THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 25A From 10/1/47 Hr. 1600 to 10/2/47 Hr. 0600

FLOWS	SCFH	%
Oxygen	2040	
Nat. Gas	2420	
Total	4460	45.7
Fresh Feed	6100	
F. F. by C	7380	
Avg. F. F.	6740	
Wet Gas	2580	
Contraction		61.9
Recycle	10300	
Bleed	270	
Total	10570	
Total Feed	17310	
Recycle/F.F.	1.58	
Inlet Vel.	1.39 ft/sec	
Steam Flow	97.5 #/hr	

RUN CONDITIONS	
Generator Press.	266
O_2 Preheat, °F	482
Gas Preheat, °F	661
Reactor Press.	243
Steam Back Press.	733
Temperatures, °F	
Heater Outlet	661
Catalyst #1	678
#2	668
#3	624
#4	577
#5	538
Average	614
Product Separator	

DISTILLATIONS	ASTM
Prod.	6450
A.P.I.	47.0
I.B.P.	116
5%	
10%	144
20	170
30	194
40	220
50	242
60	264
70	290
80	316
90	352
95	386
E.P.	408
Rec.	98.0
Res.	1.0
Loss.	1.0

Hempel Dist. °F	%	A.P.I.
to 400	71.3	53.9
400-550	18.0	34.5
550+		

WATER Temp.	%
200	
203	
208	

CATALYST DATA	
In Reactor at Start of Period	301
Fresh Catalyst Charged	
Catalyst Recharged	41.5
Total	342.5
Catalyst Taken Out	35.0
In Reactor at End of Period	307.5
Reactor d-P, H_2O	75.6
Pounds in Reactor	214.6
Density, lbs./cu. ft.	98.0
Bed Height, Feet	4.3
Space Vel. SCFH/lb. cat.	
Inventory Figures	21.9
From d-P Meters	31.4

CATALYST ANALYSIS Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	0.6	80+	65.0
100	419-150	29.1	80-40	15.0
150	149-105	20.7	40-20	20.0
200	104-74	17.7	20-10	—
250	73-62	2.8	10-0	—
325	61-44	7.4		
<325	43-0	21.7		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated			% Fe	
Settled			% C	
Compacted			% Oil	
Sp. Grav.			Specific Surface	
				m^2 gm

NATURAL GAS	%
CO_2	
CH_4	
C_2H_6	
C_3H_8	
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	49.34				
Sap. No.	55.30				
Hydrox. No.					
Bromine No.	36.90				
% Fe					
% Alc		8.9			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2					
CO_2					
CH_4					
C_2H_6					
C_3H_8					
C_4H_{10}					
N_2					
Total					

OUT	Mol %	SCFH m/hr	C	H	O
CO_2					
CO					
CH_4					
H_2					
N_2					
H_2O					
Total					

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 258 From 10/2/47 Hr. 0700 to 10/3/47 Hr. 0700

FLOWS	SCFH	%
Oxygen	2140	
Nat. Gas	2560	
Total	4700	45.5
Fresh Feed	6420	
F.F. by C	7600	
Avg. F.F.	7010	
Wet Gas	2600	
Contraction		65.8
Recycle	12900	
Bleed	304	
Total	13204	
Total Feed	20804	
Recycle F.F.	1.74	
Inlet Vel.	1.12 ft/sec	
Steam Flow	79.6 #/hr	

RUN CONDITIONS	
Generator Press.	378
O_2 Preheat, °F	411
Gas Preheat, °F	124
Reactor Press.	370
Steam Back Press.	583
Temperatures, °F	
Heater Outlet	347
Catalyst #1	666
#2	643
#3	576
#4	550
#5	574
Average	589
Product Separator	

DISTILLATIONS	ASTM	Hempel Dist. °F	%	A.P.I.
Prod.	6450			
A.P.I.	47.4	to 400	73.0	54.8
I.B.P.	118	400-550	15.6	33.9
5%		550+		
10%	142			
20	158			
30	200	WATER		
40	220	Temp.	%	
50	240	200		
60	260	203		
70	282	208		
80	314			
90	348			
95	378			
E.P.	403			
Rec.	97.5			
Res.	0.6			
Loss	1.9			

CATALYST DATA	
In Reactor at Start of Period	307.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	307.5
Catalyst Taken Out	22.0
In Reactor at End of Period	285.5
Reactor d-P, H_2O	50.5
Pounds in Reactor	143.0
Density, lbs./cu. ft.	67.0
Bed Height, Feet	4.4
Space Vel. SCFH/lb. cat.	
Inventory Figures	26.7
From d-P Meters	53.2

