VI. APPENDIX

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA CALCULATION and SUMMARY SHEET

Synthesis Run Number 17A From 5/7/47 Hr. 1630 to 5/8/47 Hr. 0700

FRESH FEED

	Orsat	Corr. Fac.	Cor. Orsat	M. S.	M. W.	Calc. M.W.	C. N.
CO_2			2.0	41.1%	44	.88	
CO			35.0		28	9.80	
CH_4			4.1		16	.66	
H_2			58.9		2	1.16	
N_2			0.7		28	.20	
Mol. Wt.						12.70	
						1.51	

FLOW CALCULATIONS

	Coeff	Chart	Fp	Ft	F m.w.	SCFH	%
Oxygen						1845	
Nat. Gas						2405	
Total						4250	43.4
Fresh Feed						6800	
F. F. by C						7020	
Avg. F. F.							
Wet Gas						3185	
Contraction							54.6
Recycle						9900	
Bleed						365	
Total						10265	
Total Feed						11285	
Recycle/F.F.						1.46	
Inlet Vel.						1.51	
Steam Flow							
% CO → Col							81.0

Col → W.G. 20.6

WEIGHT BALANCE

In	F. F. = SCFH x MW/379 =	235	
Out	Wet Gas	152	
	Oil	22.4	
	Water	57.2	
	Loss		
	Total	231.6	98.5

LIQUID YIELDS

	Oil Tank # GAUGES, INCHES Total	O/W	Oil	Gals.	Corr.	Total Gals.	Water Tank # Gauge	Gals.	Corr.	Total Gals.
At End of Period	11½						22½			
At Start of Period	5¼						10			
Production	6¼					27.5	12½			55
Samples										
Uncorrected Production						27.5				55
G. P. H.						3.62				6.88
Temperature, °F										
G.P.H. at 60°F						3.40				6.86
A.P.I. at 60°F						47.6				9.8
Pounds Per Hour						22.4				57.2

RUN CONDITIONS

Generator Press.	209
O_2 Preheat, °F	445
Gas Preheat, °F	831
Reactor Press.	200
Steam Back Press.	710
Temperatures, °F	
Heater Outlet	444
Catalyst #1	
#2	625
#3	616
#4	596
#5	536
Average	580
Product Separator	

DISTILLATIONS

ASTM		WATER	
Prod.		Temp.	%
A.P.I.		200	
I.B.P.		203	
10%		208	
20			
30			
40			
50			
60			
70			
80			
90			
E.P.			
Rec.			
Res.			
Loss.			

PRODUCT INSPECTION

Hempel Dist. °F	%	A.P.I.	Chemicals	Oil	Water
to 400			Neut. #		
400-550			Sap. #		
550+			Hydrox #		
			% Fe		
			% Alc		

PHYSICAL TESTS

Product	Pour °F	SUS @ °F	SFS @ °F

CATALYST DATA

In Reactor at Start of Period	425.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	425.5
Catalyst Taken Out	71.0
In Reactor at End of Period	354.5
Reactor d-P, H_2O 34	
Pounds in Reactor	445
Density, lbs./cu. ft.	1.32
Bed Height, Feet	5.7
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	

CATALYST ANALYSIS

Particle Size

Screen Frac.	M	%	Sedimentation 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	m²/gm

	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	35.0	6.475	181.30	11.69	.982	27.496	1.178	32.984	3.166	9.671	21.27	4.344	10.83
H2	58.2	10.767	21.53	54.23	4.555	9.110	5.466	10.932	14.685	25.452	56.14	20.151	50.23
CO2	2.0	.370	16.28	14.54	1.226	53.944	1.471	64.724	3.951	4.321	9.53	5.422	13.52
N2	0.7	.129	2.61	.63	.053	1.484	.064	1.792	.171	.300	.66	.235	.59
CH4	4.1	.758	12.13	12.62	1.060	16.960	1.272	20.352	3.417	4.175	9.21	4.689	11.69
C2H4				1.00	.084	2.352	.101	2.828	.271	.271	.60	.372	.93
C2H6				.68	.057	1.710	.068	2.040	.184	.184	.41	.252	.63
C3H6				1.18	.099	4.158	.119	4.998	.320	.320	.71	.439	1.09
C3H8				.32	.027	1.188	.032	1.408	.087	.087	.19	.119	.30
C4H8				1.23	.103	5.678	.124	6.944	.333	.333	.73	.457	1.14
C4H10				.29	.024	1.392	.029	1.682	.079	.079	.17	.108	.27
C5H10				.48	.040	2.800	.048	3.360	.130	.130	.29	.178	.44
C6H12				.17	.016	1.376	.019	1.634	.046	.046	.10	.065	.16
OIL								(26.880)				.193	.48
WATER												3.095	7.72
TOTAL		18.5	238.85		8.4	129.64	9.79		22.08	45.339	100.00	40.119	99.99
H2+CO		17.2					6.64						
H2/CO		1.66					4.64			2.64		4.67	

	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	-5.297	-5.297	18.19			-5.297				
H2	-5.301			-10.602						
CO2	1.101	1.101	17.00			2.202				
N2	.065									
CH4	.514	.514	7.94	2.056						
C2H4	.101	.202	3.12	.404						5.952
C2H6	.068	.136	2.10	.388						
C3H6	.119	.357	5.51	.714			4.49	6.25	.72	7.866
C3H8	.032	.096	1.48	.256						
C4H8	.124	.496	7.66	.992			6.59	6.10	1.08	10.82
C4H10	.024	.116	1.79	.240			1.68	4.86	.35	
C5H10	.048	.240	3.71	.480			8.36	5.40	.62	
C6H12	.014	.114	1.76	.228			1.63			
OIL		1.825	29.73	3.850			26.88	6.57	4.09	
WATER				.944		(.314) 3.095				
TOTAL	9.027		100.01				44.63		6.86	
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	13.09	2.00	32.52			
C3+	51.64	46.90	7.18	121.41			
C4+	44.65	40.49	6.20	104.84			
Ult. Oil		44.63	6.83	115.50	6.86	1.051	148.51
C02	17.00	48.44	7.42	125.47			
H20		53.80	8.25	144.58			

WEIGHT BALANCE

	#/hr	%	#/hr
Wet Gas	129.65		153.30
Oil	22.40		22.40
Water	57.20		57.20
Total	219.25	93.3	234.90

EFFLUENT RATIOS

H2/H20	6.62
C02/C0	1.25
(H2) (C02) / (H20) (C0)	5.17

CONTRACTION: 46.0

C0 Conversion: 81.2

H2 Conversion: 49.2

$H_2+CO = 57.3$

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 CALCULATION and SUMMARY SHEET

Synthesis Run Number 178 From 5/6/47 Hr. 0700 to 5/9/47 Hr. 0700

FRESH FEED

	Orsat	Corr. Fac.	Cor. Orsat	M. S.	M. W.	Calc. M.W.	C. N.
CO_2			1.7		44	.75	38.2
CO			34.4		28	9.62	
CH_4			2.1		16	.34	
H_2			61.4		2	1.23	
N_2			0.4		28	.11	
Mol. Wt.						12.05	
						1.55	

FLOW CALCULATIONS

	Coeff	Chart	Fp	Ft	F m.w.	SCFH	%
Oxygen						1820	
Nat. Gas						2370	
Total						4190	44.3
Fresh Feed						6540	
F. F. by C						7440	
Avg. F. F.							
Wet Gas						5240	
Contraction							56.5
Recycle						8840	
Bleed						360	
Total						9200	
Total Feed						16640	
Recycle/F.F.						1.24	
Inlet Vel.						1.43	
Steam Flow						225 #/hr	
% CO → CO_2							18.0

CO_2 → W.C. 18.0

WEIGHT BALANCE

In	F. F. = SCFH x MW/379 =	236
Out	Wet Gas	160
	Oil	28.6
	Water	51.5
	Loss	
	Total	240

LIQUID YIELDS

	Oil Tank # GAUGES, INCHES Total	O/W	Oil	Gals.	Corr.	Total Gals.	Water Tank # Gauge	Gals.	Corr.	Total Gals.
At End of Period	33.8						55.8			
At Start of Period	11.5						22.5			
Production	22.3				2.3	100.1	31.3		6.8	144.3
Samples						5				5
Uncorrected Production						105.1				149.3
G. P. H.						4.38				6.21
Temperature, °F										
G.P.H. at 60°F						4.35				6.20
A.P.I. at 60°F						47.6				9.8
Pounds Per Hour						291.6				57.5

RUN CONDITIONS

Generator Press.	210
O_2 Preheat, °F	468
Gas Preheat, °F	807
Reactor Press.	200
Steam Back Press.	700
Temperatures, °F	
Heater Outlet	411
Catalyst #1	
#2	610
#3	605
#4	515
#5	511
Average	540
Product Separator	

DISTILLATIONS

ASTM					WATER	
Prod.					Temp.	%
A.P.I.					200	
I.B.P.					203	
10%					208	
20						
30						
40						
50						
60						
70						
80						
90						
E.P.						
Rec.						
Res.						
Loss.						

PRODUCT INSPECTION

Hempel Dist. °F	%	A.P.I.	Chemicals		Oil	Water
to 400			Neut. #			
400-550			Sap. #			
550+			Hydrox #			
			% Fe			
			% Alc			

PHYSICAL TESTS

Product	Pour °F	SUS @ °F	SFS @ °F

CATALYST DATA

In Reactor at Start of Period	357.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	357.5
Catalyst Taken Out	24.0
In Reactor at End of Period	330.5
Reactor d-P, H_2O 30	
Pounds in Reactor	402
Density, lbs./cu. ft.	.126
Bed Height, Feet	5.1
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	

CATALYST ANALYSIS

Particle Size

Screen Frac.	M	%	Sedimentation 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 m²/gm

	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	34.4	6.742	188.776	16.25	1.381	38.668	1.355	37.884	3.444	10.686	24.26	5.287	14.22
H2	61.4	12.034	24.068	48.87	4.154	8.308	4.071	8.142	11.161	23.885	54.48	15.932	42.88
CO2	1.7	.333	14.916	19.08	1.622	71.368	1.589	69.916	4.631	4.870	11.33	6.220	16.10
N2	0.4	.078	2.184	1.76	.150	4.200	.147	4.116	.427	.505	1.15	.574	1.54
CH4	2.1	.412	6.592	4.85	.411	6.578	.403	6.448	1.174	1.584	3.61	1.575	4.23
C2H4				4.77	.405	11.340	.397	11.116	1.158	1.158	2.64	3.130	8.40
C2H6				.50	.042	1.260	.041	1.230	.121	.121	.28	.162	.43
C3H6				1.21	.103	4.326	.101	4.242	.294	.294	.67	.395	1.06
C3H8				.23	.020	.880	.019	.836	.056	.056	.13	.075	.20
C4H8				1.52	.129	7.224	.126	7.056	.369	.369	.84	.485	1.33
C4H10				.24	.020	1.160	.019	1.102	.058	.058	.13	.077	.21
C5H10				.51	.043	3.010	.042	2.940	.124	.124	.28	.166	.45
C6H12				.17	.014	1.204	.013	1.118	.041	.041	.09	.054	.14
OIL								(28.280)				.202	.54
WATER												2.889	7.76
TOTAL		19.6	236.596		8.5	158.536	8.321		24.27	43.861	99.99	37.243	99.99
H2+CO		18.7					5.424						
H2/CO		1.78					3.01			2.24		3.01	

