THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 27A From 10/27/47 Hr. 2000 to 10/28/47 Hr. 0200

FLOWS	SCFH	%
Oxygen	1830	
Nat. Gas	2500	
Total	4330	42.4
Fresh Feed	7240	
F. F. by C	6870	
Avg. F. F.		
Wet Gas	2060	
Contraction		71.5
Recycle	10300	
Bleed	274	
Total	10574	
Total Feed	17814	
Recycle F.F.	1.45	
Inlet Vel.	1.14 Ft/sec	
Steam Flow		

RUN CONDITIONS	
Generator Press.	407
O_2 Preheat, °F	460
Gas Preheat, °F	714
Reactor Press.	403
Steam Back Press.	620
Temperatures, °F	
Heater Outlet	240
Catalyst #1	676
#2	608
#3	557
#4	534
#5	493
Average	574
Product Separator	

DISTILLATIONS	A S T M
Prod.	6450
A.P.I.	47.0
I.B.P.	110
5%	
10%	148
20	168
30	200
40	222
50	245
60	270
70	292
80	322
90	365
95	380
E.P.	403
Rec.	98.0
Res.	1.2
Loss	0.8

Hempel Dist.	°F	%	A.P.I.
to 400		72.6	53.9
400-550		15.0	34.7
550+			

WATER	
Temp.	%
200	
203	
208	

CATALYST DATA	
In Reactor at Start of Period	197
Fresh Catalyst Charged	
Catalyst Recharged	
Total	197
Catalyst Taken Out	19
In Reactor at End of Period	178
Reactor d-P, H_2O	
Pounds in Reactor	74.8
Density, lbs./cu. ft.	39.2
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	40.6
From d-P Meters	96.8

CATALYST ANALYSIS — Particle Size	Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	0.8	80+	
100	419-150	22.8	80-40	
150	149-105	17.4	40-20	
200	104-74	12.6	20-10	
250	73-62	1.0	10-0	
325	61-44	8.4		
<325	43-0	37.0		

Density, lbs./cu. ft.	Chem. Anal.
Aerated	% Fe
Settled	% C
Compacted	% Oil
Sp. Grav. 5.0	Specific Surface
	m^2/gm

NATURAL GAS	%
CO_2	1.57
CH_4	88.55
C_2H_6	9.33
C_3H_8	3.37
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut No.	37.3	34.51			
Sap No.	46.58	127.39			
Hydrox No.	18.0				
Bromine No.	122.87				
% Fe					
% Alc		9.5			

GENERATOR ELEMENTAL BALANCE

IN	#/hr Mol %	SCFH m/hr	C	H	O
O_2	154.50	4.828			9.656
CO_2	4.58	.104	.104		.208
CH_4	90.29	5.643	5.643	22.572	
C_2H_6	18.81	.627	1.254	3.762	
C_3H_8	9.77	.222	.666	1.776	
C_4H_{10}					
N_2					
Total	277.95	11.424	7.667	28.110	9.864

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	1.8	.344	.344		.688
CO	33.8	6.456	6.456		6.456
CH_4	6.7	1.280	1.280	5.120	
H_2	57.3	10.944		21.888	
N_2	0.4	.076			
H_2O				1.102	2.720
Total		19.100	8.080	28.110	9.864

Loss of H_2O 228.99

	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	33.8	6.46	180.88	11.51	.63	17.64	1.13	31.75	3.21	7.59	26.28	4.34	10.76
H2	57.3	10.94	21.88	46.88	2.55	5.10	4.59	9.18	13.08	15.53	53.77	17.67	43.79
CO2	1.8	.34	14.96	18.29	.99	43.56	1.78	78.41	5.10	2.12	7.34	6.88	17.05
N2	0.4	.08	2.24	1.18	.06	1.68	.11	3.02	.33	.19	.66	.44	1.09
CH4	6.7	1.28	20.48	17.57	.96	15.36	1.73	27.65	4.90	3.01	10.42	6.63	16.45
C2H4				1.36	.07	1.96	.13	3.53	.38	.13	.45	.51	1.26
C2H6				.69	.04	1.20	.07	2.16	.19	.07	.24	.26	.64
C3H6				1.18	.06	2.52	.11	4.54	.33	.11	.38	.44	1.09
C3H8				.27	.01	.44	.02	.79	.08	.02	.07	.10	.25
C4H8				.48	.03	1.68	.05	3.02	.13	.05	.17	.18	.45
C4H10				.15	.01	.58	.02	1.04	.04	.02	.07	.06	.15
C5H10				.39	.02	1.40	.04	2.52	.11	.04	.14	.85	.37
C6H12				.06					.02			.02	.05
OIL								30.38				.22	.55
WATER												2.45	6.07
TOTAL		19.10	240.44		5.43	93.12				28.68		40.35	
H2+CO		17.40											
H2/CO		1.69					4.06			2.05		4.07	