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	0.4	80+	67.0
100	419-150	20.8	80-40	13.0
150	149-105	71.5	40-20	11.0
200	104-74	26.1	20-10	9.0
250	73-62	8.3	10-0	—
325	61-44	10.3		
<325	43-0	2.6		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated			% Fe	
Settled			% C	
Compacted			% Oil	
Sp. Grav. 2.9			Specific Surface	
				m^2/gm

NATURAL GAS	%
CO_2	2.17
CH_4	87.64
C_2H_6	6.21
C_3H_8	2.76
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION				
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	56.43	42.11			
Sap. No.	56.4	127.39			
Hydrox. No.					
Bromine No.	50.6				
% Fe					
% Alc.					

GENERATOR ELEMENTAL BALANCE

IN	#/hr ~~Mol %~~	~~SCFH~~ m/hr	C	H	O
O_2	180.67	5.646			11.292
CO_2	6.47	.147	.147		.294
CH_4	94.72	5.920	5.920	23.680	
C_2H_6	12.57	.419	.838	2.514	
C_3H_8	8.18	.186	.558	1.488	
C_4H_{10}					
N_2					
Total	302.61	12.318	7.463	27.682	11.586

Loss H_2O 241.68

OUT	Mol %	~~SCFH~~ m/hr	C	H	O
CO_2	3.5	.702	.702		1.404
CO	33.9	6.797	6.797		6.797
CH_4	0.6	.120	.120	.480	
H_2	61.6	12.357		24.702	
N_2	0.5	.100			
H_2O				2.500	3.385
Total		20.070	7.619	27.682	11.586

	FRESH FEED %	m/hr	#/hr	WET GAS %	Measured m/hr	Measured #/hr	At Wt. Balance m/hr	At Wt. Balance #/hr	RECYCLE m/hr	COMB. FEED m/hr	COMB. FEED %	EFFLUENT m/hr	EFFLUENT %
CO	33.9	6.80	190.40	10.30	.71	19.88	.81	22.68	3.59	10.39	18.93	4.40	9.24
H2	61.6	12.35	24.70	56.58	3.88	7.76	4.42	8.84	19.71	32.06	58.41	24.13	50.67
CO2	3.5	.70	30.80	17.51	1.20	52.80	1.37	60.28	6.10	6.80	12.39	7.47	15.69
N2	0.5	.10	2.80	1.13	.08	2.24	.09	2.52	.39	.49	.89	.48	1.01
CH4	0.6	.12	1.92	7.70	.53	8.48	.60	9.60	2.68	2.80	5.10	3.28	6.89
C2H4				2.06	.14	3.92	.16	4.48	.72	.72	1.31	.88	1.85
C2H6				.67	.05	1.50	.06	1.80	.23	.23	.42	.29	.61
C3H6				1.56	.11	4.62	.13	5.46	.54	.54	.98	.67	1.41
C3H8				.27	.02	.88	.02	.88	.09	.09	.16	.11	.23
C4H8				1.42	.10	5.60	.11	6.16	.49	.49	.89	.60	1.26
C4H10				.24	.02	1.16	.02	1.16	.08	.08	.15	.10	.21
C5H10				.46	.03	2.10	.03	2.10	.16	.16	.29	.19	.40
C6H12				.11	.01	.86	.01	.86	.04	.04	.07	.05	.10
OIL								45.08				.32	.67
WATER												4.65	9.74
TOTAL		20.07	250.62		6.86	111.80				54.89		47.62	
H2+CO		19.15											
H2/CO		1.82					5.46			3.09		5.48	

NET CHANGE ON REACTION	Carbon m/hr	Carbon a/hr	Carbon %	Hydrogen a/hr	Hydrogen %	Oxygen a/hr	Ultimate Oil #/hr	Ultimate Oil #/gal	Ultimate Oil gal/hr	Unsats. %
CO	-5.99	-5.99	11.91			-5.99				
H2	-7.93			-15.86						
CO2	.67	.67	9.85			1.34				
N2	- .01									
CH4	.48	.48	7.06	1.92						
C2H4	.16	.32	4.71	.64						75.46
C2H6	.06	.12	1.76	.36						
C3H6	.13	.39	5.74	.78			4.91	6.25	.79	85.25
C3H8	.02	.06	.88	.16						
C4H8	.11	.44	6.47	.88			5.85	6.1	.96	85.54
C4H10	.02	.08	1.18	.20			1.16	4.86	.24	
C5H10	.03	.15	2.21	.30			2.10	5.4	.39	
C6H12	.01	.06	.88	.12			.86			
OIL		3.22	47.35	6.44			45.08	6.5	6.94	
WATER				4.06		4.65				
TOTAL	12.24					2.03	59.96		9.32	
H2+CO										
H2/CO										