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	-3.389	-3.389	20.07			-3.389				
H2	-7.963			-15.926						
CO2	1.250	1.250	18.54			2.500				
N2	.064									
CH4	.009	.009	.01	.036						
C2H4	.397	.794	11.18	1.588						90.51
C2H6	.041	.082	1.22	.246						
C3H6	.101	.303	4.49	.606			3.82	6.25	.61	84.03
C3H8	.019	.057	.85	.152						
C4H8	.126	.504	7.48	1.008			6.70	6.10	1.09	86.36
C4H10	.019	.076	1.13	.190			1.10	4.86	.23	
C5H10	.042	.210	3.11	.420			2.64	5.40	.54	
C6H12	.013	.078	1.16	.156			1.12	5.30	.20	
OIL		2.026	30.05	4.052		(3.736)	28.28	6.50	4.35	
WATER				7.472		2.889				
TOTAL	12.585		100.00				43.96		7.09	

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	13.12	12.20	1.64	27.73			
C3+	48.27	45.57	6.13	103.66			
C4+	42.93	40.50	5.45	92.16			
Ult. Oil		43.96	5.92	100.11	7.02	.945	133.53
C02	18.54	55.00	7.40	125.13			
H20		52.00	7.00	118.37			

WEIGHT BALANCE

	#/hr	%	#/hr
Wet Gas	159.536		156.4
Oil	28.6		28.6
Water	51.5		51.5
Total	239.6	101.0	236.5

EFFLUENT RATIOS

H2/H20	5.51
C02/C0	1.17
(H2) (C02) / (H20) (C0)	6.47

CONTRACTION: 64.2

C0 Conversion: 79.9

H2 Conversion: 66.2

H2 + C0 = 66.1

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 O C. and 14.7 psig. g/M3 = 16.91 × #/MCF. cc/M3 = 141.3 × gal/MCF.

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA CALCULATION and SUMMARY SHEET

Synthesis Run Number 17C From 3/9/47 Hr. 0700 to 3/10/47 Hr. 0700

FRESH FEED

	Orsat	Corr. Fac.	Cor. Orsat	M. S.	M. W.	Calc. M.W.	C. N.
CO_2			1.8		44	.79	38.2
CO			34.3		28	9.60	
CH_4			2.1		16	.33	
H_2			60.6		2	1.21	
N_2			1.2		28	.34	
Mol. Wt.						12.27	
						1.54	

FLOW CALCULATIONS

	Coeff	Chart	Fp	Ft	F m.w.	SCFH	%
Oxygen						1860	
Nat. Gas						2480	
Total						4340	43.0
Fresh Feed						6840	
F. F. by C						7790	
Avg. F. F.							
Wet Gas						3410	
Contraction							56.3
Recycle						100740	
Bleed						359	
Total						10399	
Total Feed						18189	
Recycle/F.F.						1.34	
Inlet Vel.						1.56	
Steam Flow						191 #/hr	
%CO → CO_2							68.5

CO_2 → W.G. 18.6

WEIGHT BALANCE

In	F. F.=SCFH x MW/379=	251.5
Out	Wet Gas	172.3
	Oil	25.6
	Water	50.0
	Loss	
	Total	248.4

99.0

LIQUID YIELDS

	Oil Tank # GAUGES, INCHES Total	O/W	Oil	Gals.	Corr.	Total Gals.	Water Tank # Gauge	Gals.	Corr.	Total Gals.
At End of Period	53.0						8 5/16			
At Start of Period	33 3/4						≤3 3/4			
Production	19.1/4					89.2	31 1/8			188.6
Samples						5				5
Uncorrected Production						94.2				1436
G. P. H.						3.93				5.98
Temperature, °F										
G.P.H. at 60°F						3.90				5.97
A.P.I. at 60°F						48.3				10.53
Pounds Per Hour						25.6				50.0

RUN CONDITIONS

Generator Press.	213
O_2 Preheat, °F	476
Gas Preheat, °F	805
Reactor Press.	200
Steam Back Press.	700
Temperatures, °F	
Heater Outlet	447
Catalyst #1	
#2	600
#3	600
#4	610
#5	620
Average	607
Product Separator	

PRODUCT INSPECTION

Hempel Dist. °F	%	A.P.I.	Chemicals	Oil	Water
to 400			Neut. #		
400-550			Sap. #		
550+			Hydrox #		
			% Fe		
			% Alc		

DISTILLATIONS

ASTM					WATER	
Prod.					Temp.	%
A.P.I.					200	
I.B.P.					203	
10%					208	
20						
30						
40						
50						
60						
70						
80						
90						
E.P.						
Rec.						
Res.						
Loss.						

PHYSICAL TESTS

Product	Pour °F	SUS @ °F	SFS @ °F

CATALYST DATA

In Reactor at Start of Period	330.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	330.5
Catalyst Taken Out	17
In Reactor at End of Period	313.5
Reactor d-P, H_2O	
Pounds in Reactor	418.5
Density, lbs./cu. ft.	131.5
Bed Height, Feet	5.2
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	

CATALYST ANALYSIS

Particle Size

Screen Frac.	M	%	Sedimentation 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	m²/gm

	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	34.3	7.05	197.40	16.28	1.508	42.296	1.719	48.132	5.452	12.502	23.16	7.171	15.27	-5.331	-3.731	24.38			-5.331				
H2	60.6	12.45	24.90	57.03	5.126	10.252	5.844	11.688	18.529	30.979	57.39	24.373	51.91	-6.606			-13.212						
CO2	1.8	.37	16.28	15.43	1.387	61.028	1.581	69.564	5.013	5.383	9.97	6.594	14.05	1.211	1.211	12.18			2.422				
N2	1.2	.25	7.00	1.42	.128	3.584	.146	4.088	.461	.711	1.32	.607	1.29	.104									
CH4	2.1	.43	6.88	6.22	.559	8.944	.637	10.192	2.021	2.451	4.5[illegible]	2.658	5.66	.207	.207	2.74	1.828						
C2H4				1.22	.110	3.080	.125	3.500	.396	.396	.73	.521	1.11	.125	.250	3.55	.500						65.75
C2H6				.63	.057	1.710	.065	1.950	.205	.205	.38	.220	.58	.065	.130	1.84	.380						
C3H6				1.23	.120	5.040	.137	5.754	.432	.432	.80	.569	1.21	.137	.411	5.83	.822			5.60	6.45	.40	83.13
C3H8				.27	.024	1.056	.027	1.188	.088	.088	.16	.115	.23	.027	.081	1.15	.216						
C4H8				1.06	.085	5.320	.108	6.048	.344	.344	.64	.452	.96	.108	.432	6.13	.864			5.75	6.10	.94	58.55
C4H10				.72	.065	3.770	.074	4.292	.234	.234	.43	.308	.66	.074	.296	4.20	1.740			4.29	4.86	.58	
C5H10				.37	.033	2.310	.038	2.660	.120	.120	.22	.158	.34	.038	.190	2.70	.380			2.66	5.40	.49	
C6H12				.10	.009	.774	.010	.860	.032	.032	.06	.042	.09	.010	.060	.85	.120			.86	5.50	.16	
OIL								(28.849)				.206	.44		2.063	29.26	4.126			28.84	6.50	4.44	
WATER												2.909	6.20				4.226		(2.113) 2.909				
TOTAL		2055	246.46		8.99	149.11	10511		32.49	53.88	100.01	46.953	99.99	10.039		100.00				47.14		7.61	
H2+CO		19.50					7563																
H2/CO		1.77					3.40			2.48		3.40											

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	8.33	8.76	1.12	18.94			
C3+	50.12	49.64	6.37	107.72			
C4+	43.14	42.70	5.48	92.67			
Ult. Oil		47.14	6.05	102.31	7.61	1.00	141.3
C02	17.18	53.28	6.84	115.66			
H20		52.36	6.72	113.64			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	149.11		170.8
Oil	25.6		25.6
Water	50.0		50.0
Total	224.7	91.1	246.46

EFFLUENT RATIOS	
H2/H20	8.40
C02/C0	9.19
(H2) (C02) / (H20) (C0)	7.68

CONTRACTION: 46.8

C0 Conversion: 75.6

H2 Conversion: 53.1

H2+C0 = 58.1

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.

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA CALCULATION and SUMMARY SHEET

Synthesis Run Number 17D From 5/10/47 Hr. 0700 to 5/11/47 Hr. 0700

FRESH FEED

	Orsat	Corr. Fac.	Cor. Orsat	M. S.	M. W.	Calc. M.W.	C. N.
CO_2			1.8		44	.79	39.3
CO			36.0		28	10.08	
CH_4			1.5		16	.24	
H_2			59.8		2	1.20	
N_2			0.9		28	.25	
Mol. Wt.						12.56	
						152	

FLOW CALCULATIONS

	Coeff	Chart	Fp	Ft	F m.w.	SCFH	%
Oxygen						1430	
Nat. Gas						2470	
Total						4400	45.8
Fresh Feed						6580	
F. F. by C						7540	
Avg. F. F.							
Wet Gas						3115	
Contraction							58.8
Recycle						10600	
Bleed						378	
Total						10978	
Total Feed						18518	
Recycle/F.F.						1.46	
Inlet Vel.						1.63	
Steam Flow						144.3 #/hr	
% CO → CO_2							20.0

WEIGHT BALANCE

CO_2 → W.G. 21.8

In	F. F. = SCFH x MW/379 =	249	
Out	Wet Gas	157.5	
	Oil	26.5	
	Water	57.4	
	Loss		
	Total	241.4	97.0
% CO → Oil			23.7

LIQUID YIELDS

	Oil Tank # Gauges, Inches Total	O/W	Oil	Gals.	Corr.	Total Gals.	Water Tank # Gauge	Gals.	Corr.	Total Gals.
At End of Period	74.0						92	30		
At Start of Period	53.0						85 3/4	0		
Production	21					92.4	6 1/4	30		161.7
Samples						5				5
Uncorrected Production						97.4				166.7
G. P. H.						4.06				6.94
Temperature, °F										
G.P.H. at 60°F						4.05				6.91
A.P.I. at 60°F						48.4				10.26
Pounds Per Hour						26.5				57.4

RUN CONDITIONS

Generator Press.	311
O_2 Preheat, °F	460
Gas Preheat, °F	787
Reactor Press.	200
Steam Back Press.	840
Temperatures, °F	
Heater Outlet	450
Catalyst #1	
#2	608
#3	610
#4	624
#5	621
Average	622
Product Separator	

DISTILLATIONS

	ASTM				WATER Temp.	%
Prod.						
A.P.I.					200	
I.B.P.					203	
10%					208	
20						
30						
40						
50						
60						
70						
80						
90						
E.P.						
Rec.						
Res.						
Loss.						

