	kg/s	3.75	3.06	2.53	2.05	1.65	1.35
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	7.56	7.55	7.55	7.55	7.55	9.06
Pressure Drops							
Overall	mbar/m	13.65	12.22	12.40	11.54	11.56	11.12
Top	mbar/m	15.06	12.96	13.37	11.96	12.08	11.49
Bottom	mbar/m	10.00	9.23	9.20	8.88	8.82	8.53
Dist. Pressure Drop	mbar	0.55	0.34	0.77	0.85	1.03	1.10
Bed Liquid Volume Fraction							
From Gamma Scan		0.11	0.10	0.10	0.09	0.08	0.08
Temperature Profiles	^{o}C						
Overhead Vapor		142.7	142.9	143.0	143.0	143.1	143.0
Reflux		80.6	81.7	83.7	85.6	86.5	86.7
Distributor		98.4	101.7	106.3	111.7	116.2	119.6
Top Bed		141.8	142.1	142.1	142.1	142.2	142.2
Mid Bed		143.1	143.2	143.2	143.1	143.1	143.1
Below Bed		143.7	143.7	143.7	143.6	143.6	143.5
Composition of Liquid	Mol % p-xylene						
Reflux		49.78	47.48	44.96	43.63	42.98	42.93
Distributor		49.58	47.56	45.11	43.58	42.96	42.88
Below Bed		38.51	36.53	36.95	37.45	37.50	37.84
Bottoms		35.34	35.82	36.68	37.09	37.29	37.72
Feed		37.10	38.74	39.88	40.49	40.89	40.84
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % p-xylene	38.51	36.53	36.95	37.45	37.50	37.84
Temperature	^{o}C	143.7	143.7	143.7	143.6	143.6	143.5
Liquid Density	kg/m^3	759.0	759.5	759.4	759.4	759.4	759.4
Vapor Density	kg/m^3	3.35	3.36	3.36	3.35	3.35	3.34
Vapor Rate	kg/s	6.15	6.40	6.77	7.27	7.74	8.06
Liquid Rate	m^3/h	25.2	21.4	18.5	16.2	14.5	13.1
Fs	$m/s\ (kg/m^3)^{0.5}$	2.905	3.022	3.195	3.436	3.660	3.818
Capacity Factor, Cs	m/s	0.106	0.110	0.116	0.125	0.133	0.139
L/V		0.86	0.70	0.58	0.47	0.39	0.34
OHP Flow		0.83	1.89	2.87	3.86	4.69	5.29
Capacity Factor, Cs Top	m/s	0.105	0.107	0.110	0.115	0.119	0.122
Capacity Factor, Cs mid	m/s	0.104	0.105	0.109	0.114	0.118	0.121

