

Table 1

FLUID DYNAMIC / METHANOL RUN AT THE LAPORTE AFDU - JUNE 1995										
Run No.	No. of Days	Comment	Gas Type	Reactor Pressure psia	Reactor Temp. deg F	Space Vel. sL/kg-hr	React. Fd. lbmol/hr	Sup. Vel. ft/sec	Inlet	Slurry wt% oxide
NEW REACTOR (27.20) / BASELINE CATALYST										
	3	Dephlegmator Testing, Carbonyl Burnout	Nitrogen, Texaco							
AF-A9	1	Kingsport Reduction	4% CO in N2	67		615	32.3	0.62		40
AF-R13.1	2	Base Case	Texaco	765	482	7100	375	0.85		46
AF-R13.2	3	Kingsport Design	Kingsport	750	482	4000	210	0.49		41
AF-R13.3	2	High Velocity	Kingsport	735	482	9100	480	1.13		48
Sub-total	11									
NEW REACTOR (27.20) / ALTERNATE CATALYST										
AF-A10	1	Kingsport Reduction	4% CO in N2	67		615	32.3	0.62		40
AF-R14.1	2	Base Case	Texaco	765	482	7200	370	0.84		44
AF-R14.2	3	Kingsport Design	Kingsport	750	482	4000	210	0.48		39
AF-R14.3	1.5	High Velocity	Kingsport	535	482	7100	365	1.18		44
AF-R14.4	1.5		Texaco	765	482	4100	210	0.47		41
AF-R14.5	1	Base Case	Texaco	765	482	7200	370	0.83		45
AF-R14.6	0.8	Tracer Study	Texaco	765	482	7200	370	0.83		45
AF-R14.7	1	Tracer Study	Texaco	765	482	4100	210	0.47		41
AF-R14.8	1	Tracer Study	Kingsport	535	482	7100	365	1.18		44
AF-R14.9	0.2	Turn-down	Kingsport	765	482	1300	67	0.15		44
Sub-total	13									
TOTAL	24									

Table 2

Metal Carbonyl Analysis Results

Nickel Tetracarbonyl: not detected in any samples (lower detection limit is 10 ppbv).

Iron Pentacarbonyl (ppbv): Averages of 2 injections

Reactor Temp = 482°F Reactor Pressure = 750 psig	Sample Point 3A Economizer Product Outlet	Sample Point 4 Combined Fresh Feed + Recycle	Sample Point 15 Inlet to Reactor
5/31/95 16:30-17:30 Once-through syngas (12 KSCFH)	4	8	8
5/31/95 21:30-22:30 Once-through syngas (12 KSCFH)	2	3	3
6/1/95 08:30-09:30 Once-through syngas (12 KSCFH)	3	2	3
6/1/95 11:30-12:00 Recycle syngas (84 KSCFH)	4	3	5
6/1/95 15:30-16:00 Recycle syngas (84 KSCFH)	6	4	7
6/1/95 20:30-21:00 Recycle syngas (84 KSCFH)	7	6	8
6/2/95 08:30-09:00 Recycle syngas (132 KSCFH)	9	7	10
6/2/95 11:30-12:00 Recycle syngas (132 KSCFH)	10	6	10

Table 3

CATALYST PERFORMANCE COMPARISON FOR LPMEOH					
CATALYST RUN NO.	BASELINE AF-R13.1B	ALTERNATE AF-R14.1B	BASELINE AF-R13.2B	ALTERNATE AF-R14.2B	
SYNGAS COMPOSITION	TEXACO	TEXACO	KINGSPORT	KINGSPORT	
SPACE VEL, SL/HR-KG	7130	7200	4000	4030	
PRESSURE, PSIG	751	754	735	735	
TEMPERATURE, DEG F	484	482	483	483	
INLET LINEAR VELOCITY (FT/S)	0.85	0.84	0.49	0.48	
CO CONVERSION TO MEOH (%)	15.5	16.2	49.6	48.6	
METHANOL PRODUCTION (T/D)	11.6	11.7	9.9	9.8	
SLURRY CONCENTRATION BASED ON NDG (WT%)	48.2	45.3	42	39.7	
GAS HOLD-UP BASED ON NDG (VOL%)	54.7	49.9	43.1	38.1	

Table 4

BY-PRODUCT ANALYSIS COMPARISON FOR LPMEOH					
CATALYST	BASLINE	ALTERNATE		BASLINE	ALTERNATE
RUN NO.	AF-R13.1B	AF-R14.1B		AF-R13.2B	AF-R14.2B
SYNGAS COMPOSITION	TEXACO	TEXACO		KINGSPORT	KINGSPORT
SPACE VEL, SL/HR-KG	7000	7000		4000	4000
PRESSURE, PSIG	750	750		735	735
TEMPERATURE, DEG F	482	482		482	482
PRODUCT ANALYSIS, WT%					
methanol	96.72	96.73		97.31	97.42
ethanol	0.89	0.91		0.32	0.35
1-propanol	0.25	0.26		0.08	0.10
iso-propanol	0.02	0.02		0.01	0.00
1-butanol	0.17	0.17		0.09	0.08
2-butanol	0.06	0.05		0.03	0.03
iso-butanol	0.06	0.05		0.01	0.02
2-Methyl 1Buoh	0.00	0.00		0.00	0.00
1-pentanol	0.08	0.08		0.03	0.03
2-Methyl 1-Peoh	0.00	0.00		0.00	0.00
1-hexanol	0.04	0.04		0.00	0.00
2-Methyl 1-Isobutyrate	0.00	0.00		0.00	0.00
meAc	0.20	0.22		0.06	0.07
etAc	0.00	0.00		0.00	0.00
meFm	0.91	0.99		0.42	0.44
DME	0.00	0.00		0.00	0.00
CO2	0.00	0.00		0.00	0.00
water	0.43	0.42		1.46	1.30
oil	0.19	0.06		0.19	0.16
Total	100.00	100.00		100.00	100.00

Table 5

LPMEOH RESULTS AT HIGH VELOCITY			
CATALYST			
RUN NO.			
	BASLINE	ALTERNATE	
	AF-R13.3B	AF-R14.3	
SYNGAS COMPOSITION			
SPACE VEL, SL/HR-KG	KINGSPORT	KINGSPORT	
PRESSURE, PSIG	9110	7090	
TEMPERATURE, DEG F	720	521	
INLET LINEAR VELOCITY (FT/S)	482	482	
	1.13	1.18	
CO CONVERSION TO MEOH (%)			
METHANOL PRODUCTION (T/D)	39.9	33	
	18.3	11.1	
SLURRY CONCENTRATION (WT%)			
GAS HOLD-UP (VOL%)	48.9	45.6	
	55.8	50.4	
LIMITATION			
	RECYCLE COMPRESSOR	CO SUPPLY	
NDG READINGS			
	HIGH FLUCTUATIONS	HIGH FLUCTUATIONS	
	STABLE AVERAGE	STABLE AVERAGE	
OIL LOSS RATE FROM REACTOR			
	MODERATE	MODERATE	
REACTOR DESIGN BASIS			
	KINGSPORT:	0.64 FT/SEC	
	RECENT COMMERCIAL DESIGNS:	0.80 - 0.85 FT/SEC	
	NEW COMMERCIAL DESIGN:	~ 1.0 FT/SEC	

Table 6

RUN TIME TABLE

FLUID DYNAMIC / METHANOL RUN WITH BASELINE CATALYST				ACTIVATION (#A9) START				3-Jun-95 14:30	
				RUN (#AF-R13) START				4-Jun-95 12:00	
RUN NO.	AVG TIME ON-STR, HRS	START DATE	START TIME	TIME ON-STR, HRS	END DATE	END TIME	TIME ON-STR, HRS	PERIOD, HRS	TIME
R13.1A	20	4-Jun	23:00	11	5-Jun	17:00	29	18	
R13.1B	38.5	5-Jun	17:00	29	6-Jun	12:00	48	19	
R13.2A	80	7-Jun	11:00	71	8-Jun	5:00	89	18	
R13.2B	102	8-Jun	5:00	89	9-Jun	7:00	115	26	
R13.3A	136	9-Jun	19:00	127	10-Jun	13:00	145	18	
R13.3B	150.5	10-Jun	13:00	145	11-Jun	0:00	156	11	