PRODUCT INSPECTION

Hempel Dist. °F	%	A.P.I.	Chemicals	Oil	Water
to 400			Neut. #		
400-550			Sap. #		
550+			Hydrox #		
			% Fe		
			% Alc		

PHYSICAL TESTS

Product	Pour °F	SUS @ °F	SFS @ °F

CATALYST DATA

In Reactor at Start of Period	313.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	313.5
Catalyst Taken Out	29.5
In Reactor at End of Period	284.0
Reactor d-P, H_2O	
Pounds in Reactor	418
Density, lbs./cu. ft.	140
Bed Height, Feet	4.7
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	

CATALYST ANALYSIS

Particle Size

Screen Frac.	M	%	Sedimentation 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			

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

	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	36.0	7.16	200.48	13.06	1.07	29.96	1.11	31.08	3.78	10.94	22.40	4.89	12.05
H2	59.8	11.89	23.78	50.14	4.12	8.24	4.31	8.62	14.53	26.42	54.08	18.84	46.42
CO2	1.8	.36	15.84	22.97	1.89	83.16	1.97	86.68	6.65	7.01	14.35	8.64	21.24
N2	0.9	.18	5.04	.94	.08	2.24	.08	2.33	.27	.45	.92	.35	.86
CH4	1.5	.30	4.80	5.00	.41	6.56	.43	6.88	1.45	1.75	3.58	1.88	4.63
C2H4				2.17	.18	5.04	.19	5.32	.63	.63	1.29	.82	2.02
C2H6				.81	.07	2.10	.07	2.18	.23	.23	.47	.30	.74
C3H6				1.67	.14	5.88	.15	6.30	.48	.48	.98	.63	1.55
C3H8				.44	.04	1.76	.04	1.83	.13	.13	.27	.17	.42
C4H8				1.31	.11	6.16	.11	6.41	.38	.38	.78	.49	1.21
C4H10				.39	.03	1.74	.03	1.81	.11	.11	.23	.14	.34
C5H10				.86	.07	4.90	.07	5.10	.25	.25	.51	.32	.79
C6H12				.25	.02	1.72	.02	1.79	.07	.07	.14	.09	.22
OIL								(30.66)				.22	.54
WATER												2.83	6.97
TOTAL		19.89	249.94		8.22	154.46	8.58		28.97	48.85	100.01	40.59	100.00
H2+CO		19.05					5.42						
H2/CO		1.66					3.88			2.41		3.85	

	NET CHANGE ON REACTION 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	-6.05	-6.05	[illegible]			-6.05				
H2	-7.58			-15.16						
CO2	1.61	1.61	22.49			[illegible]				
N2	.10									
CH4	.13	.13	1.82	.52						
C2H4	.19	.38	5.31	.76						12.82
C2H6	.07	.14	1.96	.42						
C3H6	.15	.45	6.28	.90			5.67	[illegible]	.91	29.15
C3H8	.04	.12	1.68	.32						
C4H8	.11	.44	6.15	.88			5.85	6.10	.96	77.06
C4H10	.03	.12	1.68	.30			1.14	[illegible]	.36	
C5H10	.07	.35	4.89	.70			4.90	[illegible]	.91	
C6H12	.02	.12	1.68	.24			[illegible]	[illegible]	.31	
OIL		2.19	30.59	4.38			[illegible]	[illegible]	4.72	
WATER				5.74		[illegible]				
TOTAL	11.31		100.01				50.54		8.17	
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	9.05	9.50	1.32	22.32			
C3+	57.45	55.24	7.37	124.63			
C4+	44.99	45.18	6.26	105.86			
Ult. Oil		50.54	7.00	118.37	8.17	1.084	153.10
CO2	22.49	70.84	9.81	165.89			
H20		50.94	7.06	119.38			

WEIGHT BALANCE

	#/hr	%	#/hr
Wet Gas	157.5		166.0
Oil	26.5		26.5
Water	57.4		57.4
Total	243.4	97.4	249.9

EFFLUENT RATIOS

H2/H20	6.66
CO2/CO	1.26
(H2) (CO2) / (H20) (CO)	11.77

CONTRACTION: 56.8

CO Conversion: 84.5

H2 Conversion: 63.8

$H_2 + CO$ = 68.5

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 CALCULATION and SUMMARY SHEET

Synthesis Run Number 176 **From** 5/11/47 **Hr.** 0700 **to** 5/12/47 **Hr.** 0200

FRESH FEED

	Orsat	Corr. Fac.	Cor. Orsat	M. S.	M. W.	Calc. M.W.	C. N.
CO_2			1.9		44	.84	38.3
CO			34.9		28	9.77	
CH_4			1.5		16	.24	
H_2			61.6		2	1.23	
N_2			0.6		28	.17	
Mol. Wt.						12.24	
						1.57	

FLOW CALCULATIONS

	Coeff	Chart	Fp	Ft	F m.w.	SCFH	%
Oxygen						1410	
Nat. Gas						2490	
Total						4400	43.4
Fresh Feed						7110	
F. F. by C						1800	
Avg. F. F.							
Wet Gas						3210	
Contraction							58.9
Recycle						11100	
Bleed						400	
Total						11500	
Total Feed						19300	
Recycle/F.F.						1.48	
Inlet Vel.						1.73	
Steam Flow						(147) #/hr	
B.P. → Col.							20.0

WEIGHT BALANCE

Sol → W.G. 2/1.6

In	F. F. = SCFH x MW/379 =	251	
Out	Wet Gas	234.5	
	Oil	23.9	
	Water	53.3	
	Loss		
	Total	231.7	92.3
To Col. Sol.			23.8

LIQUID YIELDS

	Oil Tank # GAUGES, INCHES Total	O/W	Oil	Gals.	Corr.	Total Gals.	Water Tank # Gauge	Gals.	Corr.	Total Gals.
At End of Period	93						63			
At Start of Period	74						30			
Production	19					83.5	33		4.5	149.5
Samples						5				5
Uncorrected Production						88.5				154.5
G. P. H.						3.68				6.44
Temperature, °F										
G.P.H. at 60°F						3.66				6.42
A.P.I. at 60°F						48.5				10.5
Pounds Per Hour						23.9				53.3

RUN CONDITIONS

Generator Press.	215
O_2 Preheat, °F	493
Gas Preheat, °F	801
Reactor Press.	200
Steam Back Press.	700
Temperatures, °F	
Heater Outlet	452
Catalyst #1	
#2	617
#3	620
#4	658
#5	641
Average	625
Product Separator	

DISTILLATIONS

ASTM		WATER	
Prod.		Temp.	%
A.P.I.		200	
I.B.P.		203	
10%		208	
20			
30			
40			
50			
60			
70			
80			
90			
E.P.			
Rec.			
Res.			
Loss.			

PRODUCT INSPECTION

Hempel Dist. °F	%	A.P.I.	Chemicals		Water
to 400			Neut. #		
400-550			Sap. #		
550+			Hydrox #		
			% Fe		
			% Alc		

PHYSICAL TESTS

Product	Pour °F	SUS @ °F	SFS @ °F

CATALYST DATA

In Reactor at Start of Period	284
Fresh Catalyst Charged	
Catalyst Recharged	
Total	284
Catalyst Taken Out	36 3/4
In Reactor at End of Period	247 1/4
Reactor d-P, H_2O	
Pounds in Reactor	321
Density, lbs./cu. ft.	109
Bed Height, Feet	4.4
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	

CATALYST ANALYSIS

Particle Size

Screen Frac.	M	%	Sedimentation 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

	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 %	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	34.9	7.18	201.04	14.51	1.23	34.44	1.38	38.64	4.40	11.58	21.60	5.28	13.60	-5.80	-5.46	17.23			-5.46				
H2	61.1	12.57	25.14	59.25	4.43	8.86	4.56	9.92	15.85	28.42	53.01	20.81	48.96	-6.61			-13.22						
CO2	1.7	.39	17.16	21.63	1.83	80.52	2.05	90.20	6.56	6.55	12.96	8.61	20.26	1.66	1.66	83.13			3.32				
N2	0.6	.12	3.36	1.08	.09	2.52	.10	2.80	.33	.45	.84	.43	1.01	-.02									
CH4	1.5	.31	4.46	4.40	.37	5.92	.41	6.56	1.33	1.64	3.06	1.74	4.09	.10	.10	1.57	.40						
C2H4				1.39	.12	3.36	.13	3.64	.42	.42	.28	.55	1.24	.13	.26	3.62	.52						67.1
C2H6				.62	.05	1.50	.06	1.80	.19	.19	.35	.25	.57	.06	.12	1.67	.36						
C3H6				1.27	.11	4.62	.12	5.04	.39	.39	.73	.51	1.20	.12	.36	5.01	.72			4.54	6.21	.73	85.63
C3H8				.22	.02	.88	.02	.88	.07	.07	.13	.09	.21	.02	.06	.84	.16						
C4H8				1.21	.10	5.60	.11	6.16	.37	.37	.69	.48	1.13	.11	.44	6.13	.88			5.85	6.10	.96	81.76
C4H10				.27	.02	1.16	.02	1.16	.08	.08	.15	.10	.24	.02	.08	1.11	.20			1.16	4.86	.24	
C5H10				.88	.07	4.80	.08	5.60	.27	.27	.50	.35	.82	.08	.40	5.57	.80			5.60	5.40	1.04	
C6H12				.27	.02	1.72	.02	1.72	.08	.08	.15	.10	.24	.02	.12	1.67	.24			1.22	5.50	.31	
OIL								(30.80)				.22	.52		2.20	30.64	4.40			30.80	6.10	4.14	
WATER												2.48	5.84				4.54		(2.27) 2.48					
TOTAL		20.58	251.66		8.47	156.00	9.46		30.34	53.61	100.00	42.56	99.99	10.13		100.01				49.65		8.02	
H2+CO		19.75					6.34																
H2/CO		1.75					3.59			2.45		3.60											

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	6.68	7.04	.94	15.90			
C3+	80.97	51.36	6.86	116.00			
C4+	45.12	45.44	6.07	102.64			
Ult. Oil		49.65	6.63	112.11	8.02	1.03	145.54
C02	23.12	78.04	9.75	164.87			
H20		44.64	5.96	100.78			