Table III (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 1.0 bar

Run Number		22791	22792	22793	22794	22795	22796
Run Type		OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	bar	1.01	1.01	1.01	1.01	1.01	1.01
Reboiler Duty	MW	2.05	1.97	2.22	2.06	1.89	1.81
Condenser Duty	MW	1.85	1.78	2.03	1.86	1.71	1.62
Reflux Rate	kg/s	3.75	3.77	3.15	3.16	3.20	3.21
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	9.07	9.08	9.07	9.08	9.06	9.07
Pressure Drops							
Overall	mbar/m	8.21	6.41	7.73	5.17	4.00	3.55
Top	mbar/m	6.50	4.91	6.09	3.81	2.71	2.28
Bottom	mbar/m	7.61	5.63	7.08	4.30	3.08	2.61
Dist. Pressure Drop	mbar	0.03	0.02	0.07	0.03	0.02	0.00
Bed Liquid Volume Fraction							
From Gamma Scan		0.10	0.08	0.09	0.07	0.06	0.06
Temperature Profiles	^{o}C						
Overhead Vapor		142.2	142.0	142.7	142.6	142.4	142.3
Reflux		80.3	80.0	81.4	80.2	80.2	79.9
Distributor		97.3	96.9	100.9	99.8	99.4	99.0
Top Bed		140.0	139.7	140.8	140.6	140.3	140.1
Mid Bed		142.6	142.3	142.7	142.5	142.4	142.2
Below Bed		143.4	143.1	143.2	142.9	142.8	142.7
Composition of Liquid	Mol % p-xylene						
Reflux		58.12	60.69	49.41	51.22	54.14	56.39
Distributor		58.08	60.74	49.38	51.18	54.11	56.35
Below Bed		34.30	34.37	35.95	35.74	35.47	35.46
Bottoms		32.70	31.95	35.63	35.13	34.30	33.66
Feed		34.25	33.13	38.01	37.26	36.03	35.08
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % p-xylene	34.30	34.37	35.95	35.74	35.47	35.46
Temperature	^{o}C	143.4	143.1	143.2	142.9	142.8	142.7
Liquid Density	kg/m^3	760.3	760.5	760.1	760.5	760.7	760.7
Vapor Density	kg/m^3	3.35	3.33	3.32	3.30	3.30	3.29
Vapor Rate	kg/s	5.86	5.66	6.11	5.73	5.34	5.15
Liquid Rate	m^3/h	24.9	24.8	21.4	21.4	21.4	21.4
Fs	m/s (kg/m^3)$^{0.5}$	2.773	2.683	2.901	2.728	2.547	2.458
Capacity Factor, Cs	m/s	0.101	0.098	0.105	0.099	0.093	0.089
L/V		0.90	0.92	0.74	0.79	0.85	0.88
OHP Flow		0.61	0.43	1.60	1.21	0.82	0.62
Capacity Factor, Cs Top	m/s	0.103	0.101	0.104	0.098	0.093	0.090
Capacity Factor, Cs mid	m/s	0.101	0.098	0.103	0.097	0.091	0.088

Table III (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 1.0 bar

Run Number		22797	22798	22799	22800	22801	22802
Run Type		OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	bar	1.01	1.01	1.01	1.01	1.01	1.01
Reboiler Duty	MW	1.72	1.65	1.82	1.98	2.15	2.31
Condenser Duty	MW	1.53	1.44	1.61	1.78	1.94	2.10
Reflux Rate	kg/s	3.20	2.63	2.63	2.58	2.58	2.55
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	9.08	9.07	9.06	9.08	9.07	9.08
Pressure Drops							
Overall	mbar/m	3.11	2.34	2.87	3.49	4.48	6.01
Top	mbar/m	1.87	1.15	2.74	3.33	4.27	5.71
Bottom	mbar/m	2.17	1.35	2.91	3.55	4.58	6.17
Dist. Pressure Drop	mbar	0.00	0.00	0.03	0.07	0.07	0.12
Bed Liquid Volume Fraction							
From Gamma Scan		0.06	0.05	0.05	0.05	0.06	0.07
Temperature Profiles	^{o}C						
Overhead Vapor		142.2	142.5	142.7	142.8	142.9	143.0
Reflux		79.5	79.2	80.4	81.0	82.0	83.5
Distributor		98.7	101.4	102.2	103.4	104.3	105.6
Top Bed		139.9	140.1	140.6	140.9	141.1	141.4
Mid Bed		142.1	142.3	142.4	142.5	142.6	142.7
Below Bed		142.7	142.6	142.6	142.7	142.8	143.0
Composition of Liquid	Mol % p-xylene						
Reflux		58.87	55.58	50.65	48.65	47.31	46.29
Distributor		58.82	55.47	50.85	48.70	47.42	46.36
Below Bed		35.53	35.34	36.17	36.46	36.68	36.91
Bottoms		32.97	33.92	35.53	36.12	36.47	36.71
Feed		34.03	35.60	37.48	38.29	38.84	39.29
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % p-xylene	35.53	35.34	36.17	36.46	36.68	36.91
Temperature	^{o}C	142.7	142.6	142.6	142.7	142.8	143.0
Liquid Density	kg/m^3	760.7	760.8	760.7	760.6	760.3	760.1
Vapor Density	kg/m^3	3.29	3.28	3.28	3.28	3.29	3.31
Vapor Rate	kg/s	4.95	4.64	5.04	5.42	5.83	6.25
Liquid Rate	m^3/h	21.4	18.1	18.2	18.0	18.1	18.1
Fs	$m/s\ (kg/m^3)^{0.5}$	2.360	2.215	2.410	2.588	2.781	2.973
Capacity Factor, Cs	m/s	0.086	0.080	0.088	0.094	0.101	0.108
L/V		0.91	0.83	0.76	0.70	0.66	0.61
OHP Flow		0.43	0.81	1.21	1.63	2.00	2.42
Capacity Factor, Cs Top	m/s	0.087	0.080	0.086	0.091	0.097	0.103
Capacity Factor, Cs mid	m/s	0.085	0.078	0.084	0.090	0.096	0.102