FLUID DYNAMIC / METHANOL RUN WITH ALTERNATE CATALYST				ACTIVATION (#A10) START				12-Jun-95 14:45	
				RUN (#AF-R14) START				13-Jun-95 11:00	
RUN NO.	AVG TIME ON-STR, HRS	START DATE	START TIME	TIME ON-STR, HRS	END DATE	END TIME	TIME ON-STR, HRS	PERIOD, HRS	TIME
R14.1A	16	13-Jun	18:00	7	14-Jun	12:00	25	18	
R14.1B	37	14-Jun	12:00	25	15-Jun	12:00	49	24	
R14.2A	71	15-Jun	19:00	56	17-Jun	1:00	86	30	
R14.2B	99.5	17-Jun	1:00	86	18-Jun	4:00	113	27	
R14.3	138	18-Jun	18:00	127	19-Jun	16:00	149	22	
R14.4	172	19-Jun	23:00	156	21-Jun	7:00	188	32	
R14.5	202	21-Jun	10:00	191	22-Jun	8:00	213	22	

TIMEIABI.XLS

BLB 12/17/96

Table 7

		Gas Hold-up Comparison (vol%)						
Run No.	Time	From	From	From	%	From	Expected	
	On-stream	NDG	DP		Difference	Shut-down	from	
	Hrs					Test	Correlations	
Gas Hold-up with Baseline Catalyst								
R13.1A	20	50.5	43.8		13.3			
R13.1B	38.5	54.7	48		12.2		43	
R13.2A	80	42.3	36.3		14.2			
R13.2B	102	43.1	36.5		15.3	32.9	34.7	
R13.3A	136	55.7	45.1		19.0			
R13.3B	150.5	55.8	44.7		19.9		41.8	
					15.7	avg		
Gas Hold-up with Alternate Catalyst								
R14.1A	16	49.6	39.8		19.8			
R14.1B	37	49.9	39.8		20.2	38.9	41.1	
R14.2A	71	37.5	28.3		24.5			
R14.2B	99.5	38.1	28.6		24.9		34.1	
R14.3	138	50.4	36.6		27.4	36.6	35.3	
R14.4	172	42.9	33.3		22.4		37.8	
R14.5	202	50.8	39.8		21.7		41.1	
					23.2	avg		