WEIGHT BALANCE

	#/hr	%	#/hr
Wet Gas	156.0		174.5
Oil	23.9		23.9
Water	53.3		53.3
Total	233.2	92.6	251.7

EFFLUENT RATIOS

H2/H20	8.39
C02/C0	1.49
(H2) (C02) / (H20) (C0)	12.79

CONTRACTION: 49.2

C0 Conversion: 80.8

H2 Conversion: 52.6

$H_2+CO = 60.3$

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 CALCULATION and SUMMARY SHEET

Synthesis Run Number 17F From 5/12/47 Hr. 0700 to 5/13/47 Hr. 0700

FRESH FEED

	Orsat	Corr. Fac.	Cor. Orsat	M. S.	M. W.	Calc. M.W.	C. N.
CO_2			2.3		44	1.01	39.6
CO			34.4		28	9.62	
CH_4			2.9		16	.46	
H_2			59.2		2	1.18	
N_2			1.2		28	.34	
Mol. Wt.						12.61	
						1.52	

FLOW CALCULATIONS

	Coeff	Chart	Fp	Ft	F m.w.	SCFH	%
Oxygen						1845	
Nat. Gas						2480	
Total						4325	42.7
Fresh Feed						7000	
F. F. by C						7520	
Avg. F. F.							
Wet Gas						3170	
Contraction							51.9
Recycle						11100	
Bleed						370	
Total						11470	
Total Feed						18990	
Recycle/F.F.						1.52	
Inlet Vel.						1.57	
Steam Flow						(72) #/hr	
% CO → CO2							19.0

WEIGHT BALANCE

CO_2 → W.G. 21.0

In	F. F. = SCFH x MW/379 =	250	
Out	Wet Gas	163	
	Oil	25	
	Water	52.2	
	Loss		
	Total	240.2	96.0
% CO → Oil			26.2

LIQUID YIELDS

	Oil Tank # Gauges, Inches Total	O/W	Oil	Gals.	Corr.	Total Gals.	Water Tank # Gauge	Gals.	Corr.	Total Gals.
At End of Period	24.5						91	18 3/4		
At Start of Period	5						63	13 1/2		
Production	19.5					85.7	28	5 1/4		146
Samples						5				5
Uncorrected Production						90.7				151
G. P. H.						3.87				6.3
Temperature, °F										
G.P.H. at 60°F						3.85				6.3
A.P.I. at 60°F						48.8				10.5
Pounds Per Hour						25.0				52.2

CATALYST DATA

In Reactor at Start of Period	247 3/4
Fresh Catalyst Charged	
Catalyst Recharged	
Total	247 3/4
Catalyst Taken Out	34 1/2
In Reactor at End of Period	213 1/4
Reactor d-P, H_2O	22
Pounds in Reactor	306
Density, lbs./cu. ft.	104
Bed Height, Feet	4.6
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	

RUN CONDITIONS

Generator Press.	220
O_2 Preheat, °F	450
Gas Preheat, °F	805
Reactor Press.	200
Steam Back Press.	900
Temperatures, °F	
Heater Outlet	496
Catalyst #1	
#2	616
#3	612
#4	630
#5	637
Average	623
Product Separator	

DISTILLATIONS

ASTM					WATER Temp.	%
Prod.						
A.P.I.					200	
I.B.P.					203	
10%					208	
20						
30						
40						
50						
60						
70						
80						
90						
E.P.						
Rec.						
Res.						
Loss.						

CATALYST ANALYSIS

Particle Size

Screen Frac.	M	%	Sedimentation 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	

PRODUCT INSPECTION

Hempel Dist. °F	%	A.P.I.	Chemicals	Oil	Water
to 400			Neut. #		
400-550			Sap. #		
550+			Hydrox #		
			% Fe		
			% Alc		

PHYSICAL TESTS

Product	Pour °F	SUS @ °F	SFS @ °F

Material balance

	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	34.4	6.81	190.68	15.48	1.29	36.12	1.55	43.40	4.68	11.49	23.06	6.23	14.56
H2	59.2	11.72	23.44	52.28	4.37	8.74	5.24	10.48	15.82	27.54	55.27	21.06	49.21
CO2	2.3	.46	20.24	17.64	1.47	64.68	1.76	77.44	5.34	5.80	11.64	7.10	16.59
N2	1.2	.24	6.72	1.25	.10	2.80	.12	3.36	.38	.62	1.24	.50	1.17
CH4	2.9	.57	9.12	5.91	.49	7.84	.59	9.44	1.79	2.36	4.74	2.38	3.56
C2H4				1.48	.12	3.36	.14	3.92	.45	.45	.90	.59	1.38
C2H6				.70	.06	1.80	.07	2.10	.21	.21	.42	.28	.65
C3H6				1.85	.15	6.30	.18	7.56	.56	.56	1.12	.74	1.73
C3H8				.45	.04	1.76	.05	2.20	.13	.13	.26	.18	.42
C4H8				1.15	.09	5.04	.11	6.16	.34	.34	.68	.45	1.05
C4H10				.45	.04	2.32	.05	2.90	.14	.14	.28	.19	.44
C5H10				.56	.03	2.10	.04	2.80	.11	.11	.22	.15	.35
C6H12				.25	.02	1.76	.02	1.72	.08	.08	.16	.10	.23
OIL								(26.18)				.19	.44
WATER												2.66	6.21
TOTAL		19.8	250.20		8.36	14462			30.26	49.83	100.01	42.80	100.00
H2+CO		18.5					6.79						
H2/CO		1.72					3.38			2.40		3.38	

	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	-5.26	-5.26	22.76			-5.26				
H2	-6.48			-12.76						
CO2	1.30	1.30	19.07			2.60				
N2	-.12									
CH4	.02	.02	.29	.08						
C2H4	.14	.28	4.11	.56						>61.89
C2H6	.07	.14	2.06	.42						
C3H6	.18	.54	7.93	1.08			6.80	6.25	1.09	>81.14
C3H8	.05	.15	2.20	.40						
C4H8	.11	.44	6.46	.88			5.85	6.10	.96	>71.59
C4H10	.05	.20	2.94	.50			2.90	4.86	.60	
C5H10	.04	.20	2.94	.40			2.80	5.40	.59	
C6H12	.02	.12	1.76	.24			1.72	5.50	.31	
OIL		1.87	27.46	3.74			26.18	6.50	4.03	
WATER				4.66		(2.33) 2.66				
TOTAL	9.88		100.01				46.25		7.51	
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	6.46	6.34	.85	14.37			
C3+	51.69	49.52	6.60	111.61			
C4+	41.56	39.76	5.30	89.62			
Ult. Oil		46.25	6.17	104.33	7.51	1.00	141.3
CO2	19.09	57.20	7.63	129.02			
H2O		47.88	6.38	107.89			

WEIGHT BALANCE

	#/hr	%	#/hr
Wet Gas	144.6		173.2
Oil	25.0		25.0
Water	52.0		52.0
Total	221.6	88.5	250.2

EFFLUENT RATIOS

H2/H2O	7.92
CO2/CO	1.14
(H2) (CO2) / (H2O) (CO)	9.06

CONTRACTION: 49.8

CO Conversion: 77.24

H2 Conversion: 55.3

$H_2 + CO = 59.3$

Yield Calculations assume "oil" is CH2, and is found by difference on Carbon, and H2O 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 CALCULATION and SUMMARY SHEET

Synthesis Run Number 176 From 5/13/47 Hr. 0700 to 5/14/47 Hr. 0200

FRESH FEED

	Orsat	Corr. Fac.	Cor. Orsat	M. S.	M. W.	Calc. M.W.	C. N.
CO_2			2.1		44	.92	39.9
CO			35.5		28	9.94	
CH_4			2.3		16	.37	
H_2			58.5		2	1.39	
N_2			1.6		28	.45	
Mol. Wt.						13.07	
						1.47	

FLOW CALCULATIONS

	Coeff	Chart	Fp	Ft	F m.w.	SCFH	%
Oxygen						1775	
Nat. Gas						2425	
Total						4200	x2.3
Fresh Feed						6820	
F. F. by C						7280	
Avg. F. F.							
Wet Gas						8085	
Contraction							51.6
Recycle						10780	
Bleed						348	
Total						11628	
Total Feed						18368	
Recycle/F.F.						1.57	
Inlet Vel.						1.61	
Steam Flow							
% to Total							20.4

CO_2 in Wet Gas 22.1

WEIGHT BALANCE

In	F. F. = SCFH x MW/379 =	257	
Out	Wet Gas	151.5	
	Oil	19.1	
	Water	57.9	
	Loss		
	Total	228.4	91.0
% of Total			80.1

LIQUID YIELDS

	Oil Tank # GAUGES, INCHES Total	O/W	Oil	Gals.	Corr.	Total Gals.	Water Tank # Gauge	Gals.	Corr.	Total Gals.
At End of Period	38 1/2						47 1/4			
At Start of Period	24 1/2						18 3/4			
Production	14				4.5	66.1	28 3/4	4.5		145.2
Samples						5				5
Uncorrected Production						71.1				150.2
G. P. H.						2.94				6.26
Temperature, °F										
G.P.H. at 60°F						2.9				6.23
A.P.I. at 60°F						49.1				10.4
Pounds Per Hour						191				51.8

RUN CONDITIONS

Generator Press.	208
O_2 Preheat, °F	500
Gas Preheat, °F	840
Reactor Press.	200
Steam Back Press.	810
Temperatures, °F	
Heater Outlet	518
Catalyst #1	
#2	624
#3	612
#4	626
#5	670
Average	625
Product Separator	

DISTILLATIONS

ASTM		WATER	
Prod.		Temp.	%
A.P.I.		200	
I.B.P.		203	
10%		208	
20			
30			
40			
50			
60			
70			
80			
90			
E.P.			
Rec.			
Res.			
Loss.			