ULTIMATE YIELDS	% C0 Fed	#/l.r	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	13.53	13.96	1.92	32.47			
C3+	64.71	61.70	8.50	143.74			
C4+	58.09	55.36	7.63	129.02			
Ult. Oil		59.96	8.26	139.68	9.32	1.28	180.86
C02	9.85	29.48	4.06	68.65			
H20		83.70	11.53	194.97			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	111.8		126.8
Oil	24.8		24.8
Water	99.0		99.0
Total	235.6	94.0	250.6

EFFLUENT RATIOS	
H2/H20	5.19
C02/C0	1.70
(H2) (C02) / (H20) (C0)	8.80

CONTRACTION:	61.0
C0 Conversion:	88.09
H2 Conversion:	64.2

Yield Calculations assume "oil" is CH2, and is found by difference on Carbon, and H20 by difference on Hydrogen. "Oil" figures therefore include hydrocarbon fraction of oxygenated compounds. Standard cubic feet measured at 60 F and 14.7 psig. Cubic Meters measured at 0 C. and 14.7 psig. g/M3 = 16.91 × #/MCF. cc/M3 = 141.3 × gal/MCF.

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 25C From 10/3/47 Hr. 0700 to 10/4/47 Hr. 0700

FLOWS	SCFH	%
Oxygen	2250	
Nat. Gas	2770	
Total	5020	44.8
Fresh Feed	7870	
F. F. by C	8730	
Avg. F. F.		
Wet Gas	3430	
Contraction		60.7
Recycle	14070	
Bleed	322	
Total	14392	
Total Feed	22152	
Recycle/F.F.	1.81	
Inlet Vel.	1.058 ft/sec	
Steam Flow		

RUN CONDITIONS	
Generator Press.	411
O_2 Preheat, °F	464
Gas Preheat, °F	—
Reactor Press.	400
Steam Back Press.	553
Temperatures, °F	
Heater Outlet	408
Catalyst #1	672
#2	630
#3	563
#4	543
#5	506
Average	583
Product Separator	

DISTILLATIONS	ASTM
Prod.	6450
A.P.I.	48.8
I.B.P.	108
5%	
10%	144
20	168
30	188
40	212
50	232
60	256
70	282
80	308
90	346
95	372
E.P.	401
Rec.	97.0
Res.	0.8
Loss	2.2

Hempel Dist.		
°F	%	A.P.I.
to 400	75.0	
400-550	18.3	
550+		

WATER	
Temp.	%
200	
203	
208	

CATALYST DATA	
In Reactor at Start of Period	285.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	285.5
Catalyst Taken Out	6.0
In Reactor at End of Period	279.5
Reactor d-P, H_2O	10.0
Pounds in Reactor	116.0
Density, lbs./cu. ft.	49.0
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	31.2
From d-P Meters	75.0

CATALYST ANALYSIS

Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	0.2	80+	73.0
100	419-150	36.6	80-40	27.0
150	149-105	26.4	40-20	6.0
200	104-74	22.6	20-10	4.0
250	73-62	4.2	10-0	—
325	61-44	7.4		
<325	43-0	2.6		

Density, lbs./cu. ft.		Chem. Anal.	
Aerated		% Fe	
Settled		% C	
Compacted		% Oil	
Sp. Grav.	3.5	Specific Surface	
			m^2/gm

NATURAL GAS	%
CO_2	1.66
CH_4	86.72
C_2H_6	8.45
C_3H_8	3.17
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	58.52	43.33			
Sap. No.	58.2	129.08			
Hydrox. No.					
Bromine No.	38.6				
% Fe					
% Alc		9.8			