Figure 1

LAPORTE AFDU OXYGENATES HIGH PRESSURE REACTOR

DIFFERENTIAL PRESSURE TRANSMITTER & TRACER STUDY DETECTOR POSITIONS

DESIGN PRESSURE: 2000 PSIG

DESIGN TEMPERATURE: 700 F

FLANGE TO FLANGE
DISTANCE = 50 FT
18" ID

NORMAL LIQUID LEVEL
43.5 FT

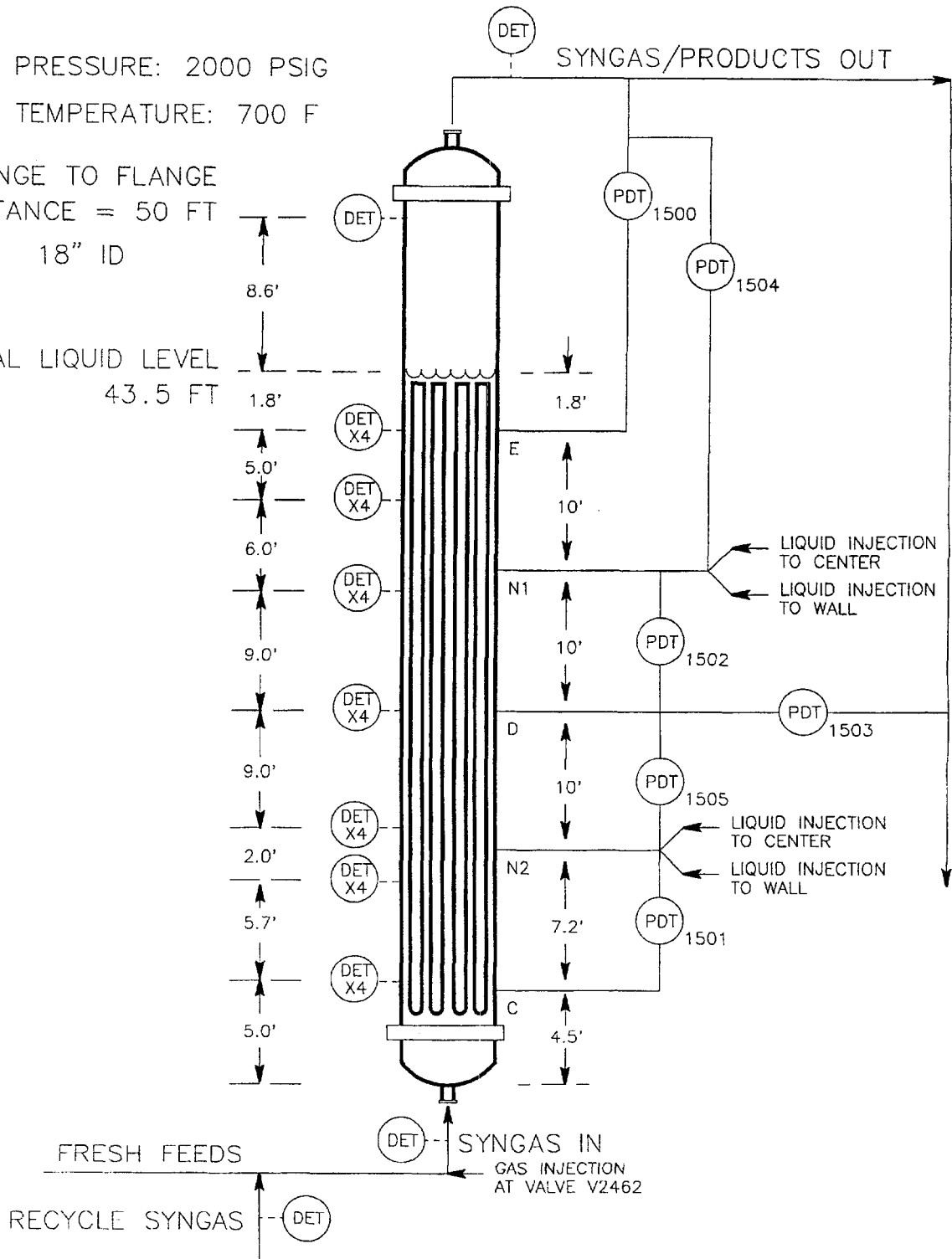


Figure 2

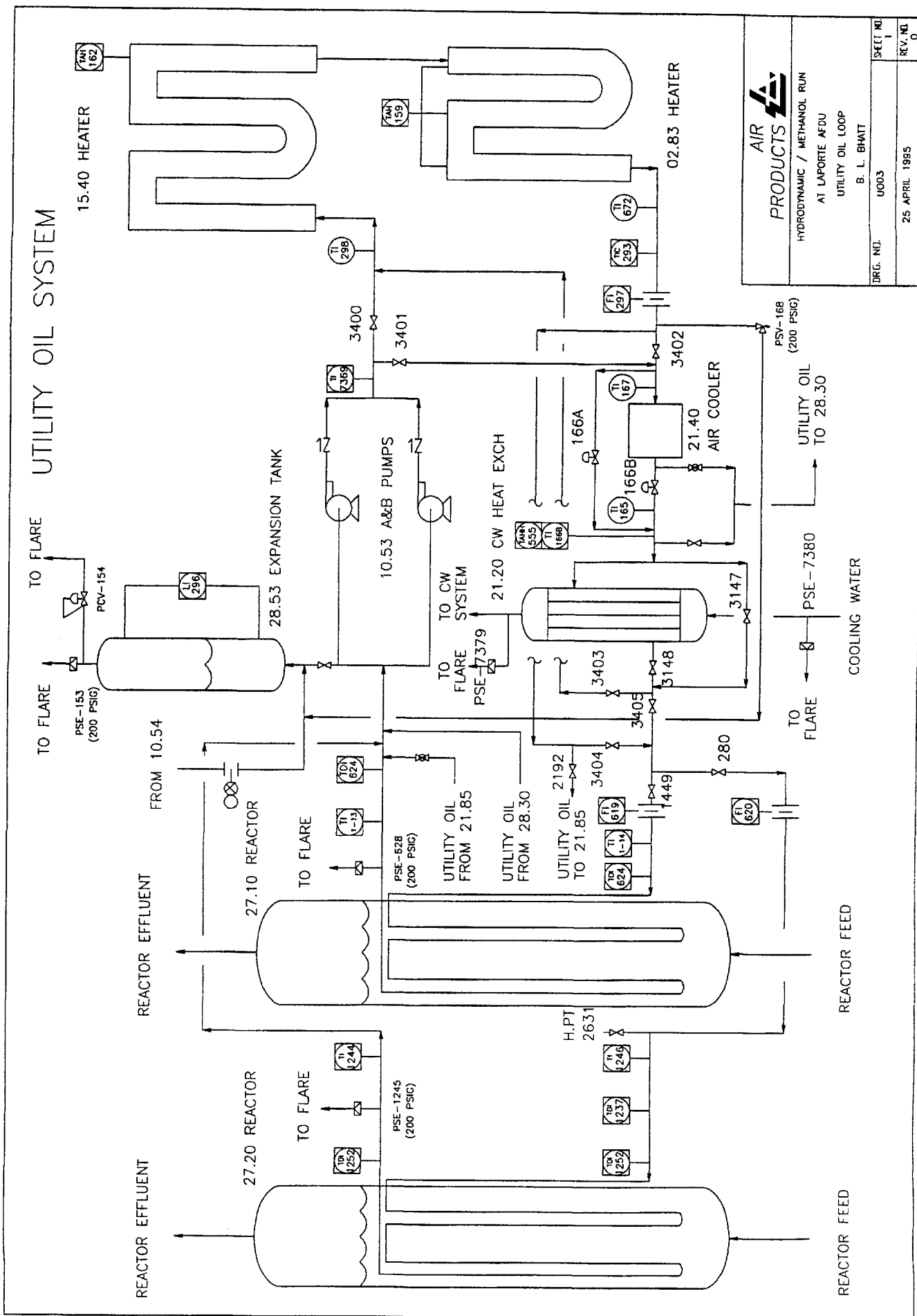
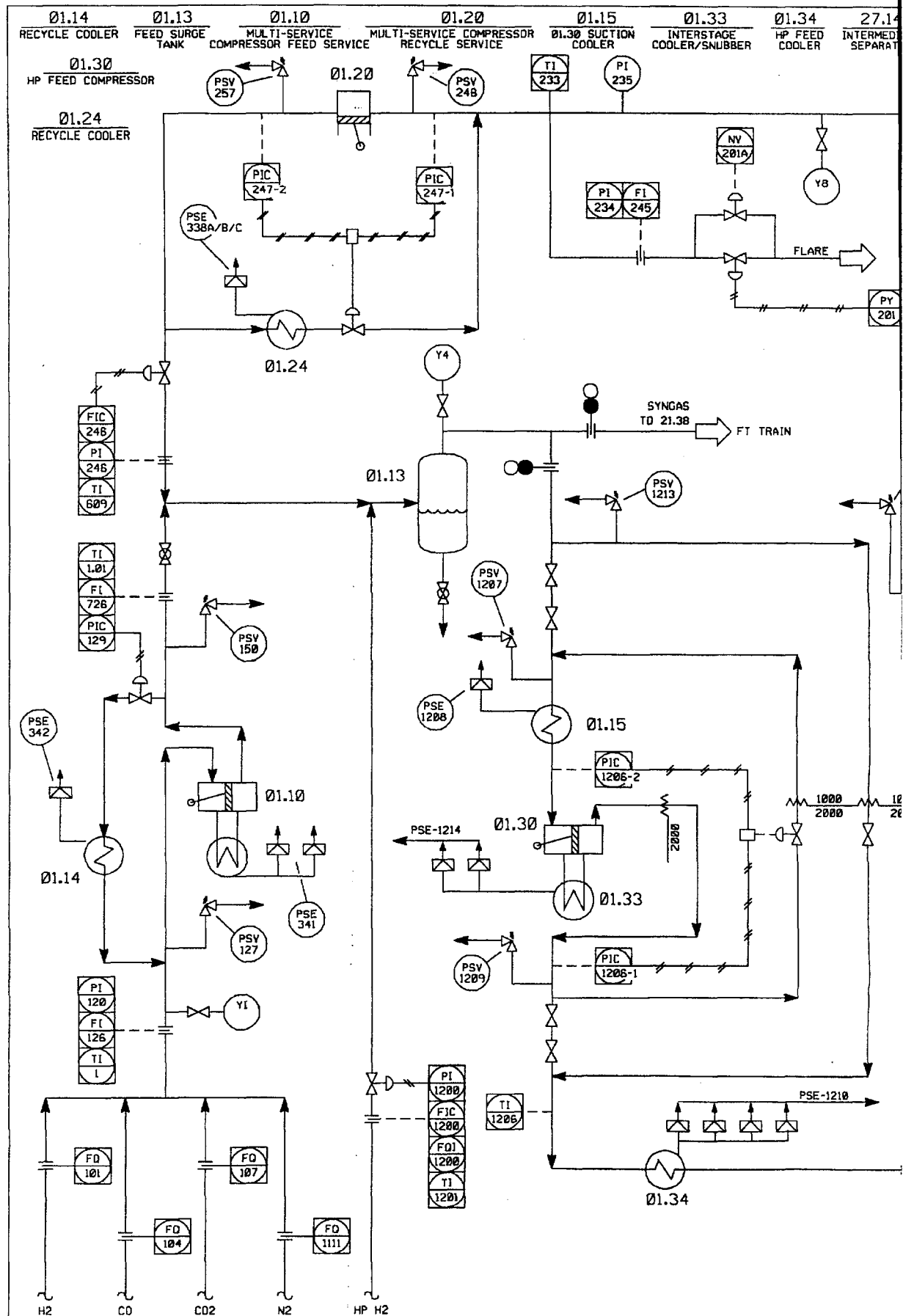
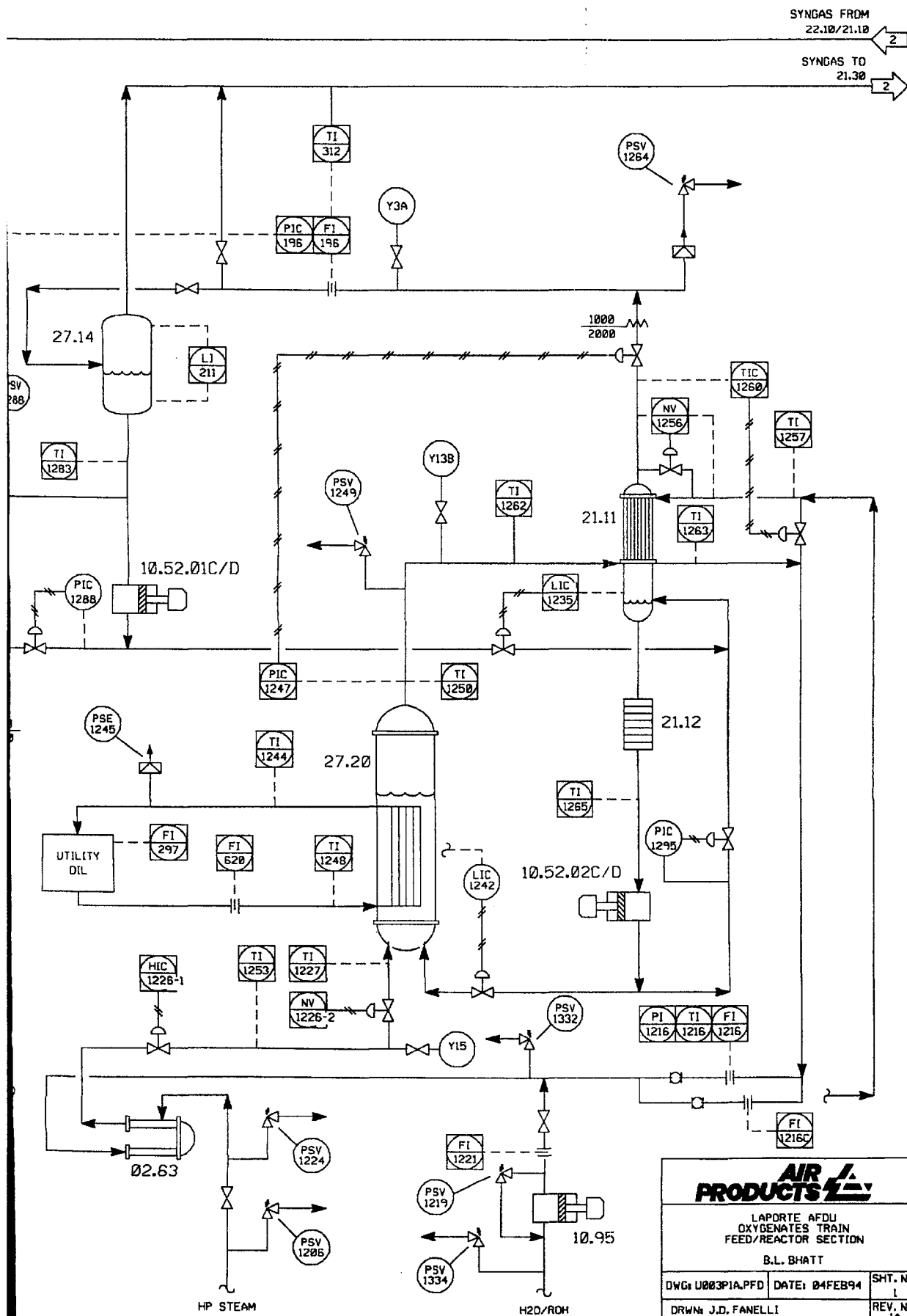