PRODUCT INSPECTION

Hempel Dist. °F	%	A.P.I.	Chemicals	Oil	Water
to 400			Neut. #		
400-550			Sap. #		
550+			Hydrox. #		
			% Fe		
			% Alc		

PHYSICAL TESTS

Product	Pour °F	SUS @ °F		SFS @ °F	

CATALYST DATA

In Reactor at Start of Period	213 1/4
Fresh Catalyst Charged	
Catalyst Recharged	
Total	213 1/4
Catalyst Taken Out	25 3/4
In Reactor at End of Period	187.5
Reactor d-P, H_2O	
Pounds in Reactor	203
Density, lbs./cu. ft.	99.5
Bed Height, Feet	4.9
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	

CATALYST ANALYSIS

Particle Size

Screen Frac.	M	%	Sedimentation 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

	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 %	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	35.5	6.82	190.96	15.78	1.28	35.84	1.45	40.60	4.59	11.41	23.71	6.04	14.86	- 5.37	- 5.37	21.26			- 5.37				
H2	58.5	11.23	22.46	47.94	3.90	7.80	4.41	8.82	13.95	25.18	52.32	18.36	45.18	- 6.82			-13.67						
CO2	2.1	.40	17.60	20.68	1.68	73.42	1.90	83.60	6.02	6.42	13.34	7.92	19.49	1.50	1.50	21.44			3.00				
N2	1.6	.31	8.68	3.14	.26	7.28	.29	8.12	.71	1.22	2.53	1.20	2.95	- .02									
CH4	2.3	.44	7.04	5.78	.47	7.52	.53	8.48	1.68	2.12	4.40	2.21	5.44	.09	.09	1.32	.36						
C2H4				1.48	.12	3.36	.14	3.92	.43	.43	.89	.57	1.40	.14	.28	4.11	.56						70.81
C2H6				.61	.05	1.50	.06	1.80	.18	.18	.37	.24	.59	.06	.12	1.16	.36						
C3H6				1.24	.10	4.20	.11	4.62	.36	.36	.75	.47	1.16	.11	.33	4.84	.66			4.16	6.25	.67	78.94
C3H8				.33	.03	1.32	.03	1.49	.10	.10	.21	.13	.32	.03	.09	1.32	.24						
C4H8				1.28	.10	5.60	.11	6.16	.37	.37	.77	.48	1.18	.11	.44	6.45	.88			5.85	6.10	.96	80.50
C4H10				.31	.03	1.74	.03	1.97	.09	.09	.19	.12	.30	.03	.12	1.76	.30			1.74	4.56	.36	
C5H10				.57	.05	3.50	.06	4.20	.17	.17	.35	.23	.57	.06	.30	4.40	.60			4.20	5.40	.78	
C6H12				.28	.02	1.72	.02	1.94	.08	.08	.17	.10	.25	.02	.12	1.76	.24			1.72	5.50	.31	
OIL								(27.72)				.20	.49		1.88	29.03	3.96			27.72	6.30	4.26	
WATER												2.37	5.83				5.48		(2.74) 2.37				
TOTAL		19.20	246.74		8.14	155.30			29.10	48.13	100.00	40.64	99.99	10.06		100.00				45.39		7.74	
H2+CO		18.05					5.86																
H2/CO		1.65					3.04			2.21		3.04											

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	7.19	7.16	.98	16.57			
C3+	49.56	47.48	6.52	110.25			
C4+	43.40	41.54	5.71	96.56			
Ult. Oil		45.39	6.23	105.18	7.34	1.01	142.71
C02	21.99	66.00	9.07	153.37			
H20		42.66	5.86	99.09			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	155.3		175.8
Oil	19.1		19.1
Water	57.8		57.8
Total	226.2	91.7	246.7

EFFLUENT RATIOS	
H2/H20	7.75
C02/C0	1.31
(H2) (C02) / (H20) (C0)	10.17

CONTRACTION: 52.4

C0 Conversion: 78.7

H2 Conversion: 60.7

$H_2 + CO = 63.5$

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 CALCULATION and SUMMARY SHEET

Synthesis Run Number 17H From 5/14/47 Hr. 0700 to 5/15/47 Hr. 0700

FRESH FEED

	Orsat	Corr. Fac.	Cor. Orsat	M. S.	M. W.	Calc. M.W.	C. N.
CO_2			2.1		44	.92	39.8
CO			35.5		28	9.94	
CH_4			2.2		16	.35	
H_2			57.1		2	1.18	
N_2			1.1		28	.31	
Mol. Wt.						12.70	
						1.51	

FLOW CALCULATIONS

	Coeff	Chart	Fp	Ft	F m.w.	SCFH	%
Oxygen						1740	
Nat. Gas						2450	
Total						4240	42.2
Fresh Feed						7150	
F. F. by C						1370	
Avg. F. F.							
Wet Gas						3015	
Contraction							57.2
Recycle						11200	
Bleed						540	
Total						11540	
Total Feed						18430	
Recycle/F.F.						1.56	
Inlet Vel.						1.62	
Steam Flow							
% CO → CO2							19.4

CO2 → W. = 22.5

WEIGHT BALANCE

In	F. F. = SCFH x MW/379 =	247	
Out	Wet Gas	157	
	Oil	23.4	
	Water	51.4	
	Loss		
	Total	228.8	92.5
% CO → Oil			23.9

LIQUID YIELDS

	Oil Tank # Gauges, Inches Total	O/W	Oil	Gals.	Corr.	Total Gals.	Water Tank # Gauge	Gals.	Corr.	Total Gals.
At End of Period	56 3/4						79.5			
At Start of Period	38 1/2						47.5			
Production	18 1/4					80.4	32.0			141
Samples						5				7
Uncorrected Production						85.4				148
G. P. H.						3.56				6.17
Temperature, °F										
G.P.H. at 60°F						3.54				6.15
A.P.I. at 60°F						49.0				10.5
Pounds Per Hour						23.4				51.4

RUN CONDITIONS

Generator Press.	209
O_2 Preheat, °F	540
Gas Preheat, °F	510
Reactor Press.	200
Steam Back Press.	860
Temperatures, °F	
Heater Outlet	460
Catalyst #1	
#2	620
#3	618
#4	625
#5	640
Average	622
Product Separator	

DISTILLATIONS

ASTM		WATER Temp.	%
Prod.		200	
A.P.I.		203	
I.B.P.		208	
10%			
20			
30			
40			
50			
60			
70			
80			
90			
E.P.			
Rec.			
Res.			
Loss.			

PRODUCT INSPECTION

Hempel Dist. °F	%	A.P.I.	Chemicals	Oil	Water
to 400			Neut. #		
400-550			Sap. #		
550+			Hydrox #		
			% Fe		
			% Alc		

PHYSICAL TESTS

Product	Pour °F	SUS @ °F	SFS @ °F

CATALYST DATA

In Reactor at Start of Period	187.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	187.5
Catalyst Taken Out	11.5
In Reactor at End of Period	176.0
Reactor d-P, H_2O	
Pounds in Reactor	156
Density, lbs./cu. ft.	89.5
Bed Height, Feet	4.1
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	

CATALYST ANALYSIS

Particle Size

Screen Frac.	M	%	Sedimentation 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 m²/gm	

	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	35.5	6.92	193.76	15.03	1.20	33.60	1.32	36.96	4.58	11.50	23.31	5.90	14.22
H2	57.1	11.52	23.04	45.97	3.66	7.32	4.03	8.06	14.00	25.52	51.86	18.05	43.71
CO2	2.1	.41	18.04	19.37	1.54	67.76	1.69	74.36	5.90	6.31	12.82	6.39	15.30
N2	1.1	.21	5.88	2.84	.23	6.44	.25	7.00	.86	1.07	2.17	1.11	1.08
CH4	2.2	.43	6.88	5.49	.44	7.04	.48	7.68	1.67	2.10	4.27	2.15	5.18
C2H4				1.78	.14	3.92	.15	4.20	.54	.54	1.10	.67	1.66
C2H6				.61	.05	1.50	.06	1.80	.19	.19	.39	.25	.60
C3H6				1.21	.10	4.20	.11	4.62	.37	.37	.75	.48	1.16
C3H8				.32	.03	1.32	.03	1.45	.10	.10	.20	.13	.31
C4H8				3.69	.29	16.24	.32	17.92	1.12	1.12	2.28	1.44	3.47
C4H10				.37	.03	1.74	.03	1.91	.11	.11	.22	.14	.34
C5H10				.70	.06	4.20	.07	4.90	.21	.21	.43	.28	.68
C6H12				.22	.02	1.72	.02	1.89	.07	.07	.14	.09	.22
OIL								(21.84)				.16	.39
WATER												3.04	7.33
TOTAL		19.50	247.60		7.96	157.00	8.56	172.75	30.45	49.21	100.00	41.48	100.01
H2+CO		18.44					5.35						
H2/CO		1.66					3.05			2.22		3.06	

	Net Change on Reaction 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	-5.60	-5.60	17.04			-5.60				
H2	-7.47			-14.94						
CO2	1.48	1.48	18.50			2.56				
N2	-.04									
CH4	.05	.05	.72	.20						
C2H4	.15	.30	4.97	.60						74.48
C2H6	.06	.12	1.13	.36						
C3H6	.11	.33	4.77	.66			4.16	6.25	.67	67.08
C3H8	.03	.09	1.30	.24						
C4H8	.32	1.28	8.50	2.56			17.02	6.10	2.79	70.49
C4H10	.03	.12	1.73	.30			1.71	4.86	.37	
C5H10	.07	.35	5.06	.70			4.70	5.40	.41	
C6H12	.02	.12	1.13	.24			1.87	5.50	.34	
OIL		1.56	22.54	3.12			21.84	6.50	3.32	
WATER				6.00		(3.00) 3.04				
TOTAL	11.01		100.00				51.72		8.11	
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	6.79	6.80	.97	16.40			
C3+	55.63	54.06	7.73	130.71			
C4+	49.56	48.12	6.88	116.34			
Ult. Oil		51.72	7.40	125.13	8.11	1.16	163.91
CO2	18.50	56.32	8.06	136.29			
H2O		54.72	7.83	132.41			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	157.0		172.8
Oil	23.4		23.4
Water	51.4		51.4
Total	231.8	93.5	247.6

EFFLUENT RATIOS	
H2/H2O	5.93
CO2/CO	1.29
(H2) (CO2) / (H2O) (CO)	7.64

CONTRACTION: 56.5

CO Conversion: 80.7

H2 Conversion: 65.0

$H_2 + CO = 67.1$

Yield Calculations assume "oil" is CH2, and is found by difference on Carbon, and H2O 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 CALCULATION and SUMMARY SHEET

Synthesis Run Number 175 From 5/15/47 Hr. 0700 to 5/16/47 Hr. 0700

FRESH FEED

	Orsat	Corr. Fac.	Cor. Orsat	M. S.	M. W.	Calc. M.W	C. N.
CO_2			2.0		44	.88	39.7
CO			35.7		28	10.00	
CH_4			2.0		16	.32	
H_2			59.4		2	1.19	
N_2			0.9		28	.25	
Mol. Wt.						12.64	
						1.52	

FLOW CALCULATIONS

	Coeff	Chart	Fp	Ft	F m.w.	SCFH	%
Oxygen						1795	
Nat. Gas						2440	
Total						4235	42.3
Fresh Feed						6800	
F. F. by C						7390	
Avg. F. F.							
Wet Gas						3000	
Contraction							57.4
Recycle						11200	
Bleed						360	
Total						11560	
Total Feed						18950	
Recycle/F.F.						1.6	
Inlet Vel.						1.6	
Steam Flow							
% CO → CO_2							19.2

CO_2 → W.G. 21.8

WEIGHT BALANCE

In	F. F. = SCFH x MW/379 =	246	
Out	Wet Gas	154	
	Oil	23	
	Water	46	
	Loss		
	Total	223	91.0
% CO → CO_2			23.6

LIQUID YIELDS

	Oil Tank # GAUGES, INCHES Total	O/W	Oil	Gals.	Corr.	Total Gals.	Water Tank # Gauge	Gals.	Corr.	Total Gals.
At End of Period	75						91 3/4	24		
At Start of Period	56 3/4						79 3/4	8		
Production	18 1/4					80.3	12 1/4	16		124
Samples						5				7
Uncorrected Production						85.3				131
G. P. H.						3.55				5.58
Temperature, °F										
G.P.H. at 60°F						3.50				5.57
A.P.I. at 60°F						49.0				10.6
Pounds Per Hour						23.0				46.0

RUN CONDITIONS

Generator Press.	210
O_2 Preheat, °F	515
Gas Preheat, °F	810
Reactor Press.	200
Steam Back Press.	860
Temperatures, °F	
Heater Outlet	435
Catalyst #1	
#2	620
#3	620
#4	635
#5	644
Average	627
Product Separator	

DISTILLATIONS

ASTM					WATER	
Prod.					Temp.	%
A.P.I.					200	
I.B.P.					203	
10%					208	
20						
30						
40						
50						
60						
70						
80						
90						
E.P.						
Rec.						
Res.						
Loss.						