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	-5.33	-5.33	17.49			-5.33				
H2	-6.35			-12.70						
CO2	1.44	1.44	22.29			2.88				
N2	.03									
CH4	.45	.45	6.97	.90						
C2H4	.13	.26	4.02	.52						>66.34
C2H6	.07	.14	2.17	.42						
C3H6	.11	.33	5.11	.66			4.09	6.25	0.65	>81.38
C3H8										
C4H8	.05	.20	3.10	.40			2.87	6.1	0.47	>76.19
C4H10	.02	.08	1.24	.20			1.04	4.64	0.21	
C5H10	.04	.20	3.10	.40			2.52	5.4	0.47	
C6H12										
OIL		2.17	33.59	4.34			30.38	6.5	4.67	
WATER				4.70		(2.45)				
TOTAL	9.32					2.35	40.90			
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	13.16	12.86	1.95	32.97			
C3+	42.07	42.29	6.42	108.56			
C4+	41.03	36.96	5.61	94.87			
Ult. Oil		40.90	6.21	105.01	6.47	0.982	138.76
C02	22.29	63.45	9.63	162.84			
H20		44.10	6.69	113.13			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	93.1		167.0
Oil	21.8		
Water	51.6		
Total	166.5	69.3	240.4

EFFLUENT RATIOS	
H2/H20	7.21
C02/C0	1.59
(H2) (C02) / (H20) (C0)	11.47

CONTRACTION:	48.8
C0 Conversion:	82.57
H2 Conversion:	58.04

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 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 27B From 10/28/47 Hr. 0700 to 10/29/47 Hr. 0700

FLOWS	SCFH	%
Oxygen	1790	
Nat. Gas	2490	
Total	4280	41.8
Fresh Feed	7500	
F. F. by C	7550	
Avg. F. F.		
Wet Gas	1700	
Contraction		77.3
Recycle	9340	
Bleed	235	
Total	95755	
Total Feed	17075	
Recycle/F.F.	1.27	
Inlet Vel.	1.25 ft/sec	
Steam Flow		

RUN CONDITIONS	
Generator Press.	411
O_2 Preheat, °F	501
Gas Preheat, °F	727
Reactor Press.	404
Steam Back Press.	825
Temperatures, °F	
Heater Outlet	430
Catalyst #1	620
#2	603
#3	572
#4	549
#5	572
Average	571
Product Separator	

DISTILLATIONS — A S T M	
Prod.	6450
A.P.I.	57.2
I.B.P.	108
5%	
10%	128
20	150
30	178
40	200
50	226
60	250
70	276
80	308
90	346
95	376
E.P.	396
Rec.	98.0
Res.	0.8
Loss	1.2

Hempel Dist.		
°F	%	A.P.I.
to 400	75.0	57.2
400-550	15.3	37.0
550+		

WATER	
Temp.	%
200	
203	
208	

CATALYST DATA	
In Reactor at Start of Period	178
Fresh Catalyst Charged	86
Catalyst Recharged	18
Total	282
Catalyst Taken Out	5
In Reactor at End of Period	277
Reactor d-P, H_2O	
Pounds in Reactor	196
Density, lbs./cu. ft.	62
Bed Height, Feet	4.6
Space Vel. SCFH/lb. cat.	
Inventory Figures	27.1
From d-P Meters	38.3

CATALYST ANALYSIS — Particle Size				
	Screen		Sedimentation	
Frac.	M	%	M	%
On 40	420+	0.6	80+	31.0
100	419-150	12.4	80-40	13.0
150	149-105	10.4	40-20	25.0
200	104-74	9.6	20-10	29.0
250	73-62	3.4	10-0	2.0
325	61-44	6.0		
<325	43-0	55.6		