GENERATOR ELEMENTAL BALANCE

	IN #/hr ~~Mol %~~	IN ~~SCFH~~ m/hr	IN C	IN H	IN O		OUT Mol %	OUT ~~SCFH~~ m/hr	OUT C	OUT H	OUT O
O_2	189.98	5.937			11.874	CO_2	3.5	.806	.806		1.612
CO_2	5.32	.121	.121		.242	CO	33.7	7.761	7.761		7.761
CH_4	101.41	6.338	6.338	25.352		CH_4	0.4	.092	.092	.368	
C_2H_6	18.54	.618	1.236	3.708		H_2	62.0	14.279		28.558	
C_3H_8	10.21	.232	.696	1.856		N_2	0.3	.069			
C_4H_{10}						H_2O				1.890	2.743
N_2						Total		23.007	8.659	30.916	12.116
Total	325.46	13.246	8.391	30.916	12.116						

Loss H_2O 276.09

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS Measured m/hr	WET GAS Measured #/hr	WET GAS At Wt. Balance m/hr	WET GAS At Wt. Balance #/hr	RECYCLE m/hr	COMB. FEED m/hr	COMB. FEED %	EFFLUENT m/hr	EFFLUENT %
CO	33.7	7.76	217.28	9.54	.86	24.08	.93	26.04	3.62	11.38	18.66	4.55	8.84
H2	62.0	14.28	28.56	50.90	4.61	9.22	4.98	9.96	19.33	33.61	55.12	24.31	47.23
CO2	3.5	.81	35.64	25.54	2.31	101.64	2.49	109.56	9.70	10.51	17.24	12.19	23.68
N2	.3	.07	1.96	1.75	.16	4.48	.17	4.76	.66	.73	1.20	.83	1.61
CH4	.4	.09	1.44	5.95	.54	8.64	.58	9.28	2.26	2.35	3.85	2.84	5.52
C2H4				1.77	.16	4.48	.17	4.76	.67	.67	1.10	.84	1.63
C2H6				.70	.06	1.80	.06	1.80	.27	.27	.44	.33	.64
C3H6				1.12	.10	4.20	.11	4.62	.43	.43	.71	.54	1.05
C3H8				.35	.03	1.32	.03	1.32	.13	.13	.21	.16	.31
C4H8				1.21	.11	6.16	.12	6.72	.46	.46	.75	.58	1.13
C4H10				.19	.02	.88	.02	1.16	.07	.07	.11	.09	.17
C5H10				.75	.07	4.90	.08	5.60	.28	.28	.46	.36	.70
C6H12				.23	.02	.84	.02	1.68	.09	.09	.15	.11	.21
OIL								37.80				.27	.52
WATER												3.47	6.74
TOTAL		23.03	284.88		9.05	172.64				60.98		51.47	
H2+CO		22.04											
H2/CO		1.84					5.35			2.95		5.34	

NET CHANGE ON REACTION	Carbon m/hr	Carbon a/hr	Carbon %	Hydrogen a/hr	Hydrogen %	Oxygen a/hr	Ultimate Oil #/hr	Ultimate Oil #/gal	Ultimate Oil gal/hr	Unsats. %
CO	-6.83	-6.83	11.98			-6.83				
H2	-9.30			-18.60						
CO2	1.68	1.68	21.65			3.36				
N2	- .10									
CH4	.49	.49	6.31	1.96						
C2H4	.17	.34	4.38	.68						71.66
C2H6	.06	.12	1.55	.36						
C3H6	.11	.33	4.25	.66			4.16	6.25	.67	76.19
C3H8	.03	.09	1.16	.24						
C4H8	.12	.48	6.19	.96			6.38	6.1	1.05	86.43
C4H10	.02	.08	1.03	.20			1.16	4.86	.24	
C5H10	.08	.40	5.15	.80			5.60	5.4	1.04	
C6H12	.02	.12	1.55	.24			1.68			
OIL		2.70	34.79	5.40			37.80	6.5	5.82	
WATER				7.10		3.47				
TOTAL	13.45					3.55	56.78		8.82	
H2+CO										
H2/CO										

ULTIMATE YIELDS	% CO Fed	#/hr	H2/CO #/MCF	H2/CO g/M3	Gal/hr	H2/CO Gal/MCF	H2/CO cc/M3
C1+C2	12.24	14.40	1.72	29.09			
C3+	54.12	58.90	7.05	119.22			
C4+	48.71	52.96	6.34	107.21			
Ult. Oil		56.78	6.80	114.99	8.82	1.06	149.78
CO2	21.65	73.92	8.85	149.65			
H20		62.46	7.48	126.49			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	172.6		185.0
Oil	19.1		19.1
Water	80.9		80.9
Total	272.6	95.8	284.9

EFFLUENT RATIOS	
H2/H20	7.01
C02/C0	2.68
(H2) (C02) / (H20) (C0)	24.05

CONTRACTION:	58.4
C0 Conversion:	88.02
H2 Conversion:	65.13

Yield Calculations assume "oil" is CH2, and is found by difference on Carbon, and H20 by difference on Hydrogen. "Oil" figures therefore include hydrocarbon fraction of oxygenated compounds. Standard cubic feet measured at 60 F and 14.7 psig. Cubic Meters measured at 0 C. and 14.7 psig. g/M3 = 16.91 × #/MCF. cc/M3 = 141.3 × gal/MCF.