FIGURE 3



10.52.01C/D CONDENSED OIL PUMPS	02.63 HP FEED STEAM PREHEATER	27.20 HP REACTOR	10.52.02C/D CARRY OVER OIL PUMPS	21.11 HP FEED/PRODUCT ECONOMIZER	10.95 HP ALCOHOL INJECTION PUMP	21.12 HOT SLURRY COOLER
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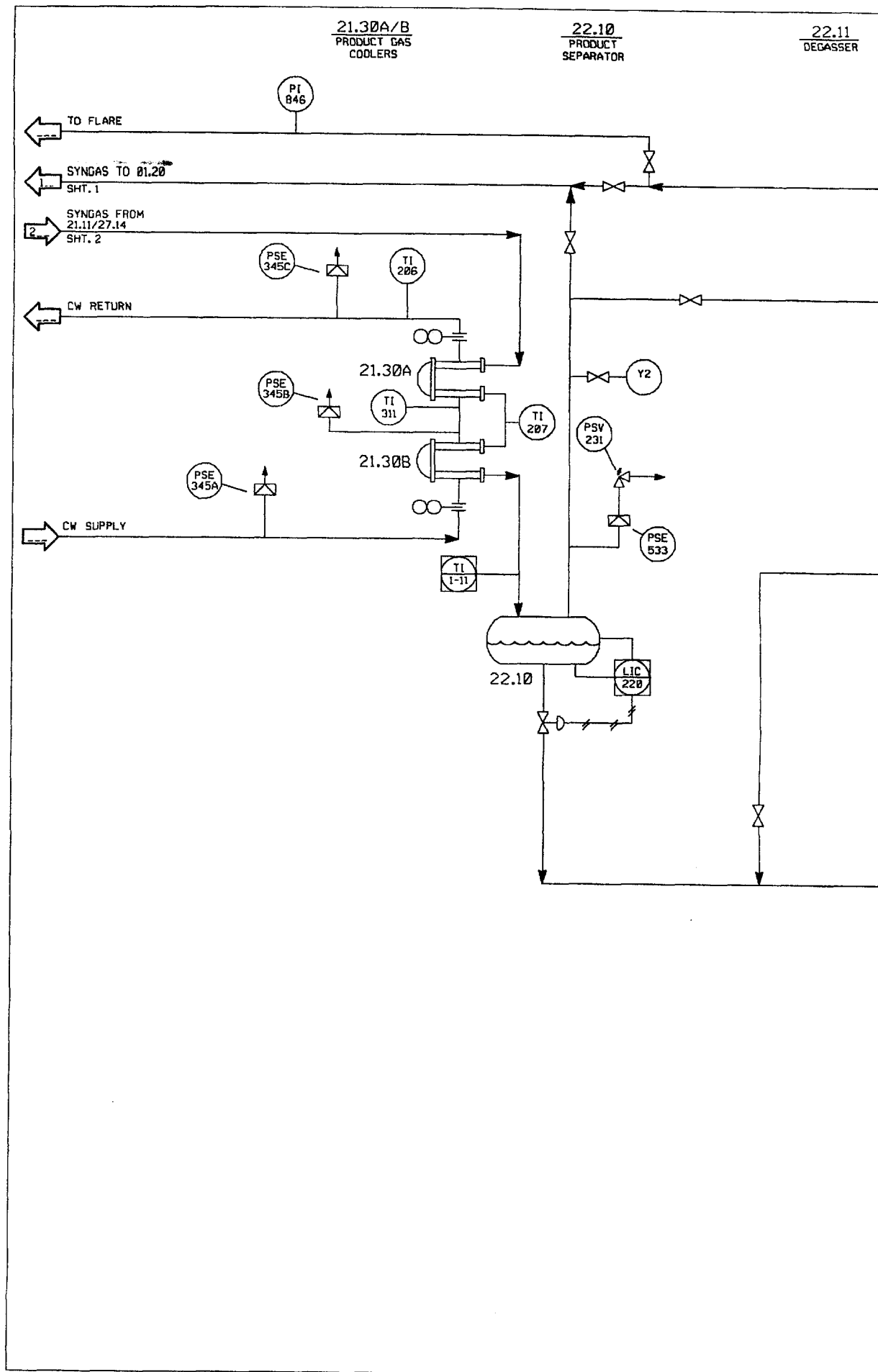
AIR PRODUCTS

LAPORTE AFOL
OXYGENATES TRAIN
FEED/REACTOR SECTION

B.L. BHATT

DWG: U003P1A.PFD	DATE: 04FEB94	SHT. NO. 1
DRWN: J.D. FANELLI		REV. NO. 1A

FIGURE 4



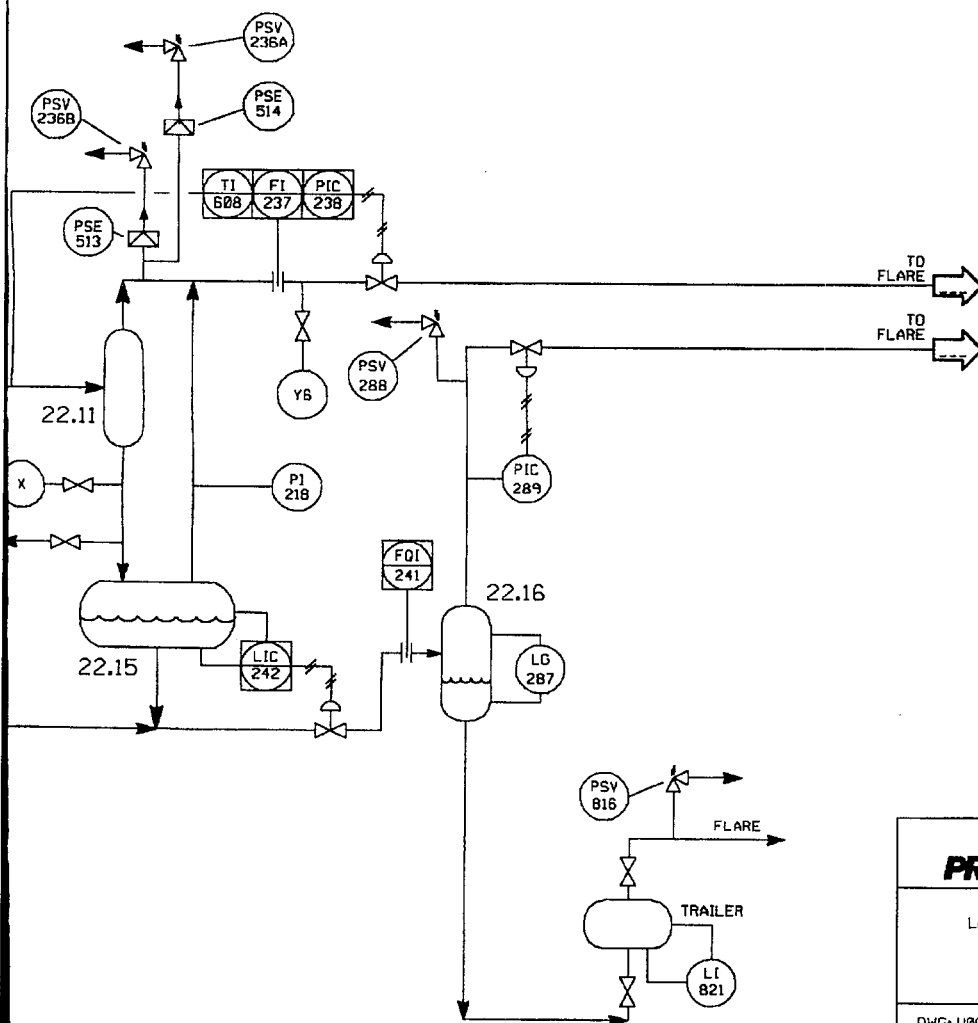
22.15
L10/L10
SEPARATOR

22.16

SYNGAS FROM
CO2 REMOVAL
(21.10)

