THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 46 Q From Hr. 0700 to Hr. 0700 Hrs. 369-393

FLOWS	SCFH	%
Oxygen	3794	
Nat. Gas	5609	
Total		
Fresh Feed	16644	
F. F. by C		
Avg. F. F.		
Wet Gas	7045	
Contraction		
Recycle	16015	
Bleed	1012	
Total	17027	
Total Feed	33671	
Recycle/F.F.	1.02	
Inlet Vel.	1.01	
Steam Flow		

RUN CONDITIONS	
Generator Press.	426
O_2 Preheat, °F	388
Gas Preheat, °F	672
Reactor Press.	418
Steam Back Press.	730
Temperatures, °F	
Heater Outlet	242
Catalyst #1	635
#2	635
#3	655
#4	643
#5	
Average	642
Product Separator	74

DISTILLATIONS							
	ASTM				Hempel Dist.		
Prod.	Naph				°F	%	A.P.I.
A.P.I.	54.8				to 400	73.0	54.8
I.B.P.	108				400-550	14.0	39.0
5%					550+	13.0	
10%	146						
20	176						
30	204				WATER		
40	228				Temp.	%	
50	250				200		
60	276				203		
70	302				208		
80	332						
90	365						
95	391						
E.P.	417						
Rec.	98.0						
Res.	1.5						
Loss.	0.5						

CATALYST DATA	
In Reactor at Start of Period	681
Fresh Catalyst Charged	100
Catalyst Recharged	
Total	
Catalyst Taken Out	82
In Reactor at End of Period	699
Reactor d-P, H_2O	
Pounds in Reactor	906
Density, lbs./cu. ft.	130
Bed Height, Feet	10.56
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	18.37
V/hr/V	2390

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	13.6	80+	
100	419-150	63.0	80-40	
150	149-105	12.2	40-20	
200	104-74	6.6	20-10	
250	73-62	1.0	10-0	
325	61-44	0.2		
<325	43-0	3.4		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated	151		% Fe	
Settled	153		% C	
Compacted	167		% Oil	
Sp. Grav.	4.5		Specific Surface	
				m^2/gm
			6.1	ml.NH_3/gm

NATURAL GAS	%
CO_2	1.80
CH_4	85.06
C_2H_6	8.27
C_3H_8	3.27
C_4H_{10}	0.22
N_2	1.13
O_2	0.26
MW	18.8936

PRODUCT INSPECTION						
	Oil	Water	Product	Pour °F	SUS @ °F	
Neut. No.	44.8	43.4				
Sap. No.	48.8	42.9				
Hydrox. No.						
Bromine No.	84					
% Fe						
% Alc		9.0				
°API	49.3	10.6				

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		10.037			20.074
CO_2		0.266	0.27		0.532
CH_4		12.587	12.59	50.348	
C_2H_6		1.224	2.45	7.344	
C_3H_8		0.484	1.35	3.872	
C_4H_{10}		0.033	0.13	0.330	
N_2		0.167			
Total			16.79	61.894	20.606

OUT	Mol %	m/hr	C	H	O
CO_2		1.053	1.1		2.1
CO		15.844	15.8		15.8
CH_4		0.224	0.2	0.896	
H_2		26.505		53.010	
N_2		0.289			
H_2O				6.650	3.3
Total		43.914	17.1	60.556	21.3
Balance			102.0	97.84	103.3

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	Measured m/hr	Measured #/hr	At Wt. Balance m/hr	At Wt. Balance #/hr	RECYCLE m/hr	COMB. FEED m/hr	COMB. FEED %	EFFLUENT m/hr	EFFLUENT %
CO	36.080	15.84	443.79	19.00	3.53	98.9	4.005	112.17	8.534	24.378	27.44	12.539	17.37
H2	60.356	26.51	53.43	51.12	9.50	19.2	10.778	21.73	22.967	49.472	55.69	33.745	46.74
CO2	2.397	1.05	46.34	19.49	3.62	159.4	4.108	180.78	8.754	9.807	11.04	12.862	17.82
N2	0.657	0.29	8.10	0.89	0.17	4.6	0.187	5.24	0.399	0.688	0.77	0.586	0.81
CH4	0.510	0.22	3.59	4.75	0.88	14.2	1.001	16.07	2.135	2.359	2.66	3.136	4.34
C2H4				1.32	0.25	6.9	0.279	7.82	0.594	0.594	0.67	0.873	1.21
C2H6				0.48	0.09	2.7	0.101	3.04	0.214	0.214	0.24	0.315	0.44
C3H6				1.35	0.25	10.5	0.284	11.93	0.605	0.605	0.68	0.889	1.23
C3H8				0.20	0.04	1.6	0.042	1.85	0.088	0.088	0.10	0.130	0.18
C4H8				0.80	1.49	8.4	0.109	9.48	0.359	0.359	0.40	0.468	0.65
C4H10				0.19	0.04	2.0	0.040	2.30	0.085	0.085	0.10	0.125	0.17
C5H10				0.32 0.03	0.06 0.01	4.2 0.4	0.068 0.007	4.77 0.49	0.145 0.013	0.145 0.013	0.16 0.01	0.213 0.020	0.30 0.03
C6H12				0.06	0.01	1.0	0.014	1.15	0.028	0.028	0.03	0.042	0.06
OIL												0.521	0.72
WATER												5.729	7.94
TOTAL		43.91	555.25		18.59	334.0	21.082	378.83	44.926	88.835		72.193	
H2+CO		42.35			13.03		14.783		31.501			27.566	
H2/CO		1.67			2.69		2.69		2.69	2.029		2.69	

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	-11.839	-11.839	25.28			11.839				
H2	-15.727			31.454						
CO2	3.055	3.055	19.28			6.110				
N2	-0.102									
CH4	0.777	0.777	4.90	3.108						
C2H4	0.279	0.558	3.52	1.116						72.00
C2H6	0.101	0.202	1.27	0.606						
C3H6	0.284	0.852	5.38	1.704			11.9 10.7	4.32 6.25	2.76 1.72	86.57
C3H8	0.042	0.126	0.80	0.336			1.9	4.24	0.44	
C4H8	0.109	0.436	2.75	0.872			9.5 9.0	5.00 6.1	1.90 1.48	80.48
C4H10	0.040	0.160	1.01	0.40			2.3	4.86	0.47	
C5H10	0.068 0.007	0.340 0.035	2.15 0.22	0.68 0.07			5.3	5.45	0.97	
C6H12	0.014	0.084	0.53	0.168			1.2	5.5	0.21	
OIL		5.214	32.91	10.428			73.1	6.52	11.21	
WATER				11.966		5.983 5.729				
TOTAL	-22.892						101.5		16.06	
H2+CO										
H2/CO	1.45									

ULTIMATE YIELDS

	% CO Fed	#/hr	H2/CO #/MCF	H2/CO g/M3	Gal/hr	H2/CO Gal/MCF	H2/CO cc/M3
C1+C2	9.699	23.34	1.454	24.587			
C3+	45.735	105.02	6.543	110.642			
C4+	39.563	91.24	5.684	96.116			
Ult. Oil		101.50	6.323	106.921	16.060	1.0006	141.384
CO2	19.281	134.44	8.376	141.638			
H20		103.21	6.430	108.731			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	334.02		378.83
Oil	55.35		55.35
Water	121.07		121.07
Total	510.44	91.93	555.25

EFFLUENT RATIOS	
H2/H20	5.890
CO2/CO	1.025
(H2) (CO2) / (H20) (CO)	6.037

CONTRACTION:	51.99
CO Conversion:	74.72
H2 Conversion:	59.34
H_2+CO=	65.09

H_2+CO= 16050 SCFH

	#/hr	#/M	gal/hr	GPM
C_3-C_5	31.97	1.992	6.75	0.421
Rec Oil	55.35	3.449	8.49	0.529
WSC	10.90	0.679	1.31	0.082
	98.22	6.120	16.55	1.032
H_2O	110.17	6.864	13.21	0.823

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 46 R From Hr. 0700 to Hr. 0700 Hrs. 393-417

FLOWS	SCFH	%
Oxygen	3830	
Nat. Gas	5468	
Total		
Fresh Feed	16218	
F. F. by C		
Avg. F. F.		
Wet Gas	6619	
Contraction		
Recycle	15968	
Bleed	1002	
Total	16970	
Total Feed	33188	
Recycle/F.F.	1.05	
Inlet Vel.	1.00	
Steam Flow		

RUN CONDITIONS	
Generator Press.	432
O_2 Preheat, °F	413
Gas Preheat, °F	665
Reactor Press.	423
Steam Back Press.	677
Temperatures, °F	
Heater Outlet	232
Catalyst #1	636
#2	633
#3	659
#4	631
#5	
Average	640
Product Separator	72

DISTILLATIONS	ASTM	Hempel Dist. °F	%	A.P.I.
Prod.	Naph			
A.P.I.	54.9	to 400	74.0	54.9
I.B.P.	105	400-550	13.3	39.1
5%		550+	12.7	
10%	148			
20	178			
30	203			
40	228			
50	250			
60	276			
70	304			
80	333			
90	369			
95	398			
E.P.	416			
Rec.	97.5			
Res.	1.5			
Loss.	1.0			

WATER	
Temp.	%
200	
203	
208	

CATALYST DATA	
In Reactor at Start of Period	699
Fresh Catalyst Charged	164
Catalyst Recharged	
Total	
Catalyst Taken Out	90
In Reactor at End of Period	773
Reactor d-P, H_2O	
Pounds in Reactor	996
Density, lbs./cu. ft.	135
Bed Height, Feet	11.18
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	16.28
V/hr/V	2198

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	14.8	80+	
100	419-150	63.6	80-40	
150	149-105	11.8	40-20	
200	104-74	6.4	20-10	
250	73-62	0.4	10-0	
325	61-44	1.2		
<325	43-0	1.8		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated	150		% Fe	
Settled	151		% C	
Compacted	170		% Oil	
Sp. Grav.	4.5		Specific Surface	
				m^2/gm
			6.0	$ml.NH_3/gm$

NATURAL GAS	%
CO_2	1.97
CH_4	83.50
C_2H_6	8.38
C_3H_8	3.79
C_4H_{10}	0.23
N_2	1.84
O_2	0.29
MW	19.1949

PRODUCT INSPECTION						
	Oil	Water	Product	Pour °F	SUS @ °F	
Neut. No.	45.2	45.3				
Sap. No.	48.8	44.8				
Hydrox. No.						
Bromine No.	76					
% Fe						
% Alc		10.0				
°API	49.4	10.6				

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		10.148			20.296
CO_2		0.284	0.28		0.568
CH_4		12.048	12.05	48.192	
C_2H_6		1.209	2.42	7.254	
C_3H_8		0.547	1.64	4.376	
C_4H_{10}		0.033	0.13	0.330	
N_2		0.265			
Total			16.52	60.152	20.864