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 25D From 10/4/47 Hr. 0700 to 10/4/47 Hr. 1300

FLOWS	SCFH	%
Oxygen	2260	
Nat. Gas	2680	
Total	4940	45.9
Fresh Feed	7240	
F. F. by C	8160	
Avg. F. F.	7700	
Wet Gas	3500	
Contraction		57.0
Recycle	13700	
Bleed	344	
Total	14044	
Total Feed	22204	
Recycle/F.F.	1.79	
Inlet Vel.	1.10 ft/sec	
Steam Flow	76#/hr	

RUN CONDITIONS	
Generator Press.	410
O_2 Preheat, °F	540
Gas Preheat, °F	—
Reactor Press.	400
Steam Back Press.	530
Temperatures, °F	
Heater Outlet	460
Catalyst #1	670
#2	630
#3	535
#4	535
#5	500
Average	576
Product Separator	

DISTILLATIONS							
	A S T M				Hempel Dist.		
Prod.	6430				°F	%	A.P.I.
A.P.I.					to 400		
I.B.P.					400-550		
5%					550+		
10%							
20							
30					WATER		
40					Temp.	%	
50					200		
60					203		
70					208		
80							
90							
95							
E.P.							
Rec.							
Res.							
Loss.							

CATALYST DATA	
In Reactor at Start of Period	279.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	279.5
Catalyst Taken Out	
In Reactor at End of Period	279.5
Reactor d-P, H_2O	
Pounds in Reactor	118.0
Density, lbs./cu. ft.	53.3
Bed Height, Feet	4.1
Space Vel. SCFH/lb. cat.	
Inventory Figures	29.2
From d-P Meters	69.0

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	0.2	80+	74.0
100	419-150	26.3	80-40	14.0
150	149-105	25.7	40-20	1.0
200	104-74	23.4	20-10	11.0
250	73-62	6.6	10-0	—
325	61-44	5.4		
<325	43-0	12.4		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated			% Fe	
Settled			% C	
Compacted			% Oil	
Sp. Grav.			Specific Surface	
				m^2/gm

NATURAL GAS	%
CO_2	1.96
CH_4	84.66
C_2H_6	10.35
C_3H_8	3.03
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	5.07	45.95			
Sap. No.	55.8	130.76			
Hydrox. No.					
Bromine No.					
% Fe					
% Alc					

GENERATOR ELEMENTAL BALANCE

IN	#/hr ~~Mol %~~	~~SCFH~~ m/hr	C	H	O
O_2	190.82	5.963			11.926
CO_2	6.12	.139	.139		.278
CH_4	95.76	5.985	5.985	23.940	
C_2H_6	21.96	.732	1.464	4.392	
C_3H_8	9.42	.214	.642	1.712	
C_4H_{10}					
N_2					
Total	324.08	13.033	8.230	30.044	12.204

OUT	Mol %	~~SCFH~~ m/hr	C	H	O
CO_2	2.4	.517	.517		1.034
CO	34.5	7.428	7.428		7.428
CH_4	0.5	.108	.108	.432	
H_2	61.0	13.133		26.266	
N_2	1.5	.323			
H_2O				3.346	3.742
Total		21.530	8.053	30.044	12.204