SYNGAS TO
CO2 REMOVAL
(21.10)

METHANOL DRAIN FROM
CO2 REMOVAL SYSTEM



AIR PRODUCTS

LAPORTE AFBU OXYGENATES
MODIFICATIONS:
PRODUCT COLLECTION
B.L. BHATT

DWG: U003P2A	DATE: 21AUG95	SHT. NO. 2A
DRWN: J.D. FANELLI		REV. NO. 2

Figure 5

Fluid Dynamic Run at LaPorte
CO Reduction of the Baseline Catalyst

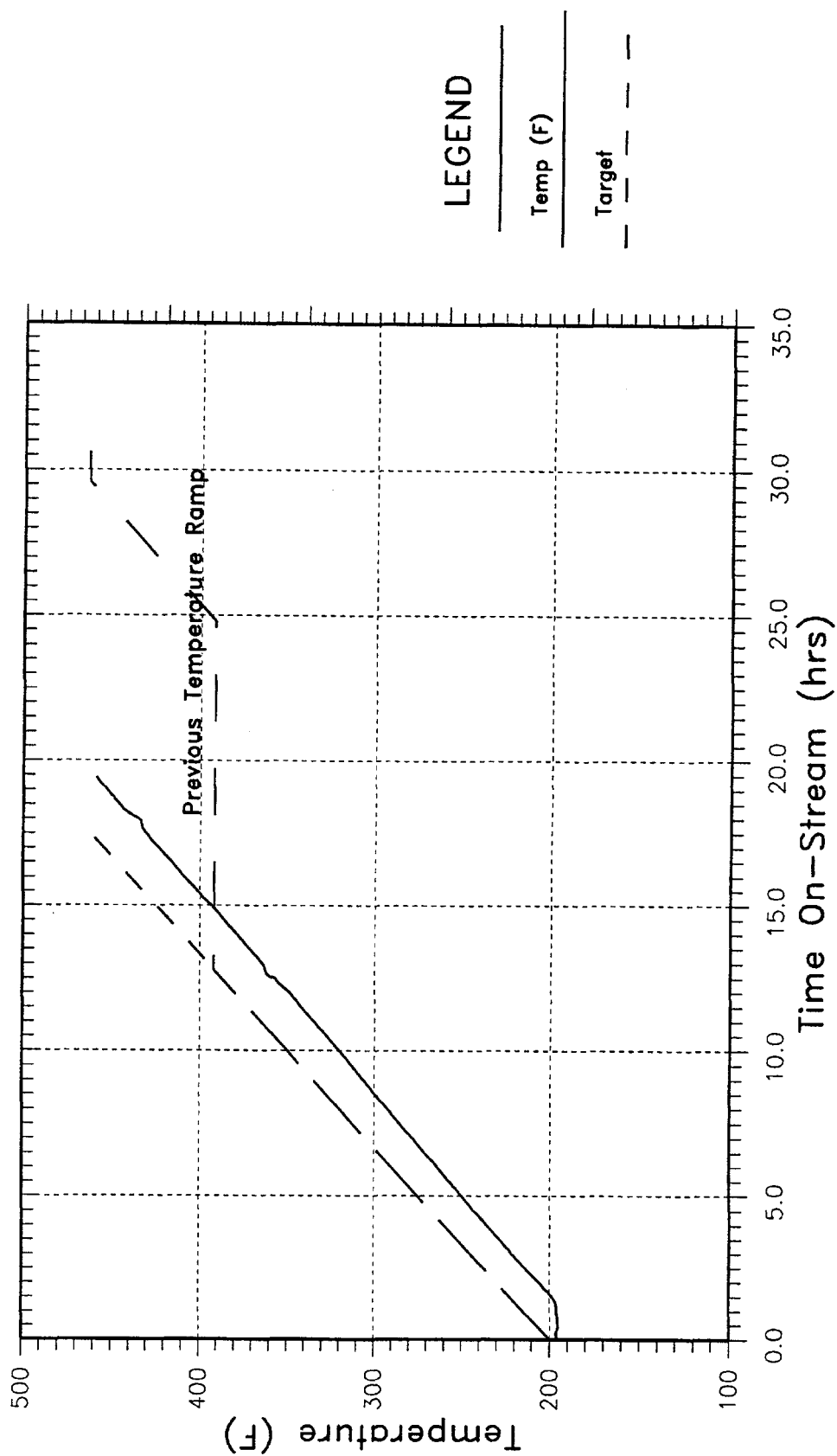
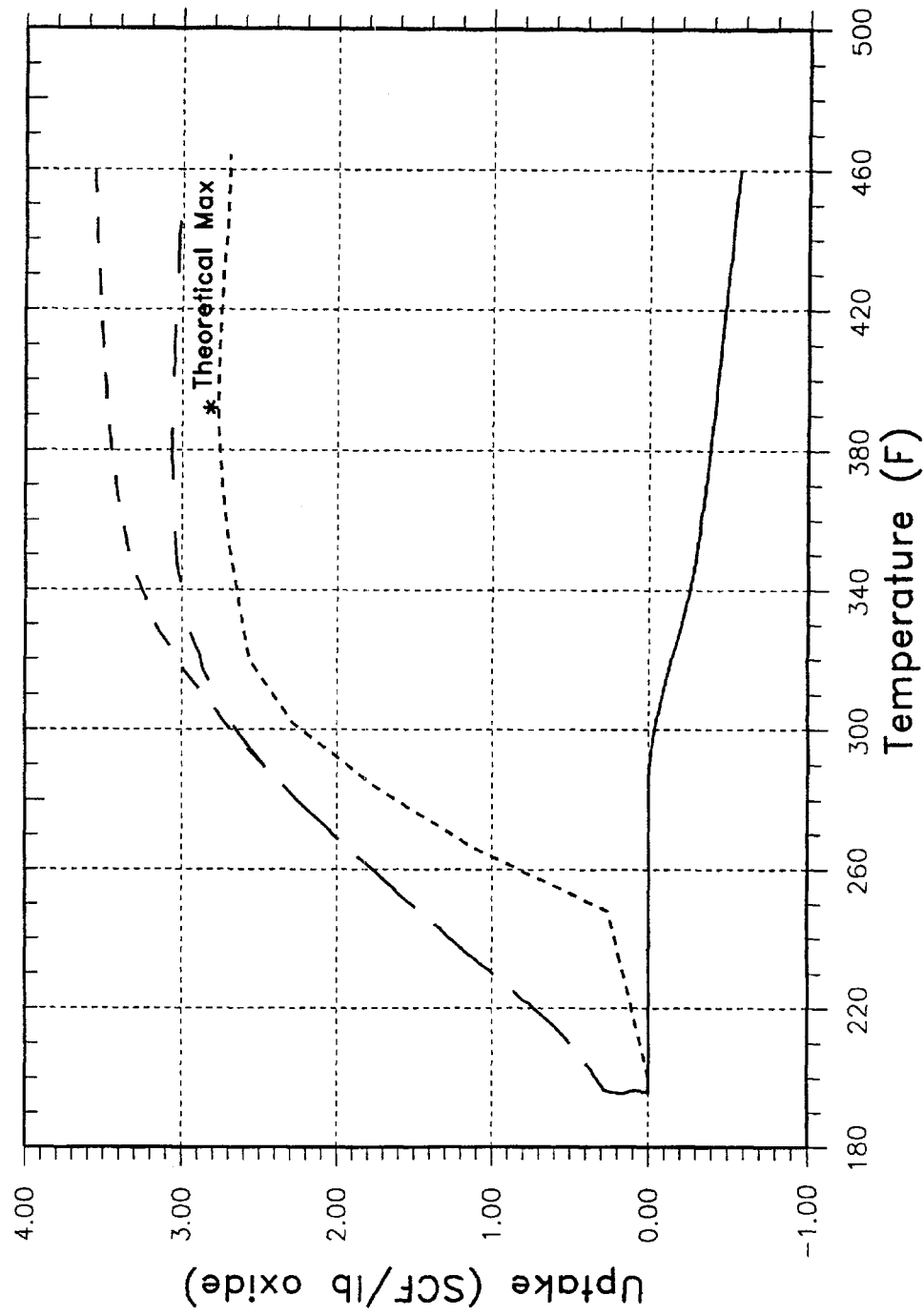