Density, lbs./cu. ft.	Chem. Anal.
Aerated	% Fe
Settled	% C
Compacted	% Oil
Sp. Grav. 5.0	Specific Surface
	m^2 gm

NATURAL GAS	%
CO_2	1.76
CH_4	85.72
C_2H_6	10.07
C_3H_8	2.45
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	39.96	38.26			
Sap. No.	49.4	126.83			
Hydrox. No.	11.5				
Bromine No.	113.88				
% Fe					
% Alc		12.5			

GENERATOR ELEMENTAL BALANCE — IN	#/hr Mol %	SCFH m/hr	C	H	O
O_2	151.14	4.723			9.446
CO_2	5.10	.116	.116		.232
CH_4	90.11	5.632	5.632	22.528	
C_2H_6	19.86	.662	1.324	3.972	
C_3H_8	7.04	.160	.480	1.280	
C_4H_{10}					
N_2					
Total	273.25	11.293	7.552	27.780	9.678

Loss 26.0 247.76

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	2.2	.435	.435		.870
CO	32.3	6.392	6.392		6.392
CH_4	5.4	1.069	1.069	4.276	
H_2	60.1	11.894		23.788	
N_2	—				
H_2O				-.284	1.416
Total		19.790	7.896	27.780	9.678

	FRESH FEED			WET GAS					RECYCLE	COMB. FEED		EFFLUENT		NET CHANGE ON REACTION										
					Measured		At Wt. Balance							Carbon			Hydrogen		Oxygen	Ultimate Oil			Unsats.
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	#/hr	m/hr	m/hr	%	m/hr	%	m/hr	a/hr	%	a/hr	%	a/hr	#/hr	#/gal	gal/hr	%
CO	32.3	6.39	178.92	6.91	.09	2.52	.13	3.64	.48	6.87	15.25	.61	1.65	-6.26	-6.26	2.03			-6.26				
H2	60.1	11.89	23.78	34.31	1.54	3.08	2.28	4.56	8.67	20.56	45.64	11.95	32.41	-9.61			-19.22						
CO2	2.2	.44	19.36	25.60	1.15	80.60	1.70	74.80	6.47	6.91	15.34	8.17	22.16	1.26	1.26	69.72			2.52				
N2	—			1.48	.02	.56	.03	.84	.12	.12	.27	.15	.41	.03									
CH4	5.4	1.07	17.12	27.36	1.23	19.68	1.82	29.12	6.91	7.88	17.71	8.73	23.68	.75	.75	11.74	3.00						
C2H4				3.14	.14	3.92	.21	5.88	.79	.79	1.75	1.00	2.71	.21	.42	6.57	1.68						67.24
C2H6				1.53	.07	2.10	.10	3.00	.39	.39	.87	.49	1.33	.10	.20	3.13	.60						
C3H6				3.25	.15	6.30	.82	9.24	.82	.82	1.82	1.04	2.82	.22	.66	10.33	1.32			8.32		1.33	87.13
C3H8				1.48	.02	.88	.03	1.32	.12	.12	.27	.15	.41	.03	.09	1.41	.24						
C4H8				1.82	.04	2.24	.06	3.36	.21	.21	.47	.27	.73	.06	.24	3.76	.48			3.19		.58	36.92
C4H10				.17	.01	.58	.01	.58	.04	.04	.09	.05	.14	.01	.04	.63	.10			.58		.12	
C5H10				.73	.03	2.10	.04	2.80	.18	.18	.40	.22	.60	.04	.20	3.13	.40			2.80		.52	
C6H12				.23	.01	.84	.01	.84	.06	.06	.13	.07	.19	.01	.06	.94	.12			.84			
OIL								32.76				.23	.62		2.34	36.62	4.68			32.76		5.04	
WATER												3.74	10.14				6.60		(3.74)				
TOTAL		19.79	239.18		4.49	95.40				45.05		36.87		13.21					3.30	48.49		7.53	
H2+CO		18.28																					
H2/CO		1.86					17.54			2.99		19.59											