OUT	Mol %	m/hr	C	H	O
CO_2		1.054	1.1		2.1
CO		15.446	15.5		15.5
CH_4		0.046	0.1	0.184	
H_2		26.021		52.042	
N_2		0.224			
H_2O				7.272	3.6
Total		42.790	16.6	59.498	21.2
Balance			100.1	98.91	101.6

	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	36.097	15.446	432.64	17.47	3.05	85.5	3.375	94.54	7.820	23.266	26.57	11.195	15.9
H2	60.810	26.021	52.46	51.06	8.92	18.0	9.864	19.89	22.860	48.881	55.82	32.724	46.3
CO2	2.463	1.054	46.39	20.84	3.64	160.2	4.027	177.21	9.332	10.386	11.86	13.359	18.9
N2	0.523	0.224	6.28	1.23	0.21	6.0	0.237	6.64	0.549	0.773	0.88	0.786	1.1
CH4	0.107	0.046	0.74	3.89	0.68	10.9	0.751	12.05	1.741	1.787	2.04	2.492	3.5
C2H4				1.37	0.24	6.7	0.264	7.41	0.612	0.612	0.70	0.876	1.2
C2H6				0.55	0.10	2.9	0.106	3.20	0.246	0.246	0.28	0.352	0.5
C3H6				1.49	0.26	10.9	0.288	12.10	0.665	0.665	0.76	0.953	1.4
C3H8				0.34	0.06	2.6	0.065	2.88	0.150	0.150	0.17	0.215	0.3
C4H8				0.99	0.17	9.7	0.190	10.67	0.441	0.441	0.50	0.631	0.9
C4H10				0.23	0.04	2.4	0.045	2.63	0.104	0.104	0.12	0.149	0.2
C5H10				0.44 0.03	0.08 0.01	5.4 0.4	0.085 0.01	5.97 0.48	0.197 0.014	0.197 0.014	0.22 0.02	0.282 0.021	0.4 0.0
C6H12				0.08	0.02	1.2	0.017	1.35	0.037	0.037	0.04	0.054	0.1
OIL												0.426	0.6
WATER												6.125	8.7
TOTAL		42.790	538.51		17.47	322.7	19.321	357.02	44.775	87.559		70.640	
H2+CO		41.467			11.97		13.239		30.68				
H2/CO		1.68			2.92		2.92		2.92	2.10		2.92	

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	-12.071	-12.071	21.85			-12.071				
H2	-16.157			-32.314						
CO2	2.973	2.973	19.25			5.946				
N2	0.013									
CH4	0.705	0.705	4.56	2.820						
C2H4	0.264	0.528	3.42	1.056						69.84
C2H6	0.106	0.212	1.37	0.636						
C3H6	0.288	0.864	5.59	1.728			12.10 10.89	4.32 6.25	2.80 1.74	80.77
C3H8	0.065	0.195	1.26	0.520			2.88	4.24	0.68	
C4H8	0.190	0.760	4.92	1.520			10.67 10.14	5.00 6.1	2.13 1.66	80.23
C4H10	0.045	0.45	2.91	0.45			2.63	4.86	0.54	
C5H10	0.085 0.007	0.85 0.07	5.50 0.45	0.85 0.07			6.45	5.45	1.18	
C6H12	0.017	0.20	1.32	0.20			1.35	5.5	0.25	
OIL		4.26	27.58	8.52			31.46	6.51	4.83	
WATER				13.94		6.970 6.125				
TOTAL	-23.470						62.92		10.20	
H2+CO	-28.228									
H2/CO	1.34									

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	9.355	21.92	1.395	23.589			
C3+	49.546	67.54	4.298	72.679			
C4+	42.690	52.56	3.344	56.547			
Ult. Oil		62.92	4.004	67.708	10.201	0.649	91.704
C02	19.248	130.82	8.324	140.759			
H20		125.57	7.990	135.111			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	322.74		357.02
Oil	59.27		59.27
Water	122.22		122.22
Total	504.23	93.63	538.51

EFFLUENT RATIOS	
H2/H20	5.343
C02/C0	1.193
(H2) (C02) / (H20) (C0)	6.374

CONTRACTION:	54.85
C0 Conversion:	78.15
H2 Conversion:	62.09
H_2+C0=	68.07

H_2+C0= 15716 SCFH

	#/hr	#/M	gal/hr	GPM
C_3-C_5	36.08	2.296	7.58	0.482
Rec Oil	59.27	3.771	9.10	0.579
WSC	12.22	0.778	1.47	0.094
	107.57	6.845	18.15	1.155
H_2O	110.00	6.999	13.19	0.839

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 46 S From Hr. 0700 to Hr. 0700 Hrs. 417-441

FLOWS	SCFH	%
Oxygen	3636	
Nat. Gas	5541	
Total		
Fresh Feed	16519	
F. F. by C		
Avg. F. F.		
Wet Gas	7117	
Contraction		
Recycle	16617	
Bleed	1039	
Total	17656	
Total Feed	34175	
Recycle/F.F.	1.07	
Inlet Vel.	1.03	
Steam Flow		

RUN CONDITIONS	
Generator Press.	425
O_2 Preheat, °F	439
Gas Preheat, °F	696
Reactor Press.	418
Steam Back Press.	718
Temperatures, °F	
Heater Outlet	209
Catalyst #1	634
#2	631
#3	664
#4	648
#5	
Average	644.250
Product Separator	70

DISTILLATIONS	ASTM				Hempel Dist.		
Prod.	Naph				°F	%	A.P.I.
A.P.I.	56.1				to 400	71.0	56.1
I.B.P.	103				400-550	16.0	39.4
5%					550+	13.0	
10%	140						
20	170						
30	195				WATER		
40	218				Temp.	%	
50	240				200		
60	264				203		
70	290				208		
80	320						
90	358						
95	385						
E.P.	402						
Rec.	97.5						
Res.	1.5						
Loss.	1.0						

CATALYST DATA	
In Reactor at Start of Period	773
Fresh Catalyst Charged	173
Catalyst Recharged	
Total	
Catalyst Taken Out	258
In Reactor at End of Period	688
Reactor d-P, H_2O	
Pounds in Reactor	925
Density, lbs./cu. ft.	137
Bed Height, Feet	10.23
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	17.86
V/hr/V	2447

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	14.5	80+	
100	419-150	62.2	80-40	
150	149-105	11.8	40-20	
200	104-74	6.3	20-10	
250	73-62	0.8	10-0	
325	61-44	2.1		
<325	43-0	2.3		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated	152		% Fe	
Settled	154		% C	
Compacted	172		% Oil	
Sp. Grav.	4.6		Specific Surface	
				m^2/gm
			5.6	ml.NH_3/gm

NATURAL GAS	%
CO_2	2.07
CH_4	83.73
C_2H_6	8.57
C_3H_8	3.90
C_4H_{10}	0.23
N_2	1.24
O_2	0.26
MW	19.2037

PRODUCT INSPECTION						
	Oil	Water	Product	Pour °F	SUS @ °F	
Neut. No.	43.6	44.1				
Sap. No.	48.0	44.9				
Hydrox. No.						
Bromine No.	79.9					
% Fe						
% Alc		9.5				
°API	49.8	10.6				

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		9.631			19.262
CO_2		0.303	0.30		0.606
CH_4		12.241	12.24	48.964	
C_2H_6		1.253	2.51	7.518	
C_3H_8		0.570	1.71	4.560	
C_4H_{10}		0.034	0.14	0.340	
N_2		0.181			
Total			16.90	61.382	19.868

OUT	Mol %	m/hr	C	H	O
CO_2		0.921	0.9		1.8
CO		15.461	15.5		15.5
CH_4		0.690	0.7	2.76	
H_2		26.326		52.65	
N_2		0.187			
H_2O				5.55	2.8
Total		43.586	17.1	60.96	200.8
Balance			101.0	99.32	101.1

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	Mensured m/hr	Mensured #/hr	At Wt. Balance m/hr	At Wt. Balance #/hr	RECYC'E m/hr	COMB. FEED m/hr	COMB. FEED %	EFFLUENT m/hr	EFFLUENT %
CO	35.473	15.461	433.06	17.74	3.33	93.3	3.795	106.30	8.264	23.725	26.32	12.059	16.20
H2	60.401	26.326	53.07	52.58	9.87	19.9	11.249	22.68	24.492	50.810	56.36	35.741	48.02
CO2	2.113	0.921	40.53	17.70	3.32	146.3	3.787	166.67	8.245	9.166	10.17	12.032	16.17
N2	0.430	0.187	5.24	0.74	0.14	3.9	0.158	4.43	0.344	0.531	0.59	0.502	0.68
CH4	1.583	0.690	11.07	6.69	1.26	20.2	1.431	22.96	3.116	3.806	4.22	4.547	6.11
C2H4				1.32	0.25	6.9	0.281	7.90	0.613	0.613	0.68	0.894	1.20
C2H6				0.48	0.09	2.7	0.103	3.09	0.223	0.223	0.25	0.326	0.44
C3H6				1.37	0.26	10.9	0.294	12.37	0.639	0.639	0.71	0.933	1.25
C3H8				0.13	0.03	1.1	0.029	1.25	0.061	0.061	0.07	0.090	0.12
C4H8				0.77	0.15	8.1	0.165	9.27	0.360	0.360	0.40	0.525	0.71
C4H10				0.17	0.03	1.8	0.035	2.05	0.077	0.077	0.09	0.112	0.15
C5H10				0.26 0.02	0.05 0.00	3.4 0.3	0.056 0.005	3.92 0.34	0.122 0.010	0.122 0.010	0.14 0.01	0.178 0.015	0.24 0.02
C6H12				0.02	0.00	0.4	0.005	0.40	0.010	0.010	0.01	0.015	0.02
OIL												0.519	0.70
WATER												5.934	7.97
TOTAL		43.586	542.97		18.78	319.2	21.395	363.63	46.584	90.153		74.422	
H2+CO		41.787			13.21		15.044		32.756	74.535		47.800	
H2/CO		1.70			2.96		2.96		2.96	2.141		2.964	

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	-11.666	-11.666	24.55			-11.666				
H2	-15.077			-30.154						
CO2	2.866	2.866	18.54			5.732				
N2	-0.029									
CH4	0.741	0.741	4.79	2.964						
C2H4	0.281	0.562	3.63	1.124						71.88
C2H6	0.103	0.206	1.33	0.618						
C3H6	0.294	0.882	5.70	1.764			12.37 11.13	4.32 6.25	2.86 1.78	90.82
C3H8	0.029	0.087	0.56	0.232			1.25	4.24	0.29	
C4H8	0.165	0.660	4.27	1.320			9.27 8.81	5.00 6.10	1.85 1.44	81.89
C4H10	0.035	0.140	0.91	0.35			2.05	4.86	0.42	
C5H10	0.056 0.005	0.280 0.025	1.81 0.16	0.56 0.05			4.26	5.45	0.78	
C6H12	0.005	0.030	0.19	0.06			0.40	5.5	0.08	
OIL		5.187	33.55	10.37			72.67	6.48	12.07	
WATER				10.74		5.369 5.934				
TOTAL	-22.192						99.32		16.57	
H2+CO	-26.743									
H2/CO	1.292									