PRODUCT INSPECTION

Hempel Dist. °F	%	A.P.I.	Chemicals	Oil	Water
to 400			Neut. #		
400-550			Sap. #		
550+			Hydrox #		
			% Fe		
			% Alc		

PHYSICAL TESTS

Product	Pour °F	SUS @ °F	SFS @ °F

CATALYST DATA

In Reactor at Start of Period	176
Fresh Catalyst Charged	
Catalyst Recharged	
Total	176
Catalyst Taken Out	15.5
In Reactor at End of Period	160.5
Reactor d-P, H_2O	16
Pounds in Reactor	147
Density, lbs./cu. ft.	80
Bed Height, Feet	4.4
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	

CATALYST ANALYSIS

Particle Size

Screen Frac.	M	%	Sedimentation 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

	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	35.7	6.96	194.88	15.22	1.21	33.88	1.71	47.88	4.64	11.60	24.27	6.35	15.17	- 5.25	-5.25	24.57			-5.25				
H2	59.4	11.58	23.16	48.55	3.85	7.70	5.43	10.86	14.81	26.39	55.21	20.24	48.34	- 6.15			-12.30						
CO2	2.0	.39	17.16	13.63	1.08	47.52	1.52	66.88	4.16	4.55	9.52	5.68	13.57	1.13	1.13	16.24			2.26				
N2	.9	.18	5.04	1.63	.13	3.64	.18	5.04	.50	.68	1.42	.68	1.62	-									
CH4	2.0	.39	10.92	5.96	.47	7.52	.66	10.56	1.82	2.21	4.62	2.48	5.92	.27	.27	2.88	1.08						
C2H4				1.91	.15	4.20	.21	5.88	.58	.58	1.21	.79	1.89	.21	.42	6.03	.84						74.40
C2H6				.64	.05	1.50	.07	2.10	.20	.20	.42	.27	.64	.07	.14	2.01	.42						
C3H6				1.16	.09	3.78	.13	5.46	.35	.35	.73	.48	1.15	.13	.39	5.60	.78			4.91	6.25	.24	85.30
C3H8				.20	.02	.88	.03	1.32	.06	.06	.13	.09	.21	.03	.09	1.29	.24						
C4H8				2.18	.17	9.52	.24	13.44	.65	.65	1.36	.89	2.13	.24	.96	13.79	1.92			12.77	6.10	7.09	82.17
C4H10				.46	.04	2.32	.06	3.48	.14	.14	.29	.20	.48	.06	.24	3.45	.60			3.48	4.86	.72	
C5H10				.94	.07	4.90	.10	7.00	.29	.29	.61	.39	.93	.10	.50	7.18	1.00			7.00	5.40	1.30	
C6H12				.39	.03	2.58	.04	3.44	.10	.10	.21	.14	.33	.04	.24	3.45	.48			3.44	5.50	.63	
OIL								(28.00)				.20	.48		2.00	28.74	4.00			28.00	6.50	4.31	
WATER												2.99	7.14				.94		(0.47) 2.99				
TOTAL		19.50	257.16		7.92	129.94			30.50	47.80	100.00	41.87	99.99	9.12		100.00				59.60		9.84	
H2+CO		18.54					7.14																
H2/CO		1.66					3.18			2.28		3.19											

ULTIMATE YIELDS

	% CO Fed	#/hr	H2 / CO #/MCF	H2 / CO g/M3	Gal/hr	H2 / CO Gal/MCF	H2 / CO cc/M3
C1+C2	11.82	7.62	1.03	17.42			
C3+	63.50	62.14	8.41	142.21			
C4+	56.61	55.76	7.49	126.66			
Ult. Oil		59.60	8.06	136.29	9.84	1.33	187.93
C02	16.24	44.72	6.73	113.80			
H20		53.82	7.28	123.10			

WEIGHT BALANCE

	#/hr	%	#/hr
Wet Gas	129.9		182.2
Oil	23.0		23.0
Water	46.0		46.0
Total	198.9	79.2	251.2

EFFLUENT RATIOS

H2/H20	6.77
C02/C0	.89
(H2) (C02) / (H20) (C0)	6.06

CONTRACTION: 46.8

C0 Conversion: 75.4

H2 Conversion: 53.1

$H_2 + CO = 58.5$

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 CALCULATION and SUMMARY SHEET

Synthesis Run Number 17-V From 5/16/47 Hr. 0700 to 5/17/47 Hr. 0700

FRESH FEED

	Orsat	Corr. Fac.	Cor. Orsat	M. S.	M. W.	Calc. M.W	C. N.
CO_2			2.0		44	.88	40.0
CO			34.8		28	9.75	
CH_4			3.2		16	.51	
H_2			57.0		2	1.14	
N_2			1.0		28	.28	
Mol. Wt.						12.60	
						1.52	

FLOW CALCULATIONS

	Coeff	Chart	Fp	Ft	F m.w.	SCFH	%
Oxygen						1803	
Nat. Gas						2440	
Total						4243	42.6
Fresh Feed						6830	
F. F. by C						7320	
Avg. F. F.							
Wet Gas						3130	
Contraction							57.3
Recycle						11650	
Bleed						553	
Total						11733	
Total Feed						18722	
Recycle/F.F.						1.56	
Inlet Vel.						1.6	
Steam Flow						240 #/hr	
% to Total							205

WEIGHT BALANCE

In	F. F. = SCFH x MW/379 =	245
Out	Wet Gas	160.8
	Oil	21.3
	Water	49.6
	Loss	
	Total	231.7
% Loss		23.6

LIQUID YIELDS

	Oil Tank # GAUGES, INCHES Total	O/W	Oil	Gals.	Corr.	Total Gals.	Water Tank # Gauge	Gals.	Corr.	Total Gals.
At End of Period	89 3/4	9					53 3/4			
At Start of Period	75	7					24.0			
Production	14 3/4	2				738	30.5		4.5	1348
Samples						5				5
Uncorrected Production						78.8				1436
G. P. H.						3.28				6.0
Temperature, °F										
G.P.H. at 60°F						3.26				5.98
A.P.I. at 60°F						49.5				10.7
Pounds Per Hour						21.3				496

RUN CONDITIONS

Generator Press.	210
O_2 Preheat, °F	410
Gas Preheat, °F	815
Reactor Press.	200
Steam Back Press.	900
Temperatures, °F	
Heater Outlet	430
Catalyst #1	
#2	622
#3	626
#4	648
#5	652
Average	635
Product Separator	

DISTILLATIONS

ASTM				WATER	
				Temp.	%
Prod.				200	
A.P.I.				203	
I.B.P.				208	
10%					
20					
30					
40					
50					
60					
70					
80					
90					
E.P.					
Rec.					
Res.					
Loss.					

PRODUCT INSPECTION

Hempel Dist. °F	%	A.P.I.	Chemicals	Oil	Water
to 400			Neut. #		
400-550			Sap. #		
550+			Hydrox #		
			% Fe		
			% Alc		

PHYSICAL TESTS

Product	Pour °F	SUS @ °F	SFS @ °F

CATALYST DATA

In Reactor at Start of Period	160.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	160.5
Catalyst Taken Out	
In Reactor at End of Period	160.5
Reactor d-P, H_2O	
Pounds in Reactor	147
Density, lbs./cu. ft.	66.0
Bed Height, Feet	5.3
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	

CATALYST ANALYSIS

Particle Size

Screen Frac.	M	%	Sedimentation 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 m²/gm

	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 %	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	34.8	6.72	168.16	9.07	.75	21.00	.80	22.40	2.73	9.45	19.12	3.53	7.21	-5.92	-5.92	11.70			-5.92				
H2	57.0	11.39	22.78	49.85	4.12	8.24	4.41	8.82	14.99	26.38	53.38	29.40	60.07	-6.98			-13.96						
CO2	2.0	.39	17.16	24.65	2.04	89.76	2.18	95.92	7.41	1.80	15.18	9.59	19.60	1.79	1.79	26.64			5.52				
N2	1.0	.19	5.32	.26	.02	.56	.02	.60	.08	.27	.55	.10	.20	.17									
CH4	3.9	.62	9.42	7.14	.59	9.44	.63	10.08	2.15	2.77	5.61	2.78	5.68	.01	.01	.15	.04						
C2H4				2.21	.18	5.04	.19	5.32	.66	.66	1.34	.85	1.74	.19	.58	5.65	.16						7466
C2H6				.75	.06	1.80	.06	1.93	.23	.23	.47	.29	.59	.06	.12	1.79	.36						
C3H6				2.07	.17	7.14	.18	7.56	.62	.62	1.25	.80	1.63	.18	.54	8.04	1.08			6.80	0.25	1.69	55.20
C3H8				1.68	.14	6.16	.15	6.60	.51	.51	1.03	.66	1.35	.15	.45	6.70	1.20						
C4H8				1.05	.09	5.04	.10	5.60	.32	.32	.65	.42	.86	.10	.40	5.95	.80			5.32	6.10	.87	76.64
C4H10				.32	.03	1.74	.03	1.86	.10	.10	.20	.13	.27	.03	.12	1.19	.30			1.74	4.86	.36	
C5H10				.77	.06	4.20	.06	4.49	.23	.23	.47	.29	.59	.06	.30	4.46	.60			4.20	5.40	.18	
C6H12				.25	.02	1.72	.02	1.84	.08	.08	.16	.10	.20	.02	.12	1.79	.24			1.72	5.50	.31	
OIL								(23.66)				.17	.35		1.64	25.15	3.38			23.66	6.50	3.64	
WATER												2.34	4.78				8.20		(2.60) 2.34				
TOTAL		19.31	243.34		8.26	161.64			30.08	49.42	100.01	46.44	100.00	10.48		100.00				43.44		7.05	
H2+CO		18.11					5.21																
H2/CO		1.69					5.51			2.79		8.33											

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	7.59	7.28	.99	16.74			
C3+	53.88	51.08	6.68	118.03			
C4+	37.14	36.92	5.04	85.23			
Ult. Oil		43.44	5.93	100.28	7.05	.96	135.65
C02	26.64	78.76	10.76	181.75			
H20		42.12	5.75	97.23			

WEIGHT BALANCE

	#/hr	%	#/hr
Wet Gas	161.8		172.4
Oil	21.3		21.3
Water	49.6		49.6
Total	232.6	95.6	243.3

EFFLUENT RATIOS

H2/H20	1.25
C02/C0	2.72
(H2) (C02) / (H20) (C0)	33.96

CONTRACTION: 54.3

C0 Conversion:	88.1
H2 Conversion:	61.3

H2+C0 = 66.4

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 O C. and 14.7 psig. g/M3 = 16.91 × #/MCF. cc/M3 = 141.3 × gal/MCF.