ULTIMATE YIELDS	% CO Fed	#/hr	H2/CO #/MCF	H2/CO g/M3	Gal/hr	H2/CO Gal/MCF	H2/CO cc/M3
C1+C2	21.44	20.88	3.01	50.90			
C3+	56.82	50.50	7.34	124.12			
C4+	45.08	40.34	5.82	98.42			
Ult. Oil		48.49	6.99	118.20	7.53	1.09	154.12
C02	19.72	55.44	8.00	135.28			
H20		67.32	9.71	164.20			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	95.4		141.1
Oil	30.3		
Water	67.8		
Total	193.5	80.9	239.2

EFFLUENT RATIOS	
H2/H20	3.20
C02/C0	13.39
(H2) (C02) / (H20) (C0)	42.43

CONTRACTION: 66.8

C0 Conversion: 97.97

H2 Conversion: 80.8

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.

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 27-C From 10-29-47 Hr. 0700 to 10-30-47 Hr. 0700

FLOWS	SCFH	%
Oxygen	1790	
Nat. Gas	2460	
Total	4250	42.2
Fresh Feed	7850	
F. F. by C	8150	
Avg. F. F.		
Wet Gas	1720	
Contraction		68.7
Recycle	9220	
Bleed	240	
Total	9460	
Total Feed	17310	
Recycle/F.F.	1.20	
Inlet Vel.	1.23	
Steam Flow		

RUN CONDITIONS	
Generator Press.	410
O_2 Preheat, °F	492
Gas Preheat, °F	730
Reactor Press.	405
Steam Back Press.	840
Temperatures, °F	
Heater Outlet	470
Catalyst #1	622
#2	613
#3	580
#4	555
#5	519
Average	578
Product Separator	

DISTILLATIONS								
	A S T M				Hempel Dist.			
Prod.	Raw Oil				°F	%	A.P.I.	
A.P.I.	54.1				to 400			
I.B.P.	110				400-550			
5%					550+			
10%	130							
20	150							
30	170				WATER			
40	192				Temp.	%		
50	218				200			
60	244				203			
70	274				208			
80	306							
90	344							
95	382							
E.P.	390							
Rec.	97.0							
Res.	0.8							
Loss	2.2							

CATALYST DATA	
In Reactor at Start of Period	277
Fresh Catalyst Charged	
Catalyst Recharged	
Total	277
Catalyst Taken Out	4
In Reactor at End of Period	273
Reactor d-P, H_2O	
Pounds in Reactor	226
Density, lbs./cu. ft.	84
Bed Height, Feet	5.2
Space Vel. SCFH/lb_o cat.	
Inventory Figures	28.5
From d-P Meters	34.7

CATALYST ANALYSIS					
Particle Size					
	Screen			Sedimentation	
Frac.	M	%		M	%
On 40	420+	0.2		80+	29.0
100	419-150	10.5		80-40	10.0
150	149-105	10.5		40-20	43.0
200	104-74	8.8		20-10	14.0
250	73-62	2.5		10-0	4.0
325	61-44	4.9			
<325	43-0	62.6			
Density, lbs./cu. ft.			Chem. Anal.		
Aerated			% Fe		
Settled			% C		
Compacted			% Oil		
Sp. Grav.	4.7		Specific Surface		
					m^2 gm

NATURAL GAS	%
CO_2	1.66
CH_4	84.27
C_2H_6	10.76
C_3H_8	3.31
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	34.58	33.2			
Sap. No.	42.65	129.64			
Hydrox. No.	92.0				
Bromine No.	127.75				
% Fe					
% Alc		12.5			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2	151.14	4.723			9.446
CO_2	4.75	.108	.108		.216
CH_4	87.52	5.470	5.470	21.880	
C_2H_6	20.94	.698	1.396	4.188	
C_3H_8	9.46	.215	.645	1.720	
C_4H_{10}					
N_2					
Total	273.81	11.214	7.619	27.788	9.662

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	3.5	.725	.725		1.450
CO	26.3	5.447	5.447		5.447
CH_4	5.4	1.118	1.118	4.472	
H_2	64.2	13.296		26.592	
N_2	0.6	.124			
H_2O				-3.276	2.765
Total		20.710	8.290	27.788	9.662