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	9.758	22.88	1.445	24.434			
C3+	47.152	102.27	6.457	109.187			
C4+	40.886	88.65	5.597	94.645			
Ult. Oil		99.32	6.271	106.042	16.574	1.0465	147.870
C02	18.536	126.14	7.965	134.688			
H20		106.91	6.750	114.142			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	319.17		363.63
Oil	55.02		55.02
Water	124.32		124.32
Total	498.51	91.81	542.97

EFFLUENT RATIOS	
H2/H20	6.023
C02/C0	0.9977
(H2) (C02)/(H20) (C0)	6.0091

CONTRACTION:	50.91
C0 Conversion:	75.45
H2 Conversion:	57.27
H_2+C0=	64.00

H_2+C0= 15837 SCFH

	#/hr	#/M	gal/hr	GPM
C_3-C_5	29.60	1.869	6.28	0.397
Rec Oil	55.02	3.474	8.47	0.535
WSC	11.81	0.746	1.42	0.090
	96.43	6.089	16.17	1.022
H_2O	112.51	7.104	13.49	0.852

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 46 T From Hr. 0700 to Hr. 0700 Hrs. 441-465

FLOWS	SCFH	%
Oxygen	3697	
Nat. Gas	5543	
Total		
Fresh Feed	16506	
F. F. by C		
Avg. F. F.		
Wet Gas	6657	
Contraction		
Recycle	15583	
Bleed	1025	
Total	16608	
Total Feed	33114	
Recycle/F.F.	1.01	
Inlet Vel.	1.00	
Steam Flow		

RUN CONDITIONS	
Generator Press.	426
O_2 Preheat, °F	418
Gas Preheat, °F	698
Reactor Press.	419
Steam Back Press.	694
Temperatures, °F	
Heater Outlet	211
Catalyst #1	637
#2	632
#3	664
#4	642
#5	
Average	644
Product Separator	71

DISTILLATIONS	ASTM				Hempel Dist.		
					°F	%	A.P.I.
Prod.	Naph						
A.P.I.	56.7				to 400	71.6	56.7
I.B.P.	106				400-550	19.3	37.9
5%					550+	9.1	
10%	138						
20	171						
30	193						
40	216						
50	238						
60	260						
70	287						
80	320						
90	353						
95	383						
E.P.	403						
Rec.	97.5						
Res.	1.5						
Loss.	1.0						

WATER	
Temp.	%
200	
203	
208	

X-Ray Diffraction on Catalyst

$Fe_{20}C_9$	30%
Fe_3O_4	60%
Fe	10%

CATALYST DATA	
In Reactor at Start of Period	688
Fresh Catalyst Charged	193
Catalyst Recharged	
Total	
Catalyst Taken Out	97
In Reactor at End of Period	784
Reactor d-P, H_2O	
Pounds in Reactor	1074
Density, lbs./cu. ft.	146
Bed Height, Feet	11.15
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	15.37
V/hr/V	2243

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	15.6	80+	
100	419-150	65.4	80-40	
150	149-105	11.6	40-20	
200	104-74	5.6	20-10	
250	73-62	0.5	10-0	
325	61-44	0.4		
<325	43-0	0.9		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated	155		% Fe	71.3
Settled	158		% C	6.18
Compacted	177		% Oil	0.9(ext)
Sp. Grav.	4.7		Specific Surface	
% K_2O	0.23			m^2/gm
% H_2	0.26			
K_2O/100 Fe 0.32			<$1m^2/g$ N_2 ads.	

NATURAL GAS	%
CO_2	1.98
CH_4	84.40
C_2H_6	8.48
C_3H_8	3.62
C_4H_{10}	0.18
N_2	1.09
O_2	0.25
MW	19.0468

PRODUCT INSPECTION						
		Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	42.4	43.0				
Sap. No.	48.9	43.9				
Hydrox. No.						
Bromine No.	87					
% Fe						
% Alc		10.0				
°API	50.2	10.6				

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		9.790			19.580
CO_2		0.290	0.29		0.580
CH_4		12.344	12.34	49.376	
C_2H_6		1.240	2.48	7.440	
C_3H_8		0.530	1.59	4.240	
C_4H_{10}		0.026	0.10	0.260	
N_2		0.159			
Total			16.81	61.316	20.160

OUT	Mol %	m/hr	C	H	O
CO_2		1.077	1.1		2.2
CO		15.477	15.5	-	15.5
CH_4		0.393	0.4	1.572	
H_2		26.430		52.860	
N_2		0.174			
H_2O				5.970	3.0
Total		43.552	17.0	60.402	20.6
Balance			100.8	98.50	102.3

	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	35.537	15.477	433.51	17.18	3.02	84.5	3.505	98.16	7.528	23.005	26.33	11.033	15.55
H2	60.687	26.430	53.28	51.04	8.97	18.1	10.412	21.00	22.367	48.797	55.85	32.779	46.19
CO2	2.473	1.077	47.40	19.25	3.38	148.8	3.926	172.79	8.434	9.511	10.89	12.360	17.42
N2	0.400	0.174	4.87	0.84	0.15	4.2	0.172	4.82	0.369	0.543	0.62	0.541	0.76
CH4	0.903	0.393	6.30	6.07	1.07	17.1	1.239	19.88	2.661	3.054	3.50	3.900	5.50
C2H4				1.53	0.27	7.5	0.311	8.73	0.669	0.669	0.77	0.980	1.38
C2H6				0.55	0.10	2.9	0.113	3.39	0.241	0.241	0.28	0.354	0.50
C3H6				1.64	0.29	12.2	0.336	14.12	0.719	0.719	0.82	1.055	1.49
C3H8				0.10	0.02	0.8	0.020	0.87	0.042	0.042	0.05	0.062	0.09
C4H8				0.10	0.17	9.7	0.201	11.28	0.432	0.432	0.49	0.633	0.89
C4H10				0.24	0.04	2.4	0.049	2.83	0.103	0.103	0.12	0.152	0.21
C5H10				0.43 0.06	0.08 0.01	5.3 0.7	0.088 0.012	6.19 0.84	0.189 0.024	0.189 0.024	0.22 0.03	0.277 0.036	0.39 0.05
C6H12				0.08	0.02	1.3	0.017	1.46	0.036	0.036	0.04	0.053	0.07
OIL												0.476	0.67
WATER												6.274	8.84
TOTAL		43.552	545.36		17.57	315.5	20.398	366.36	43.821	87.365		70.964	
H2+CO		41.907			11.98		13.917		29.895				
H2/CO		1.71			2.97		2.97		2.97	2.12		2.97	

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	-11.972	-11.972	22.65			-11.972				
H2	-16.018			-32.04						
CO2	2.849	2.849	18.41			5.698				
N2	- 0.002									
CH4	0.846	0.846	5.47	3.38						
C2H4	0.311	0.622	4.02	1.24						72.03
C2H6	0.113	0.226	1.46	0.68						
C3H6	0.336	1.008	6.51	2.02			14.12 12.71	4.32 6.25	3.27 2.03	94.20
C3H8	0.020	0.060	0.39	0.16			0.87	4.24	0.21	
C4H8	0.201	0.804	5.19	1.61			11.28 10.72	5.00 6.10	2.26 1.76	79.94
C4H10	0.049	0.196	1.27	0.49			2.83	4.86	0.58	
C5H10	0.088 0.012	0.440 0.060	2.84 0.39	0.88 0.12			7.03	5.45	1.29	
C6H12	0.017	0.102	0.66	0.20			1.46	5.5	0.27	
OIL		4.759	30.75	9.52			66.67	6.48	10.28	
WATER				11.74		5.869 6.274				
TOTAL	-23.150						101.42		16.21	
H2+CO	-27.990									
H2/CO	1.338									

ULTIMATE YIELDS	% C0 Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	10.944	25.70	1.618	27.360			
C3+	47.995	104.26	6.564	110.997			
C4+	41.096	89.27	5.620	95.034			
Ult. Oil		101.42	6.385	107.970	16.211	1.020	144.126
C02	18.407	125.39	7.895	133.504			
H20		113.03	7.116	120.331			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	315.49		366.36
Oil	63.96		63.96
Water	115.04		115.04
Total	494.49	90.67	545.36

EFFLUENT RATIOS	
H2/H20	5.224
C02/C0	1.120
(H2) (C02) / (H20) (C0)	5.850

CONTRACTION:	53.16
C0 Conversion:	77.35
H2 Conversion:	60.61
H_2+C0= 66.79	

H_2+C0= 15883 SCFH

	#/hr	#/M	Gal/hr	GPM
C_3-C_5	37.59	2.367	7.88	0.496
Reo Oil	63.96	4.027	9.86	0.621
WSC	11.50	0.724	1.38	0.087
	113.05	7.118	19.12	1.204
H_2O	103.54	6.519	12.41	0.781

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 46 U From Hr. 0700 to Hr. 0700 Hrs. 465-489

FLOWS	SCFH	%
Oxygen	3653	
Nat. Gas	5560	
Total		
Fresh Feed	16364	
F. F. by C		
Avg. F. F.		
Wet Gas	6291	
Contraction		
Recycle	16086	
Bleed	1002	
Total	17088	
Total Feed	33452	
Recycle/F.F.	1.04	
Inlet Vel.	1.01	
Steam Flow		

RUN CONDITIONS	
Generator Press.	422
O_2 Preheat, °F	410
Gas Preheat, °F	695
Reactor Press.	413
Steam Back Press.	717
Temperatures, °F	
Heater Outlet	203
Catalyst #1	637
#2	631
#3	660
#4	634
#5	
Average	640
Product Separator	68

DISTILLATIONS	ASTM
Prod.	Naph
A.P.I.	56.5
I.B.P.	102
5%	
10%	136
20	166
30	192
40	216
50	240
60	261
70	288
80	312
90	358
95	386
E.P.	400
Rec.	97.5
Res.	1.5
Loss.	1.0

Hempel Dist. °F	%	A.P.I.
to 400	72.3	56.5
400-550	17.0	38.1
550+	11.7	

WATER Temp.	%
200	
203	
208	

CATALYST DATA	
In Reactor at Start of Period	784
Fresh Catalyst Charged	180
Catalyst Recharged	
Total	
Catalyst Taken Out	206
In Reactor at End of Period	758
Reactor d-P, H_2O	
Pounds in Reactor	1034
Density, lbs./cu. ft.	127
Bed Height, Feet	12.33
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	
V/hr/V	2011

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	16.4	80+	
100	419-150	61.0	80-40	
150	149-105	11.3	40-20	
200	104-74	7.5	20-10	
250	73-62	0.4	10-0	
325	61-44	0.8		
<325	43-0	2.6		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated	154		% Fe	
Settled	156		% C	
Compacted	175		% Oil	
Sp. Grav.	4.7		Specific Surface	
				m^2/gm
			7.8	ml.NH_3/gm