Figure 6
Fluid Dynamic Run at LaPorte
CO Reduction of the Baseline Catalyst



LEGEND

H2 Uptk

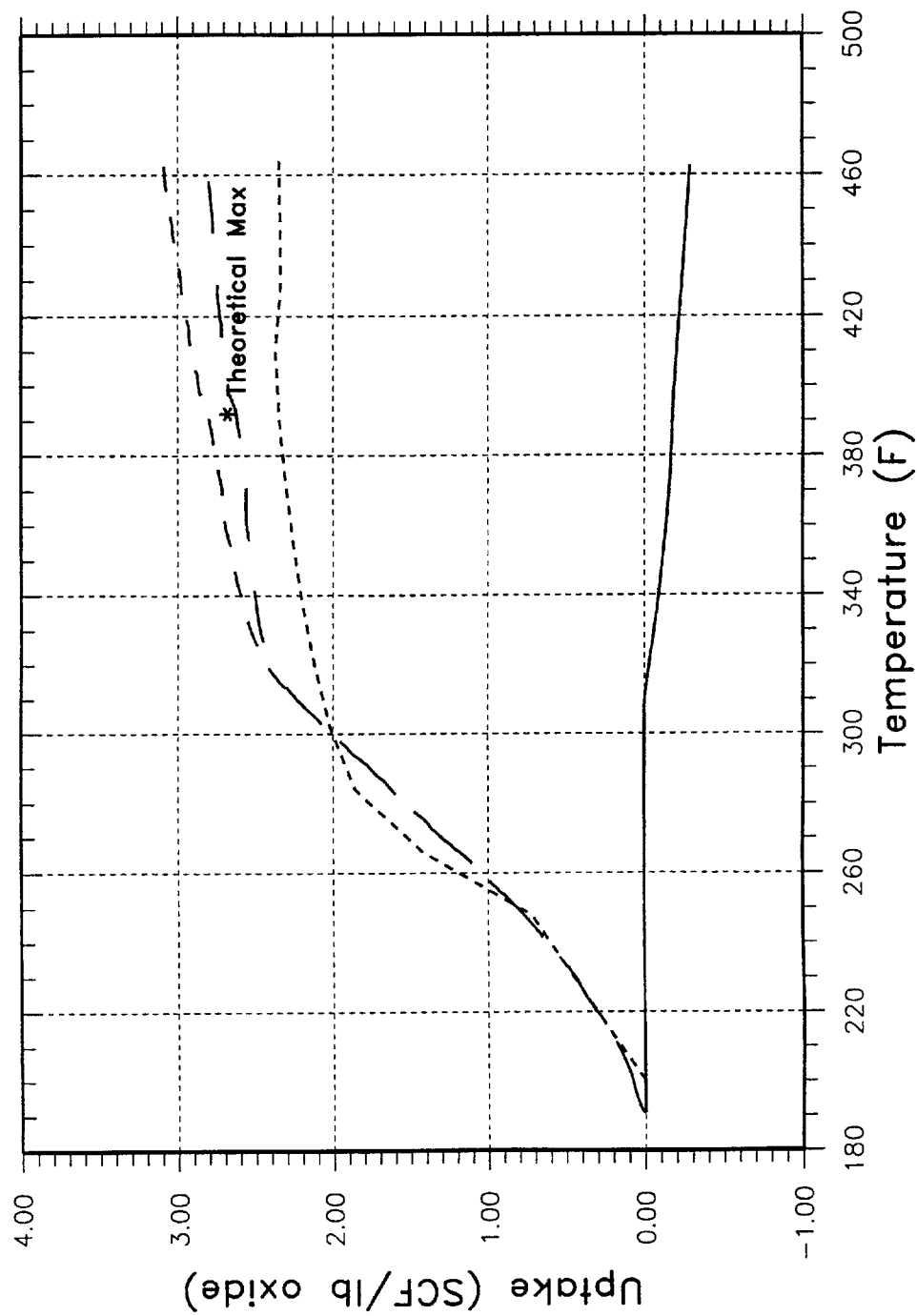
CO Uptk

Tot Uptk

Lab Uptk

FIGURE 7

Fluid Dynamic Run at LaPorte CO Reduction of the Alternate Catalyst



LEGEND

H2 Uptk

CO Uptk

Tot Uptk

Lab Uptk

Figure 8