Loss H_2O 256.72

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	Measured m/hr	Measured #/hr	At Wt. Balance m/hr	At Wt. Balance #/hr	RECYCLE m/hr	COMB. FEED m/hr	COMB. FEED %	EFFLUENT m/hr	EFFLUENT %
CO	34.5	7.43	208.04	8.46	.87	24.36	.79	22.12	3.14	10.57	18.05	3.93	7.88
H2	61.0	13.13	26.26	54.86	5.06	10.12	4.59	9.18	20.33	33.46	57.15	24.92	49.94
CO2	2.4	.52	22.88	22.00	2.03	89.32	1.84	86.46	8.15	8.67	14.81	9.99	20.02
N2	1.5	.32	8.96	2.74	.25	7.00	.23	6.44	1.02	1.34	2.29	1.25	2.51
CH4	0.5	.11	1.76	6.59	.61	9.76	.55	8.80	2.44	2.55	4.36	2.99	5.99
C2H4				1.89	.17	4.76	.15	4.20	.70	.70	1.20	.85	1.70
C2H6				.73	.07	2.10	.06	1.80	.27	.27	.46	.33	.66
C3H6				1.29	.20	8.40	.18	7.56	.48	.48	.82	.66	1.32
C3H8				.27	.02	.88	.02	.88	.10	.10	.17	.12	.24
C4H8				.52	.05	2.80	.05	2.80	.19	.19	.32	.24	.48
C4H10				.12	.01	.58	.01	.58	.04	.04	.07	.05	.10
C5H10				.39	.04	2.80	.04	2.80	.14	.14	.24	.18	.36
C6H12				.12	.01	.84	.01	.84	.04	.04	.07	.05	.10
OIL								47.04				.34	.68
WATER												4.00	8.02
TOTAL		21.53	267.90		9.23	163.28				58.55		49.90	
H2+CO		20.56											
H2/CO		1.77					5.81			3.17		6.34	

NET CHANGE ON REACTION	Carbon m/hr	Carbon a/hr	Carbon %	Hydrogen a/hr	Hydrogen %	Oxygen a/hr	Ultimate Oil #/hr	Ultimate Oil #/gal	Ultimate Oil gal/hr	Unsats. %
CO	-6.64	-6.64	10.63			-6.64				
H2	-8.54			-17.08						
CO2	1.32	1.32	17.77			2.64				
N2	- .09									
CH4	.44	.44	5.92	1.76						
C2H4	.15	.30	4.04	.60						72.14
C2H6	.06	.12	1.62	.36						
C3H6	.18	.54	7.27	1.08			6.80	6.25	1.09	82.69
C3H8	.02	.06	.81	.16						
C4H8	.05	.20	2.69	.40			2.66	6.1	0.44	81.25
C4H10	.01	.04	.54	.10			.58	4.86	0.12	
C5H10	.04	.20	2.69	.40			2.80	5.4	0.52	
C6H12	.01	.06	.81	.12			.84			
OIL		3.36	45.22	6.72			47.04	6.5	7.24	
WATER				5.38		4.00				
TOTAL	12.99					2.69	60.72		9.41	
H2+CO										
H2/CO										

ULTIMATE YIELDS	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	11.58	14.80	1.90	32.13			
C3+	60.03	62.50	8.02	135.62			
C4+	51.95	54.06	6.94	117.36			
Ult. Oil		60.72	7.80	131.90	9.41	1.21	170.97
C02	17.77	63.58	8.16	137.99			
H20		72.00	9.24	156.25			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	163.3		148.6
Oil	14.3		14.3
Water	105.0		105.0
Total	282.6	105.6	267.9

EFFLUENT RATIOS	
H2/H20	6.23
C02/C0	2.54
(H2) (C02) / (H20) (C0)	15.84

CONTRACTION:	60.3
C0 Conversion:	89.37
H2 Conversion:	65.04

Yield Calculations assume "oil" is CH2, and is found by difference on Carbon, and H20 by difference on Hydrogen. "Oil" figures therefore include hydrocarbon fraction of oxygenated compounds. Standard cubic feet measured at 60 F and 14.7 psig. Cubic Meters measured at O C. and 14.7 psig. g/M3 = 16.91 × #/MCF. cc/M3 = 141.3 × gal/MCF.

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 25E From 10/7/47 Hr. 1300 to 10/8/47 Hr. 0700

FLOWS	SCFH	%
Oxygen	2350	
Nat. Gas	2940	
Total	5290	44.5
Fresh Feed	7100	
F. F. by C	9150	
Avg. F. F.	8125	
Wet Gas	4430	
Contraction		45.7
Recycle	8870	
Bleed	294	
Total	9164	
Total Feed	17289	
Recycle/F.F.	1.13	
Inlet Vel.	1.03 ft/sec	
Steam Flow		

RUN CONDITIONS	
Generator Press.	371
O_2 Preheat, °F	418
Gas Preheat, °F	731
Reactor Press.	329
Steam Back Press.	506
Temperatures, °F	
Heater Outlet	510
Catalyst #1	663
#2	627
#3	564
#4	524
#5	478
Average	571
Product Separator	

DISTILLATIONS	ASTM					Hempel Dist.		
						°F	%	A.P.I.
Prod.	6450							
A.P.I.						to 400		
I.B.P.						400-550		
5%						550+		
10%								
20								
30						WATER		
40						Temp.	%	
50						200		
60						203		
70						208		
80								
90								
95								
E.P.								
Rec.								
Res.								
Loss.								