NATURAL GAS	%
CO_2	2.35
CH_4	83.44
C_2H_6	8.50
C_3H_8	3.75
C_4H_{10}	0.19
N_2	1.46
O_2	0.31
MW	19.2477

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	44.2	41.6			
Sap. No.	46.9	43.3			
Hydrox. No.					
Bromine No.	89				
% Fe					
% Alc		10.0			
°API	50.2	10.6			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		9.683			19.366
CO_2		0.345	0.35		0.690
CH_4		12.241	12.24	48.964	
C_2H_6		1.247	2.49	7.482	
C_3H_8		0.550	1.65	4.400	
C_4H_{10}		0.028	0.11	0.280	
N_2		0.214			
Total			16.84	61.126	20.056

OUT	Mol %	m/hr	C	H	O
CO_2		0.905	0.9		1.8
CO		15.488	15.5		15.5
CH_4		0.583	0.6	2.332	
H_2		26.002		52.004	
N_2		0.199			
H_2O				6.152	3.1
Total		43.177	17.0	60.488	
Balance			100.8	98.96	101.6

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	Measured m/hr	Measured #/hr	At Wt. Balance m/hr	At Wt. Balance #/hr	RECYCLE m/hr	COMB. FEED m/hr	COMB. FEED %	EFFLUENT m/hr	EFFLUENT %
CO	35.87	15.488	433.82	16.07	2.67	74.79	2.797	78.33	7.253	22.741	25.766	10.050	14.29
H2	60.223	26.002	52.42	48.84	8.11	16.35	8.492	17.12	22.022	48.024	54.413	30.514	43.38
CO2	2.097	0.905	39.83	20.81	3.45	152.01	3.618	159.21	9.382	10.287	11.655	13.000	18.48
N2	0.460	0.199	5.58	1.01	0.17	4.71	0.176	4.93	0.455	0.654	0.741	0.631	0.90
CH4	1.350	0.583	9.35	7.41	1.23	19.73	1.288	20.66	3.339	3.922	4.443	4.627	6.58
C2H4				1.51	0.25	7.04	0.263	7.37	0.680	0.680	0.770	0.943	1.34
C2H6				0.57	0.10	2.86	0.100	3.00	0.256	0.256	0.290	0.356	0.51
C3H6				1.51	0.25	10.56	0.263	11.06	0.682	0.682	0.772	0.945	1.34
C3H8				0.24	0.04	1.76	0.042	1.84	0.109	0.109	0.123	0.151	0.21
C4H8				1.06	0.18	9.87	0.184	10.34	0.479	0.479	0.542	0.663	0.94
C4H10				0.25	0.04	2.44	0.044	2.56	0.114	0.114	0.129	0.158	0.22
C5H10				0.47 0.12	0.08 0.02	5.47 1.44	0.082 0.021	5.73 1.51	0.210 0.055	0.210 0.055	0.237 0.062	0.292 0.076	0.42 0.11
C6H12				0.10	0.02	1.43	0.018	1.50	0.045	0.045	0.050	0.063	0.09
OIL												0.610	0.87
WATER												7.265	10.33
TOTAL		43.177	541.00		16.60	310.46	17.387	325.17	45.087	88.258		70.343	
H2+CO		41.490			10.78		11.289		29.275				
H2/CO		1.68			3.04		3.04		3.04	2.11		3.04	

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	-12.691	-12.691	18.059			-12.691				
H2	-17.510			-35.020						
CO2	2.713	2.713	17.516			5.426				
N2	- 0.023									
CH4	0.705	0.705	4.551	2.820						
C2H4	0.263	0.526	3.396	1.052						71.07
C2H6	0.100	0.200	1.291	0.600						
C3H6	0.263	0.789	5.094	1.578			11.06 9.95	4.32 6.25	2.56 1.59	85.74
C3H8	0.042	0.126	0.813	0.336			1.94	4.24	0.43	
C4H8	0.184	0.736	4.752	1.472			10.34 9.82	5.00 6.1	2.07 1.61	80.16
C4H10	0.044	0.176	1.136	0.44			2.56	4.86	0.53	
C5H10	0.082 0.021	0.410 0.105	2.647 0.677	0.82 0.21			7.24	5.45	1.33	
C6H12	0.018	0.108	0.697	0.216			1.50	5.5	0.27	
OIL		6.097	39.365	12.194			85.42	6.48	13.17	
WATER				13.282		6.641 7.265				
TOTAL	-25.789						116.49		18.50	
H2+CO	-30.201									
H2/CO	1.379									

ULTIMATE YIELDS	% C0 Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	9.238	21.68	1.379	23.318			
C3+	55.181	119.96	7.628	128.989			
C4+	49.274	107.06	6.808	115.123			
Ult. Oil		116.49	7.407	125.252	18.503	1.1766	166.25
C02	17.516	119.38	7.592	128.380			
H20		130.89	8.323	140.741			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	310.46		325.17
Oil	63.65		63.65
Water	152.18		152.18
Total	526.29	97.28	541.00

EFFLUENT RATIOS	
H2/H20	4.200
C02/C0	1.293
(H2) (C02) / (H20) (C0)	5.430

CONTRACTION: 59.73

C0 Conversion: 81.94

H2 Conversion: 67.34

H_2+C0= 72.79

H_2+C0= 15725 SCFH

	#/hr	#/M	gal/hr	GPM
C_3-C_5	34.54	2.197	7.19	0.457
Rec 01	163.65	4.048	9.82	0.624
WSC	15.22	0.968	1.82	0.116
	113.41	7.212	18.83	1.197
H_2O	136.96	8.710	16.42	1.044

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 46 V From Hr. 0700 to Hr. 0700 Hrs. 489-513

FLOWS	SCFH	%
Oxygen	3620	
Nat. Gas	5542	
Total		
Fresh Feed	16304	
F. F. by C		
Avg. F. F.		
Wet Gas	6444	
Contraction		
Recycle	16568	
Bleed	1009	
Total	17577	
Total Feed	33881	
Recycle/F.F.	1.08	
Inlet Vel.	1.02	
Steam Flow		

RUN CONDITIONS	
Generator Press.	417
O_2 Preheat, °F	379
Gas Preheat, °F	681
Reactor Press.	409
Steam Back Press.	719
Temperatures, °F	
Heater Outlet	194
Catalyst #1	636
#2	630
#3	656
#4	641
#5	633
Average	639.20
Product Separator	70

DISTILLATIONS	ASTM				Hempel Dist. °F	%	A.P.I.
Prod.	Naph						
A.P.I.	56.5				to 400	72.0	56.5
I.B.P.	100				400-550	17.3	38.5
5%					550+	11.7	
10%	136						
20	167						
30	191				WATER		
40	216				Temp.	%	
50	240				200		
60	262				203		
70	290				208		
80	320						
90	354						
95	386						
E.P.	403						
Rec.	97.5						
Res.	1.5						
Loss.	0.0						

CATALYST DATA	
In Reactor at Start of Period	758
Fresh Catalyst Charged	173
Catalyst Recharged	
Total	
Catalyst Taken Out	319
In Reactor at End of Period	612
Reactor d-P, H_2O	
Pounds in Reactor	957
Density, lbs./cu. ft.	132
Bed Height, Feet	10.99
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	17.04
V/hr/V	2250

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	14.2	80+	
100	419-150	65.8	80-40	
150	149-105	11.9	40-20	
200	104-74	6.4	20-10	
250	73-62	0.4	10-0	
325	61-44	0.1		
<325	43-0	1.1		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated	151		% Fe	
Settled	152		% C	
Compacted	172		% Oil	
Sp. Grav.	4.6		Specific Surface	
				m^2/gm
			8.5	ml.NH_3/gm

NATURAL GAS	%
CO_2	1.77
CH_4	83.38
C_2H_6	9.08
C_3H_8	4.25
C_4H_{10}	0.25
N_2	1.01
O_2	0.26
MW	19.270

PRODUCT INSPECTION		Oil	Water	Product	Pour °F	SUS @ °F
	Neut. No.	44.7	42.5			
	Sap. No.	48.4	43.9			
	Hydrox. No.					
	Bromine No.	89.3				
	% Fe					
	% Alc		10.0			
	°API	50.1	10.5			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		9.589			19.178
CO_2		0.259	0.26		0.518
CH_4		12.192	12.19	48.768	
C_2H_6		1.328	2.66	7.968	
C_3H_8		0.621	1.86	4.968	
C_4H_{10}		0.037	0.15	0.370	
N_2		0.148			
Total			17.12	62.074	19.696

OUT	Mol %	m/hr	C	H	O
CO_2		0.939	0.94		1.9
CO		15.223	15.22		15.2
CH_4		0.795	0.80	3.180	
H_2		25.911		51.822	
N_2		0.151			
H_2O				6.130	3.1
Total		43.018	16.96	61.132	20.2
Balance			99.06	98.48	102.4

	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	35.39	15.223	426.40	18.170	3.090	86.55	3.567	99.92	8.426	23.549	26.456	11.993	16.5
H2	60.23	25.911	52.24	49.827	8.473	17.08	9.782	19.72	23.107	49.018	54.836	32.889	45.2
CO2	2.18	0.939	41.33	18.617	3.166	139.34	3.655	160.87	8.633	9.572	10.708	12.288	16.9
N2	0.35	0.151	4.23	0.257	0.044	1.23	0.051	1.42	0.119	0.270	0.302	0.170	0.2
CH4	1.85	0.795	12.75	7.903	1.344	21.56	1.552	24.89	3.665	4.460	4.989	5.217	7.2
C2H4				1.770	0.301	8.44	0.348	9.74	0.820	0.820	0.917	1.168	1.6
C2H6				0.527	0.090	2.71	0.104	3.13	0.244	0.244	0.272	0.348	0.5
C3H6				1.373	0.233	9.80	0.269	11.31	0.636	0.636	0.711	0.905	1.2
C3H8				0.030	0.005	0.22	0.006	0.25	0.013	0.013	0.014	0.019	0.0
C4H8				0.847	0.144	8.08	0.166	9.33	0.392	0.392	0.438	0.558	0.8
C4H10				0.193	0.033	1.92	0.038	2.22	0.089	0.089	0.099	0.127	0.2
C5H10				0.360 0.043	0.061 0.007	4.28 0.51	0.070 0.008	4.94 0.59	0.166 0.019	0.166 0.019	0.185 0.021	0.236 0.027	0.3 0.0
C6H12				0.083	0.014	1.18	0.016	1.36	0.038	0.038	0.042	0.054	0.1
OIL												0.515	0.7
WATER												6.224	8.6
TOTAL		43.018	536.95		17.004	302.90	19.632	349.71	46.375	89.386		72.738	
H2+CO		41.134			11.563		13.349		31.533				
H2/CO		1.70			2.74		2.74		2.74	2.07		2.74	