Table III (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 1.0 bar

Run Number		22803	22804	22805	22806	22807	22808
Run Type		OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	bar	1.01	1.01	1.01	1.01	1.01	1.01
Reboiler Duty	MW	2.40	2.48	2.32	1.98	1.65	1.48
Condenser Duty	MW	2.20	2.26	2.10	1.79	1.45	1.28
Reflux Rate	kg/s	2.58	2.17	2.17	2.22	2.25	2.28
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	9.06	9.07	9.07	9.08	9.07	9.08
Pressure Drops							
Overall	mbar/m	7.53	6.55	4.80	3.09	2.07	1.71
Top	mbar/m	7.06	6.23	4.60	2.96	1.99	1.65
Bottom	mbar/m	7.82	6.72	4.88	3.13	2.08	1.71
Dist. Pressure Drop	mbar	0.13	0.15	0.11	0.07	0.01	0.00
Bed Liquid Volume Fraction							
From Gamma Scan		0.08	0.07	0.06	0.00	0.00	0.00
Temperature Profiles	^{o}C						
Overhead Vapor		142.9	143.0	143.0	142.9	142.8	142.6
Reflux		84.5	84.7	83.0	82.2	81.0	80.6
Distributor		106.3	109.6	108.8	107.2	105.7	105.1
Top Bed		141.5	141.7	141.5	141.2	140.6	140.3
Mid Bed		142.7	142.7	142.6	142.5	142.4	142.3
Below Bed		143.1	143.0	142.8	142.6	142.5	142.5
Composition of Liquid	Mol % p-xylene						
Reflux		45.86	44.76	45.16	46.51	49.09	51.76
Distributor		45.87	44.74	45.09	46.45	49.04	51.49
Below Bed		37.01	37.34	37.37	37.18	36.81	36.47
Bottoms		36.88	37.25	37.29	37.08	36.38	35.66
Feed		39.51	39.89	39.67	39.10	38.07	37.07
Conditions at Bottom (Based on Reboiler Duty)							
Composition	Mol % p-xylene	37.01	37.34	37.37	37.18	36.81	36.47
Temperature	^{o}C	143.1	143.0	142.8	142.6	142.5	142.5
Liquid Density	kg/m^3	760.0	760.0	760.2	760.4	760.7	760.7
Vapor Density	kg/m^3	3.31	3.30	3.29	3.27	3.27	3.27
Vapor Rate	kg/s	6.46	6.63	6.22	5.39	4.56	4.16
Liquid Rate	m^3/h	18.3	16.3	16.2	16.0	15.8	15.8
Fs	m/s (kg/m^3)$^{0.5}$	3.072	3.157	2.970	2.576	2.182	1.993
Capacity Factor, Cs	m/s	0.112	0.115	0.108	0.094	0.079	0.072
L/V		0.60	0.52	0.55	0.63	0.73	0.80
OHP Flow		2.61	3.20	2.80	2.02	1.22	0.83
Capacity Factor, Cs Top	m/s	0.106	0.107	0.100	0.088	0.076	0.071
Capacity Factor, Cs mid	m/s	0.105	0.106	0.100	0.087	0.075	0.070