CATALYST DATA	
In Reactor at Start of Period	279.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	279.5
Catalyst Taken Out	45.0
In Reactor at End of Period	234.5
Reactor d-P, H_2O	
Pounds in Reactor	104.0
Density, lbs./cu. ft.	38.2
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	34.6
From d-P Meters	78.0

CATALYST ANALYSIS				
Particle Size				
	Screen		Sedimentation	
Frac.	M	%	M	%
On 40	420+		80+	
100	419-150		80-40	
150	149-105		40-20	
200	104-74		20-10	
250	73-62		10-0	
325	61-44			
<325	43-0			
Density, lbs./cu. ft.			Chem. Anal.	
Aerated			% Fe	
Settled			% C	
Compacted			% Oil	
Sp. Grav.			Specific Surface	
				m^2/gm

NATURAL GAS	%
CO_2	
CH_4	
C_2H_6	
C_3H_8	
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.					
Sap. No.					
Hydrox. No.					
Bromine No.					
% Fe					
% Alc					

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2					
CO_2					
CH_4					
C_2H_6					
C_3H_8					
C_4H_{10}					
N_2					
Total					

OUT	Mol %	SCFH m/hr	C	H	O
CO_2					
CO					
CH_4					
H_2					
N_2					
H_2O					
Total					

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 25F From 10/8/47 Hr. 0700 to 10/9/47 Hr. 0700

FLOWS	SCFH	%
Oxygen	2300	
Nat. Gas	2950	
Total	5280	43.6
Fresh Feed	7340	
F. F. by C	8640	
Avg. F. F.	7990	
Wet Gas	4700	
Contraction		45.8
Recycle	11700	
Bleed	278	
Total	11978	
Total Feed	20618	
Recycle/F.F.	1.39	
Inlet Vel.	1.77 ft/sec	
Steam Flow	61.6 #/hr	

RUN CONDITIONS	
Generator Press.	404
O_2 Preheat, °F	427
Gas Preheat, °F	749
Reactor Press.	398
Steam Back Press.	456
Temperatures, °F	
Heater Outlet	370
Catalyst #1	617
#2	588
#3	536
#4	507
#5	478
Average	545
Product Separator	

DISTILLATIONS	A S T M				Hempel Dist.		
					°F	%	A.P.I.
Prod.	GASO						
A.P.I.					to 400		
I.B.P.					400-550		
5%					550+		
10%							
20							
30					WATER		
40					Temp.	%	
50					200		
60					203		
70					208		
80							
90							
95							
F.P.							
Rec.							
Res.							
Loss.							

CATALYST DATA	
In Reactor at Start of Period	234.5
Fresh Catalyst Charged	25.0
Catalyst Recharged	20.0
Total	279.5
Catalyst Taken Out	63.5
In Reactor at End of Period	216.0
Reactor d-P, H_2O	
Pounds in Reactor	93.1
Density, lbs./cu. ft.	39.2
Bed Height, Feet	—
Space Vel. SCFH/lb. cat.	
Inventory Figures	40.0
From d-P Meters	93.0

CATALYST ANALYSIS				
Particle Size				
	Screen		Sedimentation	
Frac.	M	%	M	%
On 40	420+		80+	
100	419-150		80-40	
150	149-105		40-20	
200	104-74		20-10	
250	73-62		10-0	
325	61-44			
<325	43-0			
Density, lbs./cu. ft.			Chem. Anal.	
Aerated			% Fe	
Settled			% C	
Compacted			% Oil	
Sp. Grav.			Specific Surface	
				m^2 gm

NATURAL GAS	%
CO_2	1.68
CH_4	85.48
C_2H_6	10.16
C_3H_8	2.67
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	57.17	42.76			
Sap. No.	60.6	127.95			
Hydrox. No.					
Bromine No.	44.2				
% Fe					
% Alc		11.1			

GENERATOR ELEMENTAL BALANCE

IN	#/hr ~~Mol %~~	~~SCFH~~ m/hr	C	H	O
O_2	194.21	6.069			12.138
CO_2	5.81	.132	.132		.264
CH_4	106.46	6.654	6.654	26.616	
C_2H_6	23.70	.790	1.580	4.740	
C_3H_8	9.15	.208	.624	1.664	
C_4H_{10}					
N_2					
Total	339.33	13.853	8.990	33.020	12.402