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	-11.656	-11.656	23.431			-11.656				
H2	-16.129			-32.258						
CO2	2.716	2.716	17.841			5.432				
N2	- 0.100									
CH4	0.757	0.757	4.972	3.028						
C2H4	0.348	0.696	4.572	1.392						75.68
C2H6	0.104	0.208	1.366	0.624						
C3H6	0.269	0.807	5.301	1.614			11.31 10.18	4.32 6.25	2.62 1.63	98.00
C3H8	0.006	0.018	0.118	0.048			0.25	4.24	0.06	
C4H8	0.166	0.664	4.361	1.328			9.33 8.86	5.00 6.10	1.87 1.45	81.50
C4H10	0.038	0.152	0.998	0.38			2.22	4.86	0.46	
C5H10	0.070 0.008	0.350 0.040	2.299 0.262	0.70 0.08			5.53	5.45	1.02	
C6H12	0.016	0.096	0.630	0.192			1.36	5.5	0.25	
OIL		5.152	33.843	10.304			72.18	6.49	11.12	
WATER				12.568		6.284 6.224				
TOTAL	-23.387						100.33		15.92	
H2+CO	-27.785									
H2/CO	1.38									

ULTIMATE YIELDS	% C0 Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	10.91	25.01	1.604	27.123			
C3+	47.812	102.18	6.554	110.828			
C4+	42.393	90.62	5.812	98.280			
Ult. Oil		100.33	6.435	108.815	15.924	1.021	144.267
C02	17.841	119.54	7.668	129.665			
H20		112.13	7.192	121.616			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	302.90		349.71
Oil	60.96		60.96
Water	126.28		126.28
Total	490.14	91.28	536.95

EFFLUENT RATIOS	
H2/H20	5.284
C02/C0	1.024
(H2) (C02) / (H20) (C0)	5.410

CONTRACTION:	54.36
C0 Conversion:	76.57
H2 Conversion:	62.25
H_2+C0=	67.55

H_2+C0= 15590 SCFH

	#/hr	#/M	gal/hr	GPM
C_3-C_5	30.00	1.924	6.28	0.403
Rec Oil	60.96	3.910	9.40	0.603
WSC	12.63	0.810	1.51	0.097
	103.59	6.644	17.19	1.103
H_2O	113.65	7.290	13.63	0.874

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 46 W From Hr. 0700 to Hr. 0700 Hrs. 513-537

FLOWS	SCFH	%
Oxygen	3729	
Nat. Gas	5566	
Total		
Fresh Feed	16395	
F. F. by C		
Avg. F. F.		
Wet Gas	6521	
Contraction		
Recycle	16442	
Bleed	1002	
Total	17444	
Total Feed	33839	
Recycle/F. F.	1.06	
Inlet Vel.	1.02	
Steam Flow		

RUN CONDITIONS	
Generator Press.	420
O_2 Preheat, °F	388
Gas Preheat, °F	689
Reactor Press.	417
Steam Back Press.	713
Temperatures, °F	
Heater Outlet	196
Catalyst #1	639
#2	634
#3	655
#4	638
#5	634
Average	640
Product Separator	68

DISTILLATIONS	ASTM					Hempel Dist.		
						°F	%	A.P.I.
Prod.	Naph							
A.P.I.	56.2					to 400	72.0	56.2
I.B.P.	104					400-550	15.6	38.7
5%						550+	12.4	
10%	136							
20	166							
30	190							
40	213							
50	237							
60	262							
70	292							
80	321							
90	354							
95	380							
E.P.	400							
Rec.	98							
Res.	1.5							
Loss.	0.5							

WATER	
Temp.	%
200	
203	
208	

CATALYST DATA	
In Reactor at Start of Period	612
Fresh Catalyst Charged	169
Catalyst Recharged	
Total	
Catalyst Taken Out	98
In Reactor at End of Period	683
Reactor d-P, H_2O	
Pounds in Reactor	1101
Density, lbs./cu. ft.	159
Bed Height, Feet	10.49
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	14.86
V/hr/V	2368

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	21.2	80+	
100	419-150	64.4	80-40	
150	149-105	9.9	40-20	
200	104-74	3.4	20-10	
250	73-62	0.4	10-0	
325	61-44	0.1		
<325	43-0	0.6		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated	133		% Fe	
Settled	134		% C	
Compacted	150		% Oil	
Sp. Grav.	4.4		Specific Surface	
				m^2 gm
			10.1	ml.NH_3/gm

NATURAL GAS	%
CO_2	1.82
CH_4	84.00
C_2H_6	9.04
C_3H_8	4.13
C_4H_{10}	0.21
N_2	0.69
O_2	0.11
MW	19.166

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	49.1	44.3			
Sap. No.	48.9	43.9			
Hydrox. No.					
Bromine No.	86.9				
% Fe					
% Alc		10.0			
°API	49.9	10.6			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		9.855			19.710
CO_2		0.267	0.27		0.534
CH_4		12.336	12.34	49.344	
C_2H_6		1.328	2.66	7.968	
C_3H_8		0.606	1.82	4.848	
C_4H_{10}		0.031	0.12	0.310	
N_2		0.101			
Total			17.20	62.470	20.244

OUT	Mol %	m/hr	C	H	O
CO_2		0.970	1.0		1.9
CO		15.635	15.6		15.6
CH_4		0.622	0.6	2.488	
H_2		25.888		51.776	
N_2		0.144			
H_2O				6.772	3.4
Total		43.259	17.2		20.8
Balance			100.2	97.70	103.5

	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	36.14	15.635	437.94	17.82	3.07	85.88	3.501	98.07	8.200	23.835	26.695	11.701	16.12
H2	59.84	25.888	52.19	49.97	8.60	17.33	9.819	19.79	22.999	48.887	54.753	32.818	45.20
CO2	2.24	0.970	42.69	19.54	3.36	148.01	3.840	169.02	8.995	9.965	11.161	12.835	17.68
N2	0.33	0.144	4.03	0.47	0.08	2.24	0.091	2.56	0.215	0.359	0.402	0.306	0.42
CH4	1.44	0.622	9.98	6.79	1.17	18.74	1.334	21.40	3.124	3.746	4.196	4.458	6.14
C2H4				1.15	0.20	5.53	0.225	6.31	0.528	0.528	0.591	0.753	1.04
C2H6				0.63	0.11	3.25	0.123	3.71	0.290	0.290	0.325	0.413	0.57
C3H6				1.48	0.26	10.73	0.291	12.25	0.683	0.683	0.765	0.974	1.34
C3H8				0.60	0.10	4.54	0.118	5.18	0.276	0.276	0.309	0.394	0.54
C4H8				0.92	0.16	8.86	0.180	10.12	0.422	0.422	0.473	0.602	0.83
C4H10				0.18	0.03	1.80	0.035	2.06	0.084	0.084	0.094	0.119	0.16
C5H10				0.37	0.06	4.49	0.073	5.13	0.172	0.172	0.193	0.245	0.34
C6H12				0.08	0.01	1.18	0.016	1.35	0.038	0.038	0.043	0.054	0.07
OIL												0.531	0.73
WATER												6.394	8.81
TOTAL		43.259	546.83		17.21	312.58	19.650	356.96	46.025	89.285		72.597	
H2+CO		41.523			11.66		13.320		31.199				
H2/CO		1.66			2.80		2.80		2.80	2.05		2.80	

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	-12.134	-12.134	22.39			-12.134				
H2	-16.069			32.138						
CO2	2.870	2.870	18.36			5.740				
N2	- 0.053									
CH4	0.712	0.712	4.55	2.848						
C2H4	0.225	0.450	2.88	0.900						62.97
C2H6	0.123	0.246	1.57	0.738						
C3H6	0.291	0.873	5.58	1.746			12.25 11.03	4.32 6.25	2.84 1.76	70.28
C3H8	0.118	0.354	2.26	0.944			5.18	4.24	1.22	
C4H8	0.180	0.720	4.61	1.440			10.12 9.61	5.0 6.1	2.02 1.58	83.09
C4H10	0.035	0.140	0.90	0.350			2.06	4.85	0.42	
C5H10	0.073	0.365	2.34	0.73			5.15	5.45	0.94	
C6H12	0.016	0.096	0.61	0.192			1.35	5.5	0.25	
OIL		5.308	33.95	10.616			74.37	6.49	11.45	
WATER				11.634		5.817 6.394				
TOTAL	23.613						103.57		16.40	
H2+CO	28.203									
H2/CO	1.32									

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	9.005	21.44	1.362	23.031			
C3+	50.246	110.46	7.019	118.691			
C4+	42.398	93.03	5.911	99.955			
Ult. Oil		103.57	6.581	111.285	16.401	1.042	147.235
C02	18.356	126.33	8.027	135.737			
H20		115.19	7.320	123.781			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	312.58		356.96
Oil	61.81		61.81
Water	128.06		128.06
Total	502.45	91.88	546.83

EFFLUENT RATIOS	
H2/H20	5.133
C02/C0	1.097
(H2) (C02) / (H20) (C0)	5.631

CONTRACTION:	54.58
C0 Conversion:	77.61
H2 Conversion:	62.07

H_2+C0= 67.92

H_2+C0= 15737 SCFH

	#/hr	#/M	gal/hr	GPM
C_3-C_5	36.09	2.293	7.69	0.489
Rec Oil	161.81	3.928	9.52	0.605
WSC	12.81	0.814	1.54	0.098
	110.71	7.035	18.75	1.191
H_2O	115.25	7.323	13.82	0.878

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 46-X-1 From Hr. 1000 to Hr. 1600 Hrs. 540-546

FLOWS	SCFH	%
Oxygen	3836	
Nat. Gas	5664	
Total		
Fresh Feed	16874	
F. F. by C		
Avg. F. F.		
Wet Gas	5941	
Contraction		
Recycle	24221	
Bleed	986	
Total	25207	
Total Feed	42081	
Recycle/F.F.	1.49	
Inlet Vel.	1.27	
Steam Flow		

RUN CONDITIONS	
Generator Press.	434
O_2 Preheat, °F	391
Gas Preheat, °F	652
Reactor Press.	425
Steam Back Press.	788
Temperatures, °F	
Heater Outlet	338
Catalyst #1	653
#2	653
#3	674
#4	637
#5	657
Average	654.8
Product Separator	85

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

CATALYST DATA	
In Reactor at Start of Period	683
Fresh Catalyst Charged	
Catalyst Recharged	
Total	
Catalyst Taken Out	67
In Reactor at End of Period	616
Reactor d-P, H_2O	
Pounds in Reactor	970
Density, lbs./cu. ft.	151
Bed Height, Feet	9.73
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	17.39
V/hr/V	2628