Fluid Dynamic / Methanol Run at LaPorte

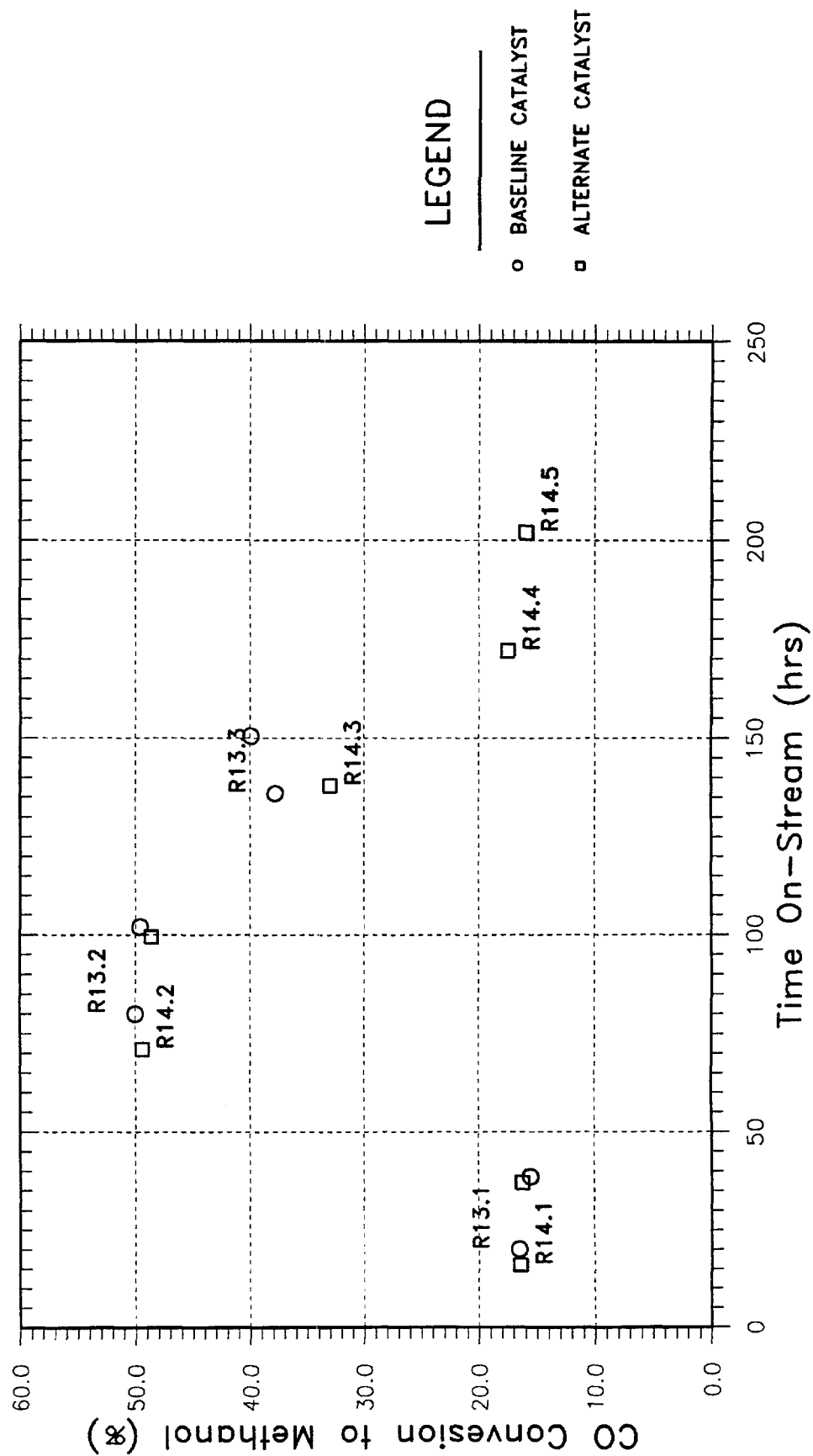
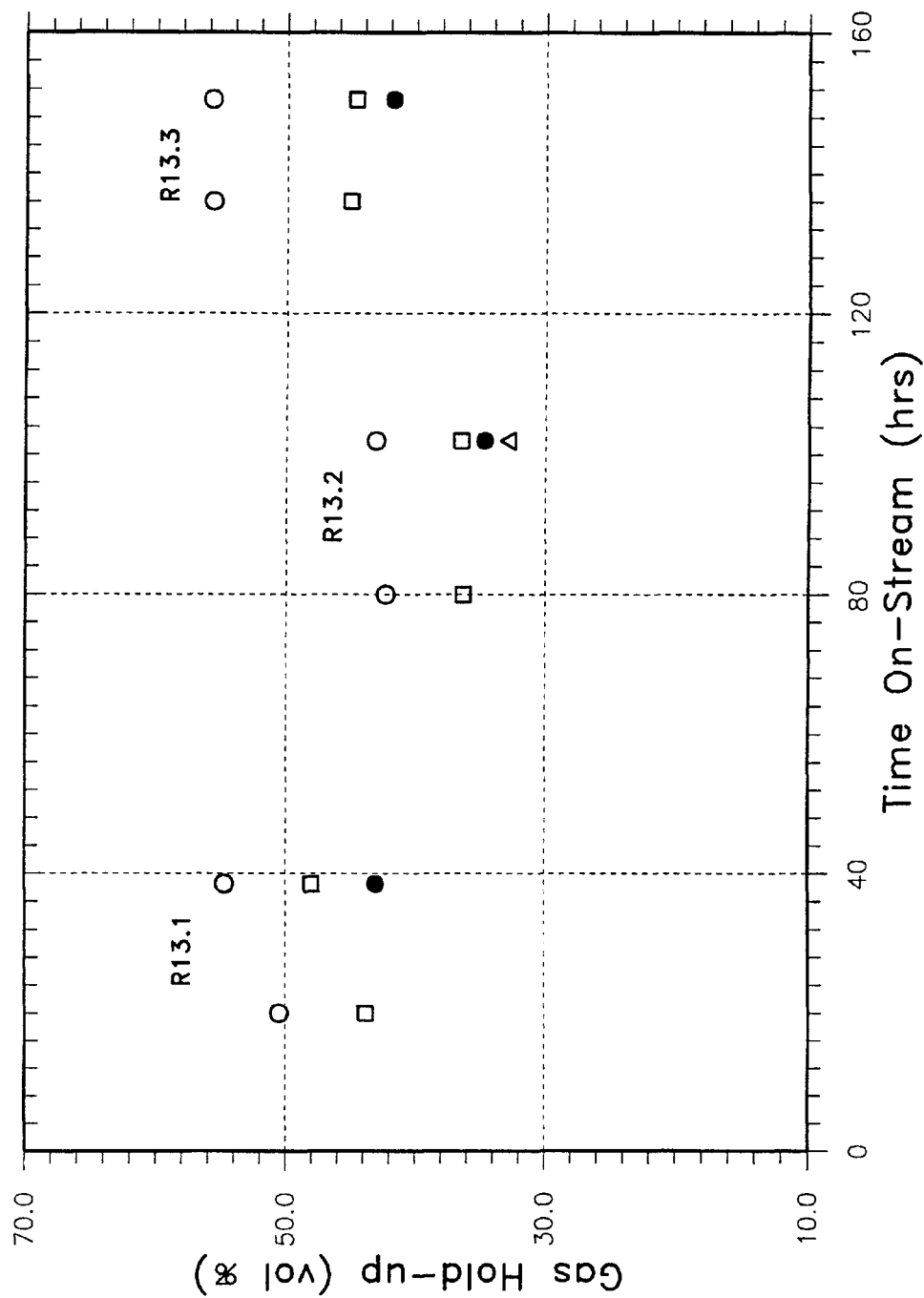


Figure 9

Fluid Dynamic / Methanol Run at LaPorte Baseline Catalyst (Run No. AF-R13)

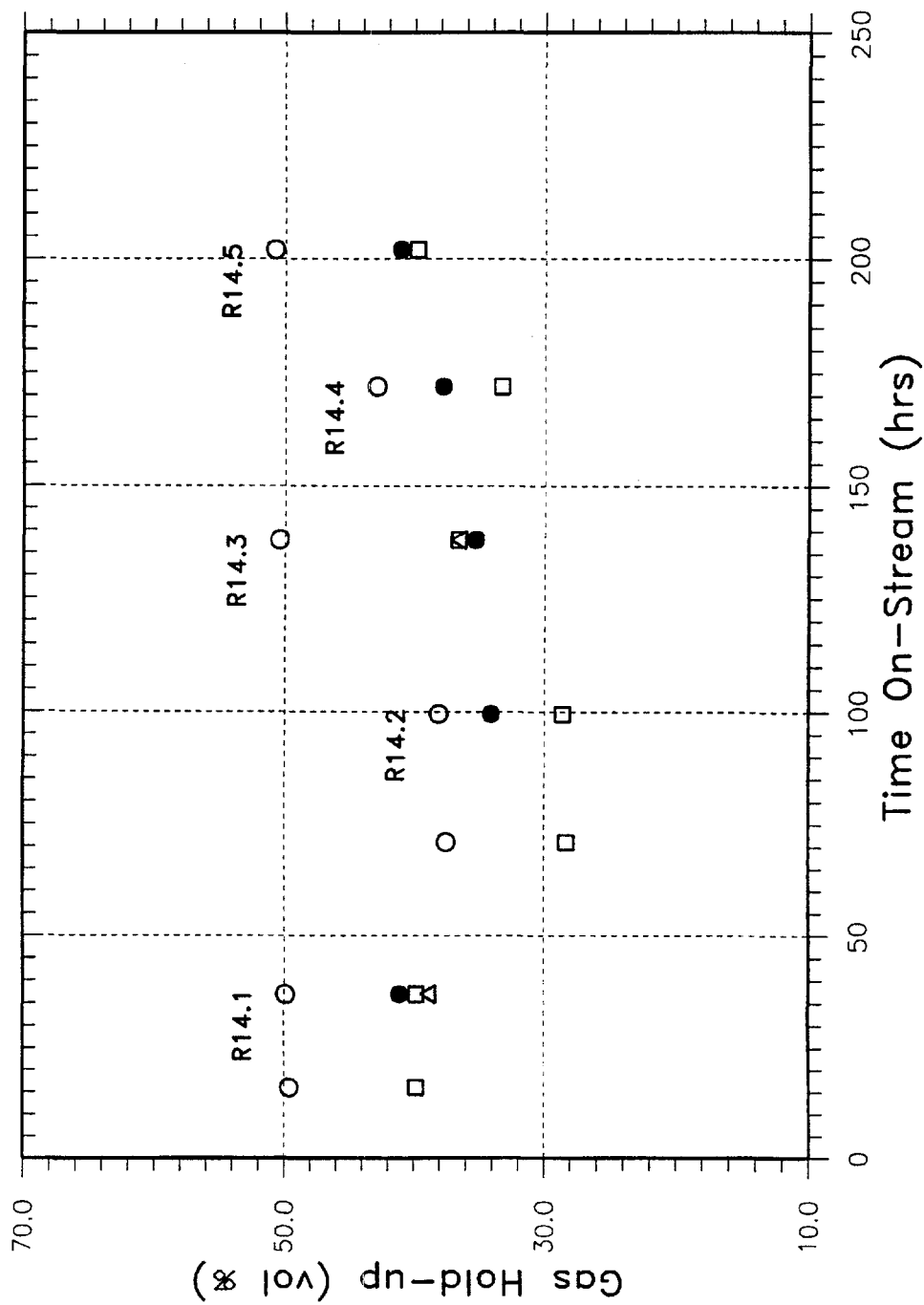


LEGEND

- from NDG
- from DP
- △ from SD Test
- from Correltn.