Less H_2O 293.57

OUT	Mol %	~~SCFH~~ m/hr	C	H	O
CO_2	4.1	.930	.930		1.860
CO	35.1	8.000	8.000		8.000
CH_4	0.1	.020	.020	.040	
H_2	58.2	13.270		26.540	
N_2	2.5	.570			
H_2O				6.440	2.542
Total		22.790	8.950	33.020	12.402

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS Measured m/hr	WET GAS Measured #/hr	WET GAS At Wt. Balance m/hr	WET GAS At Wt. Balance #/hr	RECYCLE m/hr	COMB. FEED m/hr	COMB. FEED %	EFFLUENT m/hr	EFFLUENT %
CO	35.1	8.00	224.00	18.84	2.34	65.52	2.64	73.92	5.95	13.95	25.65	8.59	17.94
H2	58.2	13.27	26.54	57.05	7.07	14.14	7.99	15.98	18.03	31.30	57.56	26.02	54.33
CO2	4.1	.93	40.92	18.40	2.28	100.32	2.58	113.52	5.81	6.74	12.39	8.39	17.52
N2	2.5	.57	15.96	.66	.08	2.24	.09	2.52	.21	.78	1.43	.30	.63
CH4	0.1	.02	.32	2.86	.35	5.60	.40	6.40	.90	.92	1.69	1.30	2.71
C2H4				.41	.05	1.40	.06	1.68	.13	.13	.24	.19	.40
C2H6				.37	.05	1.50	.06	1.80	.12	.12	.22	.18	.38
C3H6				.21	.03	1.26	.03	1.26	.07	.07	.13	.10	.21
C3H8				.25	.03	1.32	.03	1.32	.08	.08	.15	.11	.23
C4H8				.50	.06	3.36	.07	3.92	.16	.16	.29	.23	.48
C4H10													
C5H10				.41	.05	3.50	.06	4.20	.13	.13	.24	.19	.40
C6H12													
OIL								32.62				.23	.48
WATER												2.06	4.30
TOTAL		22.80	307.74		12.4	200.16				54.38		47.89	
H2+CO		21.27											
H2/CO		1.66					3.03			2.24		3.03	

NET CHANGE ON REACTION	Carbon m/hr	Carbon a/hr	Carbon %	Hydrogen a/hr	Hydrogen %	Oxygen a/hr	Ultimate Oil #/hr	Ultimate Oil #/gal	Ultimate Oil gal/hr	Unsats. %
CO	-5.36	-5.36	33.00			-5.36				
H2	-5.28			-10.56						
CO2	1.65	1.65	20.63			3.30				
N2	- .48									
CH4	.38	.38	4.75	1.52						
C2H4	.06	.12	1.50	.24						52.56
C2H6	.06	.12	1.50	.36						
C3H6	.03	.09	1.13	.09			1.13	6.25	0.18	45.65
C3H8	.03	.09	1.13	.24						
C4H8	.07	.28	3.50	.56			3.72	6.1	0.61	33.33
C4H10										
C5H10	.06	.30	3.75	.60			4.20	5.4	0.78	
C6H12										
OIL		2.33	29.13	4.66			32.62	6.5	5.02	
WATER						2.06				
TOTAL	8.78					2.33	41.67		6.59	
H2+CO										
H2/CO										

ULTIMATE YIELDS	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	7.75	9.56	1.19	20.12			
C3+	38.64	43.32	5.37	90.81			
C4+	36.38	40.74	5.05	85.40			
Ult. Oil		41.67	5.17	87.42	6.59	0.82	115.87
C02	20.63	72.60	9.01	152.36			
H20		37.08	4.60	77.79			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	200.16	1.13	226.0
Oil	11.9		11.9
Water	69.8		69.8
Total	281.9	91.5	307.74

EFFLUENT RATIOS	
H2/H20	12.63
C02/C0	0.98
(H2) (C02) / (H20) (C0)	12.33

CONTRACTION:	38.5
C0 Conversion:	67.00
H2 Conversion:	39.8

Yield Calculations assume "oil" is CH2, and is found by difference on Carbon, and H20 by difference on Hydrogen. "Oil" figures therefore include hydrocarbon fraction of oxygenated compounds. Standard cubic feet measured at 60 F and 14.7 psig. Cubic Meters measured at 0 C. and 14.7 psig. g/M3 = 16.91 × #/MCF. cc/M3 = 141.3 × gal/MCF.