Less H_2O 224.04

	FRESH FEED			WET GAS					RECYCLE	COMB. FEED		EFFLUENT		NET CHANGE ON REACTION								
					Measured		At Wt. Balance							Carbon			Hydrogen		Oxygen	Ultimate Oil			Unsats.
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	#/hr	m/hr	m/hr	%	m/hr	%	m/hr	a/hr	%	a/hr	%	a/hr	#/hr	#/gal	gal/hr	%
CO	26.3	5.45	152.60	1.74	.11	3.08	.11	3.18	.43	5.88	12.90	.54	1.53	- 5.34	- 5.34	2.02			- 5.34				
H2	64.2	13.30	26.60	37.55	2.36	4.72	2.44	4.88	9.33	22.63	49.66	11.77	33.41	-10.86			-21.72						
CO2	3.5	.72	31.68	23.90	1.50	66.00	1.55	68.22	5.94	6.66	14.61	7.49	21.26	.83	.83	15.23			1.66				
N2	0.6	.12	3.36	-	-	-	-	-	-	.12	.26	-	-	- .12									
CH4	5.4	1.12	17.92	27.62	1.73	27.68	1.79	28.61	6.86	7.98	17.51	8.65	24.55	.67	.67	12.29	2.68						
C2H4				2.92	.18	5.04	.19	5.21	.73	.73	1.60	.92	2.61	.19	.38	6.97	.76						
C2H6				1.15	.07	2.10	.07	2.17	.29	.29	.64	.36	1.02	.07	.14	2.57	.42						
C3H6				2.49	.16	6.72	.17	6.95	.62	.62	1.36	.79	2.24	.17	.51	9.36	1.02			6.26	6.25	1.00	
C3H8				.51	.03	1.32	.03	1.36	.13	.13	.29	.16	.45	.03	.09	1.65	.24						
C4H8				.91	.06	3.36	.06	3.47	.23	.23	.50	.29	.82	.06	.24	4.40	.48			3.30	6.10	.54	
C4H10				.29	.02	1.16	.02	1.20	.07	.07	.15	.09	.26	.02	.08	1.47	.20			1.20	4.86	.25	
C5H10				.67	.04	2.80	.04	2.89	.17	.17	.37	.21	.60	.04	.20	3.67	.40			2.89	5.40	.54	
C6H12				.24	.01	.84	.01	.87	.06	.06	.13	.07	.20	.01	.06	1.10	.12			.87	5.50	.16	
OIL								(29.96)				.21	.60		2.14	39.26	4.28			29.96	6.50	4.61	
WATER												3.68	10.45				11.12		(5.56) 3.68				
TOTAL		20.71	232.16		6.28	124.82	6.48	129.01	24.85	45.57	99.98	35.23	100.00	14.23		99.99				44.48		7.10	
H2+CO		18.75			2.47		2.55																
H2/CO		2.44			21.45		22.18			3.85		21.80											

ULTIMATE YIELDS	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	21.83	18.07	2.55	43.12			
C3+	60.91	46.70	6.58	111.27			
C4+	49.90	38.39	5.41	91.48			
Ult. Oil		44.48	6.26	105.86	7.10	1.00	141.30
C02	15.23	36.54	5.15	87.08			
H20		66.24	9.33	157.77			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	124.8		129.0
Oil	29.8		29.8
Water	73.4		73.4
Total	228.0	98.2	232.2

EFFLUENT RATIOS	
H2/H20	3.20
C02/C0	13.87
(H2) (C02) / (H20) (C0)	44.37

CONTRACTION: 68.7

C0 Conversion: 97.9

H2 Conversion: 81.6

H_2 + CO = 86.4

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 27 D From 10-30-47 Hr. 0700 to 10-31-47 Hr. 0700

FLOWS	SCFH	%
Oxygen	1790	
Nat. Gas	2480	
Total	4270	41.9
Fresh Feed	7950	
F. F. by C	7550	
Avg. F. F.		
Wet Gas	1840	
Contraction		68.0
Recycle	9300	
Bleed	244	
Total	9544	
Total Feed	17094	
Recycle/F.F.	1.26	
Inlet Vel.	1.25	
Steam Flow		

RUN CONDITIONS	
Generator Press.	409
O_2 Preheat, °F	490
Gas Preheat, °F	730
Reactor Press.	400
Steam Back Press.	860
Temperatures, °F	
Heater Outlet	478
Catalyst #1	620
#2	612
#3	575
#4	555
#5	519
Average	574
Product Separator	