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

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

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

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

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

	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	35.41	15.766	441.61	18.50	2.900	81.23	3.234	90.58	12.304	28.070	25.28	15.538	16.68
H2	60.89	27.111	54.66	46.39	7.272	14.66	8.109	16.35	30.854	57.965	52.20	38.963	41.83
CO2	2.19	0.975	42.91	20.34	3.188	140.30	3.555	156.45	13.528	14.503	13.06	18.058	19.39
N2	0.37	0.165	4.62	0.72	0.113	3.17	0.126	3.53	0.478	0.643	0.58	0.604	0.65
CH4	1.14	0.508	8.15	7.64	1.198	19.22	1.336	21.43	5.081	5.589	5.03	6.417	6.89
C2H4				1.84	0.288	8.08	0.321	9.01	1.223	1.223	1.10	1.544	1.66
C2H6				0.66	0.103	3.10	0.115	3.46	0.438	0.438	0.39	0.553	0.59
C3H6				1.74	0.273	11.49	0.304	12.81	1.157	1.157	1.04	1.461	1.57
C3H8													
C4H8				1.12	0.176	9.87	0.196	11.01	0.744	0.744	0.67	0.940	1.01
C4H10				0.33	0.052	3.02	0.580	3.37	0.219	0.219	0.20	0.799	0.86
C5H10				0.50 0.08	0.078 0.013	5.47 0.94	0.087 0.014	6.10 1.05	0.332 0.053	0.332 0.053	0.30 0.05	0.419 0.067	0.45 0.07
C6H12				0.14	0.022	1.85	0.025	2.06	0.093	0.093	0.08	0.118	0.13
OIL												0.358	0.38
WATER												7.306	7.84
TOTAL		44.524	551.95		15.676	302.40	17.480	337.18	66.510	111.029		93.145	
H2+CO		42.877			10.172		11.343		43.158				
H2/CO		1.719			2.51		2.51		2.51	2.065		2.51	

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	-12.532	-12.532	20.516			-12.532				
H2	-19.002			-38.004						
CO2	2.580	16.364				5.160				
N2	- 0.039									
CH4	0.828	0.828	5.251	3.31						
C2H4	0.321	0.642	4.072	1.284						72.25
C2H6	0.115	0.230	1.458	0.690						
C3H6	0.304	0.912	5.784	1.824			12.81 11.53	4.32 6.25	2.97 1.84	100.00
C3H8										
C4H8	0.196	0.784	4.972	1.568			11.01 10.46	5.00 6.10	2.20 1.71	
C4H10	0.580	2.320	14.715	5.80			3.37	4.86	0.69	
C5H10	0.087 0.014	0.435 0.070	2.759 0.443	0.87 0.14			7.15	5.45	1.31	
C6H12	0.025	0.150	0.951	0.30			2.06	5.5	0.37	
OIL		3.581	22.713	7.162			50.17	6.53	7.69	
WATER				15.054		7.527 7.372				
TOTAL	-26.523						84.74		12.67	
H2+CO	-31.534									
H2/CO	1.52									

ULTIMATE YIELDS	% C0 Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	10.781	25.75	1.585	26.802			
C3+	46.553	86.57	5.327	90.079			
C4+	41.581	73.76	4.539	76.754			
Ult. Oil		84.74	5.215	88.186	12.671	0.7797	110.172
C02	16.364	113.54	6.987	118.150			
H20		132.81	8.173	138.205			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	302.38		337.18
Oil	68.52		68.52
Water	146.25		146.25
Total	517.17	93.70	551.95

EFFLUENT RATIOS	
H2/H20	5.333
C02/C0	1.162
(H2) (C02)/(H20) (C0)	6.196

CONTRACTION: 60.74

C0 Conversion: 79.49

H2 Conversion: 70.09

H_2+C0= 73.55

H_2+C0= 16250 SCFH

	#/hr	#/M	gal/hr	GPM
C_3-C_5	36.40	2.240	7.54	0.464
Rec Oil	68.52	4.217	10.50	0.646
WSC	14.62	0.900	1.75	0.108
	119.54	7.357	19.79	1.218
H_2O	131.63	8.100	15.76	0.971

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 46-X-2 From Hr. 1600 to Hr. 0700 Hrs. 546-561

FLOWS	SCFH	%
Oxygen	3923	
Nat. Gas	5682	
Total		
Fresh Feed	17250	
F. F. by C		
Avg. F. F.		
Wet Gas	6769	
Contraction		
Recycle	16267	
Bleed	1013	
Total	17280	
Total Feed	34530	
Recycle/F.F.	1.00	
Inlet Vel.	1.04	
Steam Flow		

RUN CONDITIONS	
Generator Press.	426
O_2 Preheat, °F	384
Gas Preheat, °F	687
Reactor Press.	418
Steam Back Press.	808
Temperatures, °F	
Heater Outlet	347
Catalyst #1	699
#2	699
#3	718
#4	690
#5	682
Average	697.6
Product Separator	65

DISTILLATIONS	ASTM	Hempel Dist. °F	%	A.P.I.
Prod.	Naph			
A.P.I.	55.0	to 400	73.0	55.0
I.B.P.	104	400-550	19.3	34.8
5%		550+	7.7	
10%	140			
20	167			
30	190			
40	214			
50	240			
60	261			
70	292			
80	319			
90	358			
95	388			
E.P.	408			
Rec.	97.5			
Res.	1.5			
Loss	1.0			

WATER	
Temp.	%
200	
203	
208	

CATALYST DATA	
In Reactor at Start of Period	616
Fresh Catalyst Charged	
Catalyst Recharged	
Total	
Catalyst Taken Out	33
In Reactor at End of Period	583
Reactor d-P, H_2O	
Pounds in Reactor	880
Density, lbs./cu. ft.	133
Bed Height, Feet	10.02
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	19.60
V/hr/V	2608

CATALYST ANALYSIS

Particle Size: Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	12.2	80+	
100	419-150	64.9	80-40	
150	149-105	11.7	40-20	
200	104-74	5.3	20-10	
250	73-62	1.0	10-0	
325	61-44	0.1		
<325	43-0	4.8		

Density, lbs./cu. ft.		Chem. Anal.	
Aerated	152	% Fe	
Settled	156	% C	
Compacted	171	% Oil	
Sp. Grav.	4.6	Specific Surface	
		m^2 gm	
		8.1	ml.NH_3/gm

NATURAL GAS	%
CO_2	2.10
CH_4	84.53
C_2H_6	8.60
C_3H_8	3.62
C_4H_{10}	0.21
N_2	0.79
O_2	0.15
MW	19.0579

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	44.1	42.9			
Sap. No.	48.4	44.2			
Hydrox. No.					
Bromine No.	80				
% Fe					
% Alc		10.0			
°API	49.0	10.4			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		10.373			20.746
CO_2		0.315	0.32		0.630
CH_4		12.673	12.67	50.692	
C_2H_6		1.289	2.58	7.734	
C_3H_8		0.543	1.63	4.344	
C_4H_{10}		0.031	0.12	0.310	
N_2		0.118			
Total			17.32	63.080	21.376

OUT	Mol %	m/hr	C	H	O
CO_2		1.029	1.0		2.1
CO		16.303	16.3		16.3
CH_4		0.191	0.2	0.764	
H_2		27.828		55.656	
N_2		0.164			
H_2O				6.354	3.2
Total		45.515	17.5	62.774	21.5
Balance			101.2	99.51	100.7

	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	35.82	16.303	456.65	18.56	3.315	92.87	3.784	106.01	8.462	24.765	27.180	12.246	17.6
H2	61.14	27.828	56.10	50.85	9.081	18.31	10.366	20.90	23.185	51.013	55.987	33.551	48.3
CO2	2.26	1.029	45.29	18.98	3.390	149.19	3.870	170.30	8.654	9.683	10.627	12.524	18.0
N2	0.36	0.164	4.59	0.30	0.054	1.51	0.062	1.72	0.137	0.301	0.330	0.199	0.3
CH4	0.42	0.191	3.06	5.88	1.050	16.84	1.199	19.22	2.681	2.872	3.152	3.880	5.6
C2H4				1.59	0.284	7.97	0.324	9.10	0.725	0.725	0.796	1.049	1.5
C2H6				0.56	0.100	3.01	0.114	3.43	0.255	0.255	0.280	0.369	0.5
C3H6				1.49	0.266	11.19	0.304	12.77	0.679	0.679	0.745	0.983	1.4
C3H8				0.12	0.021	0.93	0.024	1.06	0.055	0.055	0.060	0.079	0.1
C4H8				0.94	0.168	9.43	0.192	10.76	0.429	0.429	0.471	0.621	0.9
C4H10				0.21	0.038	2.21	0.043	2.52	0.096	0.096	0.105	0.139	0.2
C5H10				0.40 0.05	0.071 0.009	4.98 0.65	0.081 0.010	5.68 0.74	0.182 0.023	0.182 0.023	0.200 0.025	0.263 0.033	0.4 0.1
C6H12				0.07	0.013	1.09	0.015	1.24	0.032	0.032	0.035	0.047	0.1
OIL												0.5325	0.8
WATER												2.913	4.2
TOTAL		45.515	565.69		17.859	320.18	20.386		45.595	91.110		69.429	
H2+CO		44.131			12.396		14.150		31.647				
H2/CO		1.71			2.74		2.74		2.74	2.06		2.74	

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	-12.519	-12.519	23.210			-12.519				
H2	-17.462			-34.924						
CO2	2.841	2.841	17.426			5.682				
N2	- 0.102									
CH4	1.008	1.008	6.183	4.032						
C2H4	0.324	0.648	3.975	1.296						72.6
C2H6	0.114	0.228	1.399	0.684						
C3H6	0.304	0.912	5.594	1.824			12.77 11.49	4.32 6.25	2.96 1.84	92.5
C3H8	0.024	0.072	0.442	0.192			1.06	4.24	0.25	
C4H8	0.192	0.768	4.711	1.536			10.76 10.22	5.0 6.10	2.15 1.68	81
C4H10	0.043	0.172	1.055	0.43			2.52	4.86	0.52	
C5H10	0.081 0.010	0.405 0.050	2.484 0.307	0.81 0.10			6.42	5.45	1.18	
C6H12	0.015	0.090	0.552	0.180			1.24	5.5	0.23	
OIL		5.325	32.662	10.650			74.60	6.53	11.43	
WATER				13.190		6.595 6.837				
TOTAL	-25.127						106.50		16.88	
H2+CO	-29.981									
H2/CO	1.395									

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2 / C0 #/MCF	g/M3	Gal/hr	H2 / C0 Gal/MCF	cc/M3
C1+C2	11.557	28.69	1.715	29.00			
C3+	47.807	109.37	6.539	110.574			
C4+	41.771	95.54	5.712	96.590			
Ult. Oil		106.50	6.367	107.666	16.876	1.009	142.572
C02	17.426	125.01	7.474	126.385			
H20		123.18	7.364	124.525			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	320.18		365.49
Oil	63.14		63.14
Water	137.06		137.06
Total	520.38	91.99	565.69