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA CALCULATION and SUMMARY SHEET

Synthesis Run Number 17K From 5/17/47 Hr. 0700 to 5/18/47 Hr. 0700

FRESH FEED	Orsat	Corr. Fac.	Cor. Orsat	M. S.	M. W.	Calc. M.W.	C. N.
CO_2			2.0		44	.88	39.4
CO			35.4		28	9.91	
CH_4			2.0		16	.32	
H_2			59.2		2	1.18	
N_2			1.4		28	.39	
Mol. Wt.						12.68	
						1.51	

FLOW CALCULATIONS	Coeff	Chart	Fp	Ft	F m.w.	SCFH	%
Oxygen						1783	
Nat. Gas						2440	
Total						4223	42.2
Fresh Feed						6880	
F. F. by C						7430	
Avg. F. F.							
Wet Gas						3170	
Contraction							57.4
Recycle						10620	
Bleed						336	
Total						10956	
Total Feed						18386	
Recycle/F.F.						1.48	
Inlet Vel.						1.63	
Steam Flow						235 #/hr	
% CO → CO2							20.0

CO2 → W.G. 21.3

WEIGHT BALANCE			
In	F. F. = SCFH x MW/379 =	248.5	
Out	Wet Gas	165.2	
	Oil	23.6	
	Water	48.0	
	Loss		
	Total	236.8	95.4
% CO → Oil			24.4

LIQUID YIELDS	Oil Tank # Gauges, Inches Total	O/W	Oil	Gals.	Corr.	Total Gals.	Water Tank # Gauge	Gals.	Corr.	Total Gals.
At End of Period	27.5						85			
At Start of Period	9.0						54.5			
Production	18.5					81.3	30.5			134
Samples						5				5
Uncorrected Production						86.3				139
G. P. H.						3.6				5.8
Temperature, °F										
G.P.H. at 60°F						3.5				5.7
A.P.I. at 60°F						48.8				10.5
Pounds Per Hour						23.6				48.0

RUN CONDITIONS	
Generator Press.	211
O_2 Preheat, °F	525
Gas Preheat, °F	805
Reactor Press.	200
Steam Back Press.	900
Temperatures, °F	
Heater Outlet	440
Catalyst #1	
#2	621
#3	627
#4	640
#5	658
Average	634
Product Separator	

DISTILLATIONS ASTM					WATER Temp.	%
Prod.					200	
A.P.I.					203	
I.B.P.					208	
10%						
20						
30						
40						
50						
60						
70						
80						
90						
E.P.						
Rec.						
Res.						
Loss.						

PRODUCT INSPECTION Hempel Dist. °F	%	A.P.I.	Chemicals	Oil	Water
to 400			Neut. #		
400-550			Sap. #		
550+			Hydrox #		
			% Fe		
			% Alc		

PHYSICAL TESTS Product	Pour °F	SUS @ °F	SFS @ °F

CATALYST DATA	
In Reactor at Start of Period	160.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	160.5
Catalyst Taken Out	5
In Reactor at End of Period	155.5
Reactor d-P, H_2O	
Pounds in Reactor	137
Density, lbs./cu. ft.	60
Bed Height, Feet	5.5
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	

CATALYST ANALYSIS

Particle Size: Screen Frac.	M	%	Sedimentation 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	

	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 %	NET CHANGE 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	35.4	6.44	194.32	15.22	1.28	35.84	1.50	42.00	4.40	11.34	23.42	5.90	14.18	-5.44	-5.44	21.61			-5.44				
H2	59.2	11.60	23.20	50.42	4.24	8.48	4.96	9.92	14.58	26.18	54.07	19.54	46.97	-6.64			-13.28						
CO2	2.0	.39	17.16	17.67	1.48	65.12	1.73	76.12	5.11	5.50	11.36	6.84	16.44	1.34	1.34	19.31			2.68				
N2	1.4	.27	7.56	3.32	.28	7.84	.33	9.24	.96	1.23	2.54	1.29	3.10	.06									
CH4	2.0	.39	6.24	6.85	.58	9.28	.68	10.88	1.98	2.37	4.89	2.66	6.39	.29	.27	4.18	1.16						
C2H4				1.49	.13	3.64	.15	4.20	.43	.43	.89	.58	1.39	.15	.30	4.32	.60						} 69.45
C2H6				.64	.05	1.50	.06	1.80	.19	.19	.39	.25	.60	.06	.12	1.73	.36						
C3H6				1.18	.10	4.20	.12	5.04	.34	.34	.70	.46	1.11	.12	.36	5.19	.72			4.54	6.25	.73	} 60.20
C3H8				.78	.07	3.08	.08	3.52	.23	.23	.48	.31	.75	.08	.24	3.46	.64						
C4H8				1.19	.10	5.60	.12	6.72	.34	.34	.70	.46	1.11	.12	.48	6.92	.96			6.38	6.10	1.05	} 85.61
C4H10				.20	.02	1.16	.02	1.36	.06	.06	.12	.08	.19	.02	.08	1.15	.20			1.16	4.86	.24	
C5H10				.54	.05	3.50	.06	4.20	.16	.16	.33	.22	.53	.06	.30	4.32	.60			4.20	5.40	.78	
C6H12				.16	.01	.86	.01	1.01	.05	.05	.10	.06	.14	.01	.06	.86	.12			.86	5.50	.16	
OIL								(26.18)				.19	.46		1.87	26.95	3.74			26.18	6.50	4.03	
WATER												2.76	6.63				4.18		(2.09) 2.76				
TOTAL		19.59	248.48		8.39	150.10			28.92	48.42	100.00	41.60	100.00	9.89		100.01				43.32		6.99	
H2+CO		18.54					6.46																
H2/CO		1.67					3.31			2.31		3.31											

ULTIMATE YIELDS	% CO Fed	#/hr	H2 / CO #/MCF	H2 / CO g/M3	Gal/hr	H2 / CO Gal/MCF	H2 / CO cc/M3
C1+C2	10.23	10.64	1.43	24.18			
C3+	48.85	47.68	6.43	108.73			
C4+	40.20	39.12	5.27	89.12			
Ult. Oil		43.32	5.84	98.75	6.99	.94	132.82
CO2	19.31	58.96	7.95	134.43			
H2O		49.68	6.70	113.30			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	150.1		176.9
Oil	23.6		23.6
Water	48.0		48.0
Total	221.7	89.2	248.5

EFFLUENT RATIOS	
H2/H2O	7.08
CO2/CO	1.16
(H2) (CO2) / (H2O) (CO)	8.20

CONTRACTION:	50.5
CO Conversion:	78.4
H2 Conversion:	57.2

H2+CO = 61.6

Yield Calculations assume "oil" is CH2, and is found by difference on Carbon, and H2O 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 CALCULATION and SUMMARY SHEET

Synthesis Run Number 17L **From** 5/15/47 **Hr.** 0700 **to** 5/19/47 **Hr.** 0700

FRESH FEED

	Orsat	Corr. Fac.	Cor. Orsat	M. S.	M. W.	Calc. M.W.	C. N.
CO_2			2.1		44	.92	38.9
CO			34.0		28	9.53	
CH_4			2.8		16	.45	
H_2			59.1		2	1.18	
N_2			2.0		28	.56	
Mol. Wt.						12.64	
						1.52	

FLOW CALCULATIONS

	Coeff	Chart	Fp	Ft	F m.w.	SCFH	%
Oxygen						1780	
Nat. Gas						2445	
Total						4225	42.1
Fresh Feed						6400	
F. F. by C						7550	
Avg. F. F.							
Wet Gas						3100	
Contraction							59.0
Recycle						10950	
Bleed						340	
Total						11290	
Total Feed						18840	
Recycle/F.F.						1.5	
Inlet Vel.						1.6	
Steam Flow						238 #/hr	
% CC → CO2							19.4

WEIGHT BALANCE

(Fe → W.G. 21.2)

In	F. F. = SCFH x MW/379 =	252	
Out	Wet Gas	154.5	
	Oil	21.9	
	Water	46.5	
	Loss		
	Total	227.9	90.5
% Co → O4			23.2

LIQUID YIELDS

	Oil Tank # GAUGES, INCHES Total	O/W	Oil	Gals.	Corr.	Total Gals.	Water Tank # Gauge	Gals.	Corr.	Total Gals.
At End of Period	43 3/4						93	28		
At Start of Period	27 1/2						85	6 1/2		
Production	16 1/4				4.5	76	8	21 1/2		130
Samples						5				5
Uncorrected Production						81				135
G. P. H.						3.38				5.6
Temperature, °F										
G.P.H. at 60°F						3.36				5.6
A.P.I. at 60°F						48.8				10.7
Pounds Per Hour						21.9				46.5

RUN CONDITIONS

Generator Press.	209
O_2 Preheat, °F	520
Gas Preheat, °F	915
Reactor Press.	200
Steam Back Press.	750
Temperatures, °F	
Heater Outlet	380
Catalyst #1	
#2	625
#3	629
#4	618
#5	570
Average	610
Product Separator	

DISTILLATIONS

ASTM					WATER	
Prod.					Temp.	%
A.P.I.					200	
I.B.P.					203	
10%					208	
20						
30						
40						
50						
60						
70						
80						
90						
E.P.						
Rec.						
Res.						
Loss.						