DISTILLATIONS	A S T M				Hempel Dist.		
					°F	%	A.P.I.
Prod.	Raw Oil						
A.P.I.	53.6				to 400	78.0	59.1
I.B.P.	108				400-550	12.0	
5%					550+		
10%	130						
20	152						
30	174				WATER		
40	197				Temp.	%	
50	222				200		
60	246				203		
70	272				208		
80	308						
90	342						
95	374						
E.P.	394						
Rec.	98.0						
Res.	1.0						
Loss	1.0						

CATALYST DATA	
In Reactor at Start of Period	273
Fresh Catalyst Charged	
Catalyst Recharged	
Total	273
Catalyst Taken Out	1.5
In Reactor at End of Period	271.5
Reactor d-P, H_2O	
Pounds in Reactor	249
Density, lbs./cu. ft.	59
Bed Height, Feet	7.4
Space Vel. SCFH/lb. cat.	
Inventory Figures	27.8
From d-P Meters	30.4

CATALYST ANALYSIS	Particle Size				
	Screen			Sedimentation	
	Frac.	M	%	M	%
	On 40	420+	0.6	80+	23.0
	100	419-150	9.0	80-40	10.0
	150	149-105	7.6	40-20	46.0
	200	104-74	6.5	20-10	19.0
	250	73-62	1.4	10-0	2.0
	325	61-44	5.2		
	<325	43-0	69.7		
	Density, lbs./cu. ft			Chem. Anal.	
	Aerated			% Fe	
	Settled			% C	
	Compacted			% Oil	
	Sp. Grav. 4.3			Specific Surface	
					m^2 gm

NATURAL GAS	%
CO_2	1.51
CH_4	86.95
C_2H_6	8.71
C_3H_8	2.83
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	37.16	32.64			
Sap. No.	46.58	128.51			
Hydrox. No.	127.0				
Bromine No.	90.11				
% Fe					
% Alc		12.5			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2	151.14	4.723			9.446
CO_2	4.36	.099	.099		.198
CH_4	91.04	5.690	5.690	22.760	
C_2H_6	17.10	.570	1.140	3.420	
C_3H_8	8.14	.185	.555	1.480	
C_4H_{10}					
N_2					
Total	271.78	11.267	7.484	27.660	9.644

Less H_2O 217.60

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	1.8	.359	.359		.718
CO	29.7	5.916	5.916		5.916
CH_4	6.0	1.195	1.195	4.780	
H_2	61.7	12.291		24.582	
N_2	0.8	.159			
H_2O				-1.702	5.010
Total		19.920	7.470	27.660	9.644

	FRESH FEED			WET GAS					RECYCLE	COMB. FEED		EFFLUENT		NET CHANGE ON REACTION									
					Measured		At Wt. Balance							Carbon			Hydrogen		Oxygen	Ultimate Oil			Unsats.
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	#/hr	m/hr	m/hr	%	m/hr	%	m/hr	a/hr	%	a/hr	%	a/hr	#/hr	#/gal	gal/hr	%
CO	29.7	5.92	165.76	2.97	.19	5.32	.19	5.35	.75	6.67	14.78	.94	2.68	- 5.73	- 5.73	3.21			- 5.73				
H2	61.7	12.29	24.58	38.04	2.41	4.82	2.43	4.85	9.59	21.88	48.48	12.02	34.21	- 9.86			-19.72						
CO2	1.8	.36	15.84	25.00	1.58	69.52	1.59	69.97	6.30	6.66	14.76	7.89	22.46	1.23	1.23	20.78			2.46				
N2	0.8	.16	4.48	-	-	-	-	-	-	.16	.35	-	-	- .16									
CH4	6.0	1.19	19.04	27.67	1.75	28.00	1.76	28.18	6.97	8.16	18.08	8.73	24.85	.57	.57	9.63	2.28						
C2H4				2.52	.16	4.48	.16	4.51	.64	.64	1.42	.80	2.28	.16	.32	5.41	.64						
C2H6				1.22	.08	2.40	.08	2.42	.31	.31	.69	.39	1.11	.08	.16	2.70	.48						
C3H6				.08	.005	.21	.01	.21	.02	.02	.04	.03	.09	.01	.03	.51	.06			.19	6.25	.03	
C3H8				.76	.05	2.20	.05	2.21	.19	.19	.42	.24	.68	.05	.15	2.53	.40						
C4H8				.80	.05	2.80	.05	2.82	.20	.20	.44	.25	.71	.05	.20	3.38	.40			2.68	6.10	.44	
C4H10				.23	.01	.58	.01	.58	.06	.06	.13	.07	.20	.01	.04	.68	.10			.58	4.86	.12	
C5H10				.53	.03	2.10	.03	2.11	.13	.13	.29	.16	.46	.03	.15	2.53	.30			2.11	5.40	.39	
C6H12				.19	.01	.84	.01	.85	.05	.05	.11	.06	.17	.01	.06	1.01	.12			.85	5.50	.15	
OIL								(39.48)				.28	.80		2.82	47.63	5.64			39.48	6.50	6.07	
WATER												3.27	9.31				9.30		(4.65) 3.27				
TOTAL		19.92	229.70		6.33	123.27	6.37	124.06	25.20	45.13	99.99	35.13	100.01	13.55		100.00				45.89		7.20	
H2+CO		18.21			2.60		2.62																
H2/CO		2.08			12.68		12.79			3.28		12.79											