Table III (SI Units) (cont'd)
FRI Distillation Unit Experimental Data
1.21 m Diameter Low Pressure Column
Raschig Super Rings No. 0.7 Test, **3.05 m** Packing Depth
Raschig **DT-S** Distributor
o/p xylene System 1.0 bar

Run Number		22809	22810	22811	22812	22813	22814	22815
Run Type		OHP	OHP	OHP	OHP	OHP	OHP	OHP
Column Pressure	bar	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Reboiler Duty	MW	1.32	1.32	1.65	1.99	2.15	2.48	2.65
Condenser Duty	MW	1.12	1.14	1.45	1.79	1.94	2.18	2.42
Reflux Rate	kg/s	2.35	1.99	1.91	1.84	1.79	1.74	1.76
Feed Location		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Mass Feed Flow Rate	kg/s	9.06	9.07	9.07	9.07	9.06	9.07	9.05
Pressure Drops								
Overall	mbar/m	1.42	1.31	1.90	2.75	3.32	5.09	6.89
Top	mbar/m	1.37	1.26	1.83	2.65	3.19	4.90	6.56
Bottom	mbar/m	1.41	1.29	1.90	2.76	3.34	5.16	7.05
Dist. Pressure Drop	mbar	0.00	0.00	0.00	0.04	0.07	0.12	0.14
Bed Liquid Volume Fraction								
From Gamma Scan		0.04	0.04	0.04	0.04	0.04	0.06	0.07
Temperature Profiles	°C							
Overhead Vapor		142.4	142.6	142.9	143.0	143.0	143.1	143.1
Reflux		81.8	81.7	81.4	82.1	82.6	83.9	85.2
Distributor		105.1	108.3	109.0	110.8	111.9	112.7	113.5
Top Bed		139.9	140.2	140.8	141.3	141.5	141.6	141.8
Mid Bed		142.1	142.3	142.4	142.5	142.5	142.6	142.7
Below Bed		142.5	142.5	142.5	142.5	142.6	142.8	143.0
Composition of Liquid	Mol % p-xylene							
Reflux		55.92	53.02	47.93	45.48	44.89	44.08	43.81
Distributor		55.21	53.64	48.10	45.46	44.84	44.01	43.74
Below Bed		36.54	36.07	37.02	37.54	37.64	37.68	37.65
Bottoms		34.65	35.36	36.74	37.44	37.50	37.57	37.69
Feed		35.43	36.61	38.46	39.47	39.73	40.16	40.35
Conditions at Bottom (Based on Reboiler Duty)								
Composition	Mol % p-xylene	36.54	36.07	37.02	37.54	37.64	37.68	37.65
Temperature	°C	142.5	142.5	142.5	142.5	142.6	142.8	143.0
Liquid Density	kg/m^3	760.7	760.8	760.6	760.4	760.3	760.1	759.9
Vapor Density	kg/m^3	3.27	3.27	3.26	3.27	3.27	3.29	3.30
Vapor Rate	kg/s	3.78	3.72	4.52	5.38	5.79	6.62	7.06
Liquid Rate	m^3/h	15.9	13.8	13.9	14.1	14.1	14.3	14.5
Fs	$m/s\ (kg/m^3)^{0.5}$	1.807	1.779	2.166	2.575	2.771	3.162	3.362
Capacity Factor, Cs	m/s	0.066	0.065	0.079	0.094	0.101	0.115	0.122
L/V		0.89	0.79	0.65	0.55	0.51	0.45	0.43
OHP Flow		0.41	0.80	1.60	2.41	2.81	3.61	4.01
Capacity Factor, Cs Top	m/s	0.065	0.063	0.074	0.086	0.092	0.105	0.111
Capacity Factor, Cs mid	m/s	0.064	0.062	0.073	0.086	0.091	0.105	0.110