PRODUCT INSPECTION

Hempel Dist. °F	%	A.P.I.	Chemicals	Oil	Water
to 400			Neut. #		
400-550			Sap. #		
550+			Hydrox #		
			% Fe		
			% Alc		

PHYSICAL TESTS

Product	Pour °F	SUS @ °F		SFS @ °F	

CATALYST DATA

In Reactor at Start of Period	155.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	155.5
Catalyst Taken Out	14.0
In Reactor at End of Period	141.5
Reactor d-P, H_2O	19
Pounds in Reactor	
Density, lbs./cu. ft.	48
Bed Height, Feet	9.5
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	

CATALYST ANALYSIS

Particle Size

Screen Frac.	M	%	Sedimentation 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	m²/gm

FRESH FEED / WET GAS / RECYCLE / COMB. FEED / EFFLUENT / NET CHANGE ON REACTION

	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 %	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	34.0	6.77	189.56	11.60	.97	27.16	1.13	31.64	3.52	10.29	20.75	4.65	11.19	-5.64	-5.64	16.69			-5.64				
H2	59.1	11.76	23.52	48.15	3.95	7.90	4.58	9.16	14.34	26.10	52.64	18.92	45.54	-7.18			-14.36						
CO2	2.1	.42	18.48	22.44	1.84	80.96	2.13	93.72	6.68	7.10	14.32	8.81	21.21	1.71	1.71	28.54			3.42				
N2	2.0	.40	11.20	3.89	.33	9.24	.38	10.64	1.19	1.59	3.21	1.57	3.78	-.02									
CH4	2.8	.56	8.96	6.49	.53	8.48	.61	9.76	1.93	2.49	5.02	2.54	6.11	.05	.05	.83	.20						
C2H4				1.89	.15	4.20	.17	4.76	.56	.56	1.13	.73	1.76	.17	.34	5.68	.68						75.30
C2H6				.62	.05	1.50	.06	1.80	.18	.18	.36	.24	.58	.06	.12	2.00	.36						
C3H6				1.36	.11	4.62	.13	5.46	.41	.41	.82	.54	1.30	.13	.39	6.51	.78			4.91	6.25	.79	80.47
C3H8				.33	.03	1.32	.03	1.32	.10	.10	.20	.13	.31	.03	.09	1.50	.24						
C4H8				1.19	.10	5.60	.12	.07	.35	.35	.71	.47	1.13	.12	4.68	8.01	.96			.06	6.10	.01	41.51
C4H10				.97	.02	1.16	.02	1.46	.08	.08	.16	.10	.24	.02	.04	1.74	.20			1.16	4.96	.24	
C5H10				.95	.08	5.60	.09	6.30	.28	.28	.56	.37	.89	.09	.45	7.37	.90			6.30	5.40	1.17	
C6H12				.16	.01	.86	.01	.86	.05	.05	.10	.06	.14	.01	.06	1.00	.12			.86	8.50	.16	
OIL								(26.18)				.19	.46		1.87	31.21	3.74			26.18	6.50	4.03	
WATER												2.22	5.34				6.18		(3.96) 2.22				
TOTAL		19.91	251.72		8.20	158.60			29.79	49.58	100.01	41.54	99.99	10.45		100.00				40.08		6.38	
H2+CO		18.53						5.71															
H2/CO		1.73						4.05		1.54		4.07											

ULTIMATE YIELDS

	% CO Fed	#/hr	H2/CO #/MCF	H2/CO g/M3	Gal/hr	H2/CO Gal/MCF	H2/CO cc/M3
C1+C2	8.37	7.36	.97	16.40			
C3+	57.08	41.35	5.48	92.67			
C4+	49.07	34.57	4.58	77.45			
Ult. Oil		40.08	5.31	89.79	6.38	.85	160.11
CO2	28.54	75.24	9.97	168.59			
H20		39.96	5.29	89.45			

WEIGHT BALANCE

	#/hr	%	#/hr
Wet Gas	158.6		183.3
Oil	21.9		21.9
Water	46.5		46.5
Total	227.0	90.4	251.7

EFFLUENT RATIOS

H2/H20	8.52
C02/C0	1.89
(H2) (C02) / (H20) (C0)	16.17

CONTRACTION: 52.5

C0 Conversion:	83.3
H2 Conversion:	61.1

$H_2 + CO = 64.0$

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 CALCULATION and SUMMARY SHEET

Synthesis Run Number 17M From 5/19/47 Hr. 0700 to 5/20/47 Hr. 0700

FRESH FEED

	Orsat	Corr. Fac.	Cor. Orsat	M. S.	M. W.	Calc. M.W.	C. N.
CO_2			1.9		44	.36	39.6
CO			34.7		28	9.71	
CH_4			3.0		16	.48	
H_2			59.0		2	1.18	
N_2			1.4		28	.39	
Mol. Wt.						12.12	
						1.55	

FLOW CALCULATIONS

	Coeff	Chart	Fp	Ft	F m.w.	SCFH	%
Oxygen						1800	
Nat. Gas						2470	
Total						4270	42.1
Fresh Feed						6800	
F. F. by C						7490	
Avg. F. F.							
Wet Gas						3530	
Contraction							53.0
Recycle						11700	
Bleed						370	
Total						12070	
Total Feed						19560	
Recycle/F.F.						1.6	
Inlet Vel.						1.67	
Steam Flow						238#/hr	
% Co 7 Co2							21.0

Co2 7 W.G. 19.5

WEIGHT BALANCE

In	F. F.=SCFH x MW/379=	239	
Out	Wet Gas	160	
	Oil	17	
	Water	41	
	Loss		
	Total	218	91.3

LIQUID YIELDS

	Oil Tank # Gauges, Inches Total	O/W	Oil	Gals.	Corr.	Total Gals.	Water Tank # Gauge	Gals.	Corr.	Total Gals.
At End of Period	57						52.5			
At Start of Period	43 3/4						28			
Production	13 1/4					58.3	24.5		4.5	112.5
Samples						5				5
Uncorrected Production						63.3				117.5
G. P. H.						2.64				4.9
Temperature, °F										
G.P.H. at 60°F						2.63				4.9
A.P.I. at 60°F						49.1				10.8
Pounds Per Hour						17.1				41.0

CATALYST DATA

In Reactor at Start of Period	141.5
Fresh Catalyst Charged	
Catalyst Recharged	
Total	141.5
Catalyst Taken Out	99.0
In Reactor at End of Period	42.5
Reactor d-P, H_2O	16.5
Pounds in Reactor	192
Density, lbs./cu. ft.	40
Bed Height, Feet	9.0
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	

RUN CONDITIONS

Generator Press.	212
O_2 Preheat, °F	485
Gas Preheat, °F	830
Reactor Press.	200
Steam Back Press.	650
Temperatures, °F	
Heater Outlet	340
Catalyst #1	
#2	621
#3	608
#4	590
#5	565
Average	596
Product Separator	

DISTILLATIONS

ASTM					WATER Temp.	%
Prod.						
A.P.I.					200	
I.B.P.					203	
10%					208	
20						
30						
40						
50						
60						
70						
80						
90						
E.P.						
Rec.						
Res.						
Loss.						

CATALYST ANALYSIS

Particle Size

Frac.	Screen M	%	Sedimentation 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 m²/gm	

PRODUCT INSPECTION

Hempel Dist. °F	%	A.P.I.	Chemicals	Oil	Water
to 400			Neut. #		
400-550			Sap. #		
550+			Hydrox #		
			% Fe		
			% Alc		

PHYSICAL TESTS

Product	Pour °F	SUS @ °F	SFS @ °F

	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 %	NET CHANGE 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	34.7	6.87	192.36	14.80	1.38	33.10	1.71	41.04	4.71	11.58	22.33	7.42	15.88	-5.16	-5.16	24.87			-5.16				
H2	59.0	11.68	23.36	52.84	4.41	9.82	6.09	12.18	16.83	28.51	54.96	22.72	47.05	-5.59			-11.18						
CO2	1.9	.38	16.72	18.26	1.70	74.80	2.11	92.75	5.82	6.40	12.34	7.93	16.97	1.73	1.73	25.14			3.46				
N2	1.4	.28	7.84	3.57	.33	9.24	.41	11.46	1.14	1.42	2.74	1.55	3.32	.13									
CH4	3.0	.59	9.44	6.11	.57	9.12	.71	11.31	1.95	2.54	4.90	2.66	5.69	.12	.12	1.75	.48						
C2H4				1.40	.13	3.64	.16	4.51	.45	.45	.87	.61	1.31	.16	.32	4.66	.64						71.07
C2H6				.57	.05	1.50	.06	1.86	.18	.18	.35	.24	.51	.06	.12	1.75	.36						
C3H6				.84	.08	3.36	.10	4.17	.28	.28	.54	.38	.81	.10	.30	4.37	.60			3.75	6.25	.58	88.12
C3H8				.12	.01	.44	.01	.55	.04	.04	.08	.05	.11	.01	.03	.44	.08						
C4H8				.03	—	—	—	—	.01	.01	.02	.01	.02	—	—	—	—			—	—	—	12.50
C4H10				.21	.02	1.16	.02	1.44	.07	.07	.13	.09	.19	.02	.08	1.16	.20			1.44	4.86	.30	
C5H10				.90	.08	5.60	.10	6.84	.29	.29	.56	.39	.83	.10	.50	7.28	1.00			6.84	5.40	1.29	
C6H12				.30	.03	2.58	.04	3.20	.10	.10	.19	.14	.30	.04	.24	3.49	.48			3.20	5.50	.58	
OIL								(24.08)				.17	.36		1.72	25.04	3.44			24.08	6.50	3.70	
WATER												1.70	3.64				3.90		(1.95) 1.10				
TOTAL		19.80	249.72		9.30	154.36		191.41	31.85	57.87	100.00	46.26	100.00	8.54		100.01				39.41		6.45	
H2+CO		18.55					7.80																
H2/CO		1.70					3.56			2.46		3.09											

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	8.16	8.24	1.09	18.43			
C3+	41.78	41.10	5.48	92.67			
C4+	36.97	36.38	4.85	82.01			
Ult. Oil		39.41	4.25	71.87	6.45	.86	121.52
C02	25.18	76.03	10.17	171.97			
H20		30.60	4.08	68.99			

WEIGHT BALANCE

	#/hr	%	#/hr
Wet Gas	154.36		191.72
Oil	17.00		17.00
Water	41.00		41.00
Total	212.36	85.0	249.72

EFFLUENT RATIOS

H2/H20	13.48
C02/C0	1.07
(H2) (C02) / (H20) (C0)	14.42

CONTRACTION: 43.1

C0 Conversion: 75.1

H2 Conversion: 47.9

H2+CO = 54.3

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.