ULTIMATE YIELDS	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	cc/M3
C1+C2	18.74	16.07	2.33	39.40			
C3+	58.27	48.26	6.99	118.20			
C4+	55.23	45.84	6.64	112.28			
Ult. Oil		45.89	6.65	112.45	7.29	1.04	146.95
C02	20.78	54.13	7.84	132.57			
H20		58.86	8.53	144.24			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	123.3		124.1
Oil	28.0		28.0
Water	77.6		77.6
Total	228.9	99.7	229.7

EFFLUENT RATIOS	
H2/H20	3.68
C02/C0	8.39
(H2) (C02) / (H20) (C0)	30.89

CONTRACTION: 68.0

C0 Conversion: 96.8

H2 Conversion: 80.2

$H_2 + CO = 85.6$

Yield Calculations assume "oil" is CH_2, 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 27E From 10/31/47 Hr. 0700 to 10/31/47 Hr. 1900

FLOWS	SCFH	%
Oxygen	1750	
Nat. Gas	2440	
Total	4190	41.9
Fresh Feed	7800	
F. F. by C	7500	
Avg. F. F.		
Wet Gas	1690	
Contraction		77.4
Recycle	9200	
Bleed	122	
Total	9322	
Total Feed	16822	
Recycle/F.F.	1.24	
Inlet Vel.	1.27 Ft/sec	
Steam Flow		

RUN CONDITIONS	
Generator Press.	409
O_2 Preheat, °F	510
Gas Preheat, °F	745
Reactor Press.	400
Steam Back Press.	870
Temperatures, °F	
Heater Outlet	584
Catalyst #1	620
#2	612
#3	575
#4	554
#5	572
Average	574
Product Separator	

DISTILLATIONS	ASTM
Prod.	6450
A.P.I.	53.8
I.B.P.	106
5%	
10%	134
20	154
30	176
40	198
50	220
60	246
70	272
80	302
90	344
95	374
E.P.	398
Rec.	98.0
Res.	0.8
Loss.	1.2

Hempel Dist.	°F	%	A.P.I.
to 400		78.0	57.8
400-550		12.0	39.4
550+			

WATER	Temp.	%
	200	
	203	
	208	

CATALYST DATA	
In Reactor at Start of Period	271.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	271.5
Catalyst Taken Out	
In Reactor at End of Period	271.5
Reactor d-P, H_2O	
Pounds in Reactor	234.0
Density, lbs./cu. ft.	64.4
Bed Height, Feet	7.2
Space Vel. SCFH/lb. cat.	
Inventory Figures	28.8
From d-P Meters	33.4

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	3.85
CH_4	92.51
C_2H_6	3.06
C_3H_8	.48
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	39.0	32.82			
Sap. No.	43.77	128.51			
Hydrox. No.	161.0				
Bromine No.	109.8				
% Fe					
% Alc		14.6			