EFFLUENT RATIOS	
H2/H20	11.52
C02/C0	1.023
(H2) (C02) / (H20) (C0)	11.78

CONTRACTION:	55.21
C0 Conversion:	76.79
H2 Conversion:	62.75
H_2+C0=	67.94

H_2+C0= 16726 SCFH

	#/hr	#/M	gal/hr	GPM
C_3-C_5	34.77	2.079	7.29	0.436
Rec Oil	163.14	3.775	9.68	0.579
WSC	13.71	0.820	1.64	0.098
	111.62	6.674	18.61	1.113
H_2O	123.35	7.375	14.79	0.884

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 46 Y From Hr. 0700 to Hr. 1300 Hrs. 561-580

FLOWS	SCFH	%
Oxygen	3909	
Nat. Gas	5724	
Total		
Fresh Feed	17160	
F. F. by C		
Avg. F. F.		
Wet Gas	6471	
Contraction		
Recycle	16115	
Bleed	1011	
Total	17126	
Total Feed	34286	
Recycle/F.F.	1.00	
Inlet Vel.	1.03	
Steam Flow		

RUN CONDITIONS	
Generator Press.	426
O_2 Preheat, °F	428
Gas Preheat, °F	695
Reactor Press.	417
Steam Back Press.	825
Temperatures, °F	
Heater Outlet	370
Catalyst #1	696
#2	695
#3	716
#4	692
#5	691
Average	698
Product Separator	70

DISTILLATIONS	ASTM				Hempel Dist.		
Prod.	Naph				°F	%	A.P.I.
A.P.I.	53.2				to 400	74.0	53.2
I.B.P.	104				400-550	20.0	33.3
5%					550+	6.0	
10%	139						
20	166						
30	191				WATER		
40	213				Temp.	%	
50	237				200		
60	261				203		
70	290				208		
80	322				X-Ray Diffraction		
90	358				on Catalyst		
95	386				$Fe_{20}C_9$	30%	
E.P.	400				Fe_3O_4	65%	
Rec.	98.0				Fe	5%	
Res.	1.5						
Loss.	0.5						

CATALYST DATA	
In Reactor at Start of Period	583
Fresh Catalyst Charged	120
Catalyst Recharged	
Total	
Catalyst Taken Out	52
In Reactor at End of Period	651
779 lbs. weighed out at end of Run 46	
Reactor d-P, H_2O	
Pounds in Reactor	981
Density, lbs./cu. ft.	135
Bed Height, Feet	11.01
Space Vel. SCFH/lb. cat.	
Inventory Figures	
From d-P Meters	17.49
V/hr/V	2362

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	14.0	80+	
100	419-150	70.9	80-40	
150	149-105	12.6	40-20	
200	104-74	2.0	20-10	
250	73-62	0.3	10-0	
325	61-44	0.1		
<325	43-0	0.1		
Density, lbs./cu. ft			Chem. Anal.	
Aerated	151		% Fe	68.1
Settled	152		% C	7.38
Compacted	179		% Oil	0.2(ext)
Sp. Grav.	4.3		Specific Surface	
% K_2O	0.24		m^2 gm	
% H_2	0.25		8.6	ml.NH_3/gm
K_2O/100 Fe 0.35			<$1m^2$/g N_2 ads.	

NATURAL GAS	%
CO_2	2.10
CH_4	84.53
C_2H_6	8.60
C_3H_8	3.62
C_4H_{10}	0.21
N_2	0.79
O_2	0.15
MW	19.057

PRODUCT INSPECTION						
	Oil	Water	Product	Pour °F	SUS @ °F	
Neut. No.	39.5	40.9				
Sap. No.	53.4	40.0				
Hydrox No.						
Bromine No.	85.3					
% Fe						
% Alc		10.0				
°API	46.6	10.5				

GENERATOR ELEMENTAL BALANCE — IN	Mol %	m/hr	C	H	O
O_2		10.336			20.672
CO_2		0.317	0.32		0.634
CH_4		12.766	12.77	51.064	
C_2H_6		1.299	2.60	7.794	
C_3H_8		0.547	1.64	4.376	
C_4H_{10}		0.032	0.13	0.320	
N_2		0.119			
Total			17.45	63.554	21.306

OUT	Mol %	m/hr	C	H	O
CO_2		0.935	0.9		1.9
CO		16.558	16.6		16.6
CH_4		0.174	0.2	0.690	
H_2		27.456		54.912	
N_2		0.154			
H_2O				6.820	3.4
Total		45.277	17.7	62.428	21.9
Balance			101.2	98.23	102.6

	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	36.57	16.558	463.79	17.15	2.93	81.98	3.265	91.46	7.747	24.305	26.86	11.012	15.2
H2	60.64	27.456	55.35	49.59	8.47	17.07	9.445	19.04	22.406	49.862	55.11	31.851	44.1
CO2	2.07	0.935	41.15	20.21	3.45	151.83	3.849	169.39	9.130	10.065	11.13	12.979	18.0
N2	0.34	0.154	4.31	0.69	0.12	3.28	0.131	3.66	0.310	0.464	0.51	0.441	0.6
CH4	0.39	0.174	2.79	6.39	1.09	17.50	1.217	19.52	2.888	3.062	3.38	4.105	5.7
C2H4				1.65	0.28	7.88	0.313	8.79	0.743	0.743	0.82	1.056	1.5
C2H6				0.58	0.10	2.95	0.109	3.29	0.260	0.260	0.29	0.369	0.5
C3H6				1.64	0.28	11.74	0.311	13.10	0.739	0.739	0.82	1.050	1.5
C3H8				0.43	0.07	3.22	0.081	3.59	0.192	0.192	0.21	0.273	0.4
C4H8				0.96	0.16	9.20	0.183	10.26	0.434	0.434	0.48	0.617	0.9
C4H10				0.23	0.04	2.27	0.043	2.53	0.104	0.104	0.12	0.147	0.2
C5H10				0.44	0.08	5.26	0.084	5.87	0.199	0.199	0.22	0.283	0.4
C6H12				0.08	0.01	1.18	0.016	1.32	0.036	0.036	0.04	0.052	0.1
OIL												0.590	0.8
WATER												7.465	10.3
TOTAL		45.277	567.39		17.07	315.36	19.048	351.83	45.188	90.465		72.290	
H2+CO		44.014			11.39		12.710		30.153				
H2/CO		1.66			2.89		2.89		2.89	2.05		2.89	

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	-13.293	-13.293	19.718			-13.293				
H2	-18.011			-36.02						
CO2	2.914	2.914	17.599			5.828				
N2	- 0.023									
CH4	1.043	1.043	6.299	4.17						
C2H4	0.313	0.626	3.781	1.25						72.76
C2H6	0.109	0.218	1.317	0.65						
C3H6	0.311	0.933	5.635	1.9			13.10 11.79	4.32 6.25	3.03 1.89	78.49
C3H8	0.081	0.243	1.468	0.65			3.59	4.24	0.85	
C4H8	0.183	0.732	4.421	1.46			10.26 9.75	5.0 6.1	2.05 1.60	80.22
C4H10	0.043	0.172	1.039	0.43			2.53	4.86	0.52	
C5H10	0.084	0.420	2.537	0.84			5.87	5.45	1.08	
C6H12	0.016	0.096	0.580	0.19			1.32	5.5	0.24	
OIL		5.896	35.608	11.79			82.60	6.62	12.49	
WATER				12.71		6.356 7.465				
TOTAL	-26.230						113.86		17.82	
H2+CO	-31.304									
H2/CO	1.35									

ULTIMATE YIELDS	% C0 Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	11.397	28.81	1.727	29.204			
C3+	51.288	119.27	7.150	120.907			
C4+	44.185	102.58	6.150	103.997			
Ult. Oil		113.86	6.826	115.428	17.817	1.068	150.91
C02	17.599	128.24	7.688	130.004			
H20		134.49	8.062	136.328			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	315.36		351.83
Oil	67.88		67.88
Water	147.68		147.68
Total	530.92	93.57	567.39

EFFLUENT RATIOS	
H2/H20	4.27
C02/C0	1.18
(H2) (C02) / (H20) (C0)	5.039

CONTRACTION:	57.93
C0 Conversion:	80.28
H2 Conversion:	65.60
H_2+C0=	71.12

H_2+C0= 16681 SCFH

	#/hr	#/M	gal/hr	GPM
C_3-C_5	36.67	2.198	7.77	0.466
Rec 01	167.88	4.069	10.26	0.615
WSC	14.77	0.885	1.77	0.106
	119.32	7.153	19.80	1.187
H_2O	132.91	7.968	15.94	0.956

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 48 A From Hr. 0900 to Hr. 0700 Hrs. 0-22

FLOWS	SCFH	%
Oxygen	3821	43.1
Nat. Gas	5042	
Total	8863	
Fresh Feed	15079	
F. F. by C	15623	
Avg. F. F.		
Wet Gas	4950	
Contraction		64.5
Recycle	15413	
Bleed	1125	
Total	16538	
Total Feed	31617	
Recycle/F.F.	1.10	
Inlet Vel.	1.046	
Steam Flow		

RUN CONDITIONS	
Generator Press.	417
O_2 Preheat, °F	423
Gas Preheat, °F	698
Reactor Press.	386
Steam Back Press.	709
Temperatures, °F	
Heater Outlet	151
Catalyst #1	646
#2	647
#3	670
#4	635
#5	635
Average	647
Product Separator	70

DISTILLATIONS	ASTM				Hempel Dist.		
Prod.	Naph				°F	%	A.P.I.
A.P.I.	58.8				to 400	58.1	58.8
I.B.P.	100				400-550	18.2	37.7
5%					550+	13.7	
10%	142						
20	170						
30	190						
40	204						
50	236						
60	258						
70	285						
80	316						
90	350						
95	370						
E.P.	405						
Rec.	97.0						
Res.	1.2						
Loss	1.8						

WATER	
Temp.	%
200	
203	
208	

CATALYST DATA	
In Reactor at Start of Period	1133
Fresh Catalyst Charged	
Catalyst Recharged	
Total	1133
Catalyst Taken Out	86
In Reactor at End of Period	1047
Reactor d-P, H_2O	
Pounds in Reactor	1249
Density, lbs./cu. ft.	149.0
Bed Height, Feet	12.7
Space Vel. SCFH/lb. cat.	
Inventory Figures	14.402
From d-P Meters	12.073
V/hr/V	1792

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	27.4	80+	
100	419-150	60.2	80-40	
150	149-105	6.6	40-20	
200	104-74	2.8	20-10	
250	73-62	0.6	10-0	
325	61-44	0.6		
<325	43-0	1.6		
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	2.29
CH_4	81.09
C_2H_6	9.35
C_3H_8	5.35
C_4H_{10}	0.37
N_2	1.24
O_2	0.31
MW	19.7492

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	40.6	39.4			
Sap. No.	47.9	40.5			
Hydrox. No.					
Bromine No.	93.3				
% Fe					
% Alc		8.5			
°API	49.6	9.7			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		0.041			
		10.078			20.278
CO_2		0.305	0.31		0.610
CH_4		10.785	10.79	43.140	
C_2H_6		1.244	2.49	7.464	
C_3H_8		0.712	2.14	5.696	
C_4H_{10}		0.049	0.20	0.49	
N_2		0.165			
Total			15.91	56.790	20.888