Figure 10

Fluid Dynamic / Methanol Run at LaPorte
Alternate Catalyst (Run No. AF-R14)



LEGEND

- from NDG
- from DP
- △ from SD Test
- from Correl'n.

Figure 11 - Axial Variations in Gas Hold-up based on NDG

Run No. AF-R13 (Baseline Catalyst)

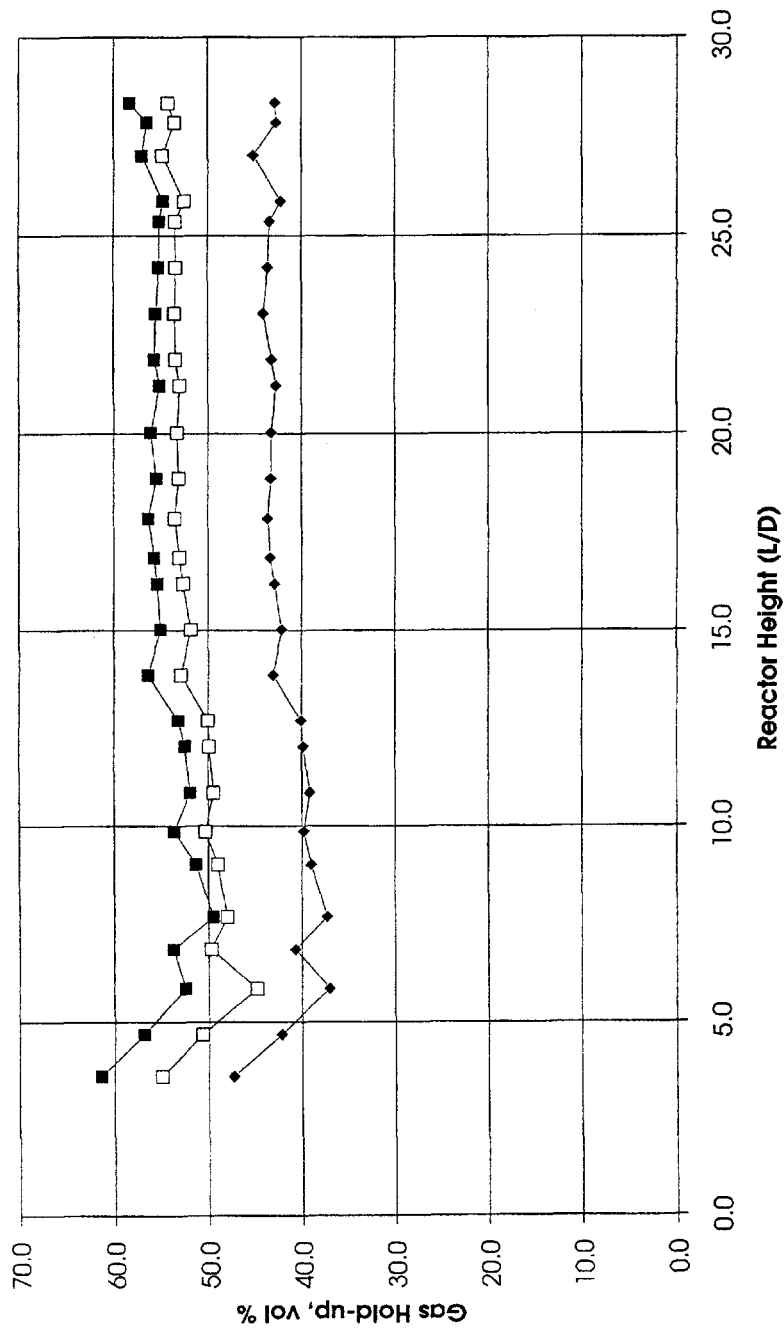


Figure 12 - Axial Variations in Gas Hold-up based on NDG

Run No. AF-R14 (Alternate Catalyst)

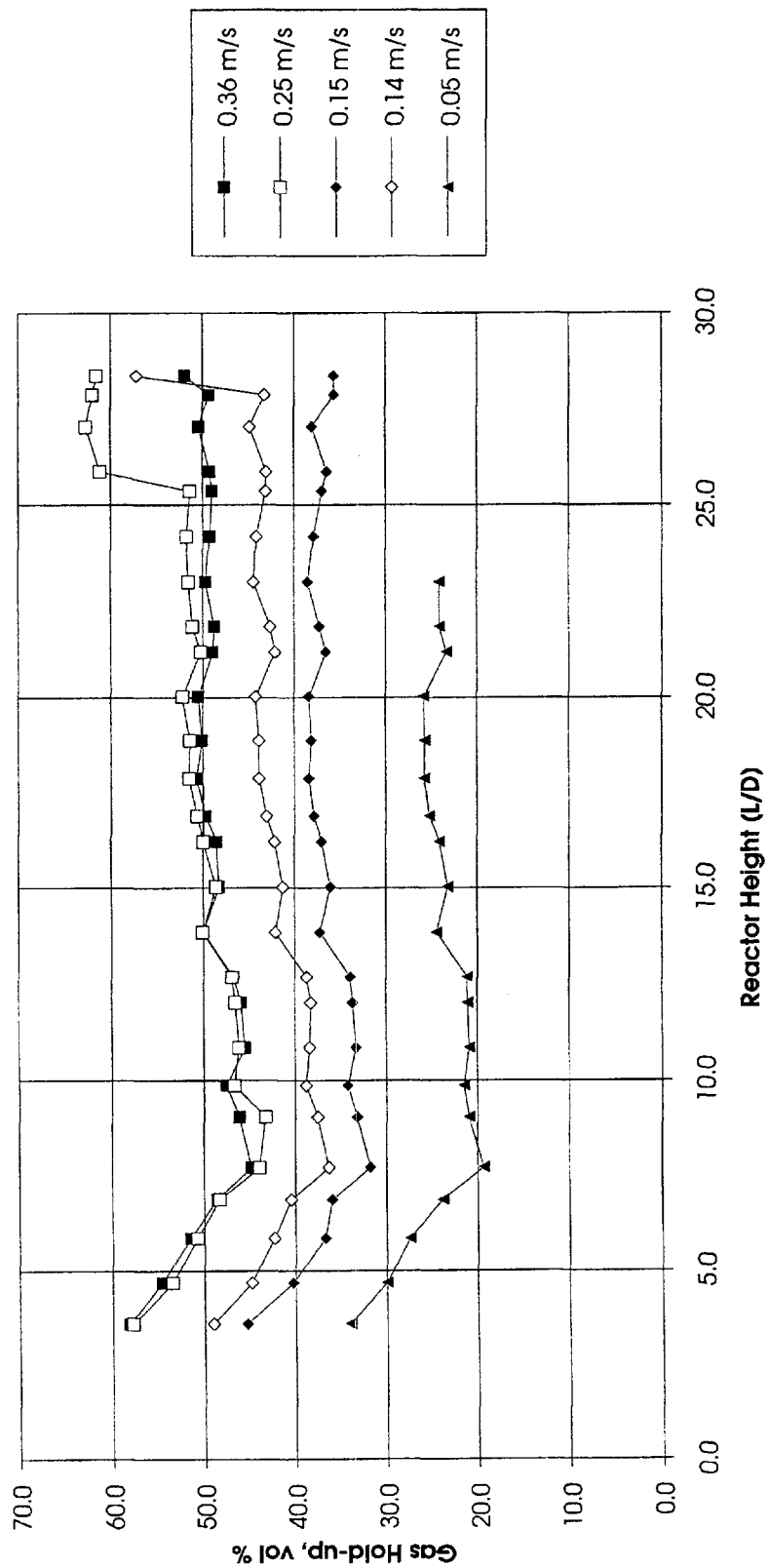


Figure 13 - Utility Oil System Heater/Cooler Realignment

(Run No. 13.2B)