GENERATOR ELEMENTAL BALANCE

IN	#/hr	Mol %	SCFH m/hr	C	H	O
O_2	147.74		4.617			9.234
CO_2	11.18		.254	.254		.508
CH_4	95.30		5.956	5.956	23.824	
C_2H_6	5.91		.197	.394	1.182	
C_3H_8	1.36		.031	.093	.248	
C_4H_{10}						
N_2						
Total	261.49		11.055	6.697	25.254	9.742

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	1.8	.370	.370		.740
CO	29.4	6.057	6.057		6.057
CH_4	3.6	.741	.741	2.964	
H_2	65.2	13.448		26.836	
N_2	—				
H_2O				-4.546	2.951
Total		20.580	7.162	25.254	9.742

Loss H_2O 208.37

	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	29.4	6.05	169.40	5.35	.24	6.72	.21	5.88	1.32	7.37	16.32	1.53	4.53
H2	65.2	13.42	26.84	40.79	1.82	3.64	1.60	3.20	10.03	23.45	51.91	11.63	34.43
CO2	1.8	.37	16.28	21.75	.97	42.68	.85	37.40	5.35	5.72	12.66	6.20	18.34
N2	—			.53	.02	.56	.02	.56	.13	.13	.29	.15	.44
CH4	3.6	.74	11.84	22.17	.99	15.84	.87	13.92	5.45	6.19	13.70	6.32	18.69
C2H4				2.74	.12	3.36	.11	3.08	.67	.67	1.48	.78	2.31
C2H6				1.46	.07	2.10	.06	1.80	.36	.36	.80	.42	1.24
C3H6				3.00	.13	5.46	.11	4.62	.74	.74	1.64	.85	2.51
C3H8				.48	.02	.88	.02	.88	.12	.12	.27	.14	.41
C4H8				.84	.04	2.24	.04	2.24	.21	.21	.46	.25	.74
C4H10				.22	.01	.58	.01	.58	.05	.05	.11	.06	.18
C5H10				.50	.02	1.40	.02	1.40	.12	.12	.27	.14	.41
C6H12				.17	.01	.84	.01	.84	.04	.04	.09	.05	.15
OIL								57.96				.41	1.21
WATER												4.88	14.43
TOTAL		20.58	224.36		4.46	86.30				45.17		33.81	
H2+CO		19.47											
H2/CO		2.22					7.62			3.18		7.61	

NET CHANGE ON REACTION	Carbon a/hr	Carbon %	Hydrogen a/hr	Hydrogen %	Oxygen a/hr	Ultimate Oil #/hr	Ultimate Oil #/gal	Ultimate Oil gal/hr	Unsats. %
CO	-5.84	3.47			-5.84				
H2	-11.82		23.64						
CO2	.48	7.93			.96				
N2									
CH4	.13	2.15	.52						
C2H4	.11	3.64	.44						65.24
C2H6	.06	1.88	.36						
C3H6	.11	5.45	.66			4.16		.67	86.21
C3H8	.02	.99	.16						
C4H8	.04	2.64	.32			2.13		.35	79.25
C4H10	.01	.66	.10			.58		.12	
C5H10	.02	1.65	.20			1.40		.26	
C6H12	.01	.99	.12			.84			
OIL	4.14	68.42	8.28			57.96		8.92	
WATER			12.48		(4.88) 6.24				
TOTAL	16.67					67.07		10.32	

ULTIMATE YIELDS	% CO Fed	#/hr	H2/CO #/MCF	H2/CO g/M3	Gal/hr	H2/CO Gal/MCF	H2/CO cc/M3
C1+C2	7.77	6.96	0.94	15.90			
C3+	80.80	68.52	9.28	156.92			
C4+	74.36	63.02	8.54	144.41			
Ult. Oil		67.07	9.09	153.71	10.32	1.40	197.82
C02	7.93	21.12	2.86	48.36			
H20		87.84	11.90	201.23			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	86.3		76.3
Oil	31.2		
Water	116.9		
Total	234.4	104	224.4

EFFLUENT RATIOS	
H2/H20	2.38
C02/C0	4.05
(H2) (C02) / (H20) (C0)	9.65

CONTRACTION:	81.0
C0 Conversion:	96.57
H2 Conversion:	88.1

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.