OUT	Mol %	m/hr	C	H	O
CO_2	2.57	1.022	1.02		2.04
CO	35.887	14.274	14.27		14.27
CH_4	0.14	0.056	0.06	0.22	
H_2	60.827	24.195		48.39	
N_2	0.577	0.230			
H_2O				8.66	4.33
Total			15.35	57.27	20.65
Balance			96.49	100.85	98.85

	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	35.89	14.274	399.815	10.66	1.392	38.99	1.507	42.212	4.651	18.925	22.689	6.158	9.42
H2	60.83	24.195	48.777	46.37	6.055	12.21	6.555	13.216	20.229	44.424	53.260	26.784	40.97
CO2	2.57	1.022	44.978	28.80	3.761	165.52	4.072	179.201	12.564	13.586	16.288	16.636	25.45
N2	0.58	0.230	6.444	1.22	0.159	4.45	0.172	4.822	0.532	0.762	0.914	0.704	1.08
CH4	0.14	0.056	0.998	5.68	0.742	11.90	0.803	12.887	2.478	2.534	3.038	3.281	5.02
C2H4				2.08	0.272	7.63	0.294	8.261	0.907	0.907	1.087	1.201	1.84
C2H6				0.65	0.085	2.56	0.092	2.767	0.284	0.284	0.340	0.376	0.58
C3H6				2.01	0.262	11.02	0.284	11.935	0.877	0.877	1.051	1.161	1.78
C3H8													
C4H8				1.31	0.171	9.59	0.185	10.387	0.572	0.572	0.686	0.757	1.16
C4H10				0.39	0.051	2.96	0.055	3.209	0.170	0.170	0.204	0.225	0.34
C5H10				0.66	0.086	6.03	0.093	6.529	0.288	0.288	0.345	0.381	0.58
C6H12				0.17	0.022	1.85	0.024	2.004	0.074	0.074	0.089	0.098	0.15
OIL												0.5777	0.88
WATER												7.029	10.75
TOTAL		39.776	500.912		13.058	274.73	14.136	297.430	43.626	83.403		65.369	
H2+CO		38.469							24.880	63.349			
H2/CO		1.70			4.350		4.350		4.349	2.347		4.349	

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	-12.767	-12.767	10.558			-12.767				
H2	-17.640			-35.280						
CO2	3.050	3.050	21.368			6.100				
N2	- 0.058									
CH4	0.747	0.747	5.233	2.988						
C2H4	0.294	0.588	4.119	1.176						74.91
C2H6	0.092	0.184	1.289	0.552						
C3H6	0.284	0.852	5.969	1.704			11.9 10.7	4.32 6.25	2.76 1.72	100.00
C3H8										
C4H8	0.185	0.740	5.184	1.480			10.4 9.9	5.00 6.10	2.08 1.62	76.40
C4H10	0.055	0.220	1.541	0.55			3.2	4.86	0.66	
C5H10	0.093	0.465	3.258	0.93			6.5	5.45	1.19	
C6H12	0.024	0.144	1.009	0.288			2.0	5.50	0.37	
OIL		5.777	40.472	11.554			81.0	6.505	12.46	
WATER				14.058		7.029 6.667				
TOTAL	-25.641						115.1 113.4		19.51 18.01	
H2+CO	-30.407									
H2/CO	1.382									

ULTIMATE YIELDS

	% CO Fed	#/hr	H2/CO #/MCF	H2/CO g/M3	Gal/hr	H2/CO Gal/MCF	H2/CO cc/M3
C1+C2	10.641	23.02	1.578	26.684			
C3+*	57.433	34.06	2.336	39.502			
C4+*	51.464	22.13	1.517	25.652			
Ult. Oil		113.38	7.774	131.458	18.008	1.235	174.506
CO2	21.368	134.22	9.203	155.623			
H20		120.11	8.236	139.271			

* In product gas only

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	274.726	108.26	297.430
Oil	76.412		76.412
Water	127.070		127.070
Total	478.208	95.47	500.912

H_2+CO= 14584 SCFH

	#/hr	#/M	gal/hr	GPM
C_3+	34.064	2.336	7.055	0.484
Rec Oil	176.412	5.239	11.747	0.805
WSC	10.801	0.741	1.295	0.089
	121.277	8.316	20.097	1.378
H_2O	116.269	7.972	13.941	0.956

EFFLUENT RATIOS	
H2/H20	3.810
C02/C0	2.702
(H2) (C02) / (H20) (C0)	10.295

CONTRACTION:	64.461
C0 Conversion:	89.442
H2 Conversion:	72.908

H_2+C0= 79.043

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 48 B From Hr. 0700 to Hr. 0700 Hrs. 23-46

FLOWS	SCFH	%
Oxygen	3991	42.8
Nat. Gas	5344	
Total	9335	
Fresh Feed	15350	
F. F. by C	16207	
Avg. F. F.		
Wet Gas	5968	
Contraction		60.5
Recycle	15290	
Bleed	1026	
Total	16316	
Total Feed	31666	
Recycle/F.F.	1.063	
Inlet Vel.	1.040	
Steam Flow		

RUN CONDITIONS	
Generator Press.	412
O_2 Preheat, °F	460
Gas Preheat, °F	711
Reactor Press.	385
Steam Back Press.	741
Temperatures, °F	
Heater Outlet	137
Catalyst #1	652
#2	643
#3	669
#4	632
#5	631
Average	645
Product Separator	69

DISTILLATIONS	ASTM	Hempel Dist. °F	%	A.P.I.
Prod.	Naph	to 400	70.6	56.5
A.P.I.	56.5	400-550	17.6	38.7
I.B.P.	106	550+	11.8	
5%				
10%	143			
20	166			
30	188			
40	210			
50	234			
60	257			
70	282			
80	309			
90	347			
95	381			
E.P.	399			
Rec.	98.0			
Res.	1.5			
Loss	0.5			

WATER	
Temp.	%
200	
203	
208	

CATALYST DATA	
In Reactor at Start of Period	1047
Fresh Catalyst Charged	
Catalyst Recharged	
Total	1047
Catalyst Taken Out	88
In Reactor at End of Period	959
Reactor d-P, H_2O	
Pounds in Reactor	1131
Density, lbs./cu. ft.	144
Bed Height, Feet	11.9
Space Vel. SCFH/lb. cat.	
Inventory Figures	16.01
From d-P Meters	13.57
V/hr/V	1954

CATALYST ANALYSIS

Particle Size

Screen Frac.	M	%	Sedimentation M	%
On 40	420+	16.1	80+	
100	419-150	61.9	80-40	
150	149-105	11.6	40-20	
200	104-74	6.6	20-10	
250	73-62	1.8	10-0	
325	61-44	1.0		
<325	43-0	1.0		

Density, lbs./cu. ft.		Chem. Anal.	
Aerated	133	% Fe	
Settled	135	% C	
Compacted	151	% Oil	
Sp. Grav.	4.52	Specific Surface	
			m^2/gm
			1.35 ml. NH_3/gm

NATURAL GAS	%		Oil	Water	Product	Pour °F	SUS @ °F
CO_2	2.42	Neut. No.	40.7	38.8			
CH_4	82.41	Sap. No.	43.7	42.8			
C_2H_6	8.24	Hydrox. No.					
C_3H_8	3.72	Bromine No.	96.9				
C_4H_{10}	0.23	% Fe					
N_2	2.478	% Alc		8.0			
O_2	0.502	°API	50.2	9.9			
MW	19.392						

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		10.528 0.071			21.198
CO_2		0.341	0.34		0.682
CH_4		11.617	11.62	46.468	
C_2H_6		1.162	2.32	6.972	
C_3H_8		0.524	1.57	4.192	
C_4H_{10}		0.032	0.13	1.28	
N_2		0.349			
Total			15.98	58.912	21.880

OUT	Mol %	m/hr	C	H	O
CO_2	2.74	0.111	0.11		0.22
CO	36.62	14.879	14.88		14.88
CH_4	0.08	0.033	0.03	0.13	
H_2	60.03	24.390		48.78	
N_2	0.53	0.215			
H_2O				11.78	5.39
Total			15.02	60.69	20.49
Balance			94.00	103.02	93.65

	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	36.62	14.879	416.761	11.52	1.814	50.81	1.851	51.842	4.958	19.837	23.709	6.809	10.7	-13.028	-13.028	12.440			-13.028				
H2	60.03	24.390	49.170	46.95	7.391	14.90	7.541	15.203	20.206	44.596	53.301	27.747	42.2	-16.849			-33.698						
CO2	2.74	1.113	48.983	27.46	4.323	190.26	4.411	194.119	11.818	12.931	15.455	16.229	24.7	3.298	3.298	22.165			6.598				
N2	0.53	0.215	6.023	1.50	0.236	6.61	0.241	6.746	0.646	0.861	1.029	0.887	1.4	0.026									
CH4	0.08	0.033	0.529	5.77	0.908	14.57	0.926	14.862	2.483	2.516	3.007	3.409	5.2	0.893	0.893	6.002	3.572						
C2H4				1.93	0.304	8.53	0.310	8.701	0.831	0.831	0.993	1.141	1.7	0.310	0.620	4.167	1.240						72.611
C2H6				0.68	0.107	3.22	0.109	3.282	0.293	0.293	0.350	0.402	0.6	0.109	0.218	1.465	0.654						
C3H6				1.97	0.310	13.04	0.316	13.309	0.848	0.848	1.014	1.164	1.8	0.316	0.948	6.371	1.896			13.31 11.98	4.32 6.25	3.08 1.91	87.306
C3H8				0.27	0.043	1.90	0.044	1.935	0.116	0.116	0.139	0.160	0.2	0.044	0.132	0.887	0.358			1.94	4.86	0.40	
C4H8				1.19	0.187	10.49	0.191	10.704	0.512	0.512	0.612	0.703	1.1	0.191	0.764	5.135	1.528			10.70 10.17	5.00 6.10	2.14 1.67	81.492
C4H10				0.26	0.041	2.38	0.042	2.431	0.112	0.112	0.134	0.154	0.2	0.042	0.168	1.129	0.42			2.43	4.86	0.50	
C5H10				0.42	0.066	4.28	0.067	4.365	0.181	0.181	0.216	0.248	0.4	0.067	0.335	2.251	0.67			4.37	5.45	0.79	
C6H12				0.08	0.013	1.09	0.013	1.116	0.034	0.034	0.041	0.047	0.1	0.013	0.078	0.524	0.156			1.12	5.50	0.20	
OIL												0.557	0.8		5.574	37.462	11.148			78.18	6.48	12.07	
WATER												6.031	9.2				12.062		6.031 6.430				
TOTAL		40.63	521.466		15.743	322.07	16.062	328.615	43.038	83.668		65.688		-24.568						112.04 108.24		19.18 17.15	
H2+CO		39.269							25.164	64.433				-29.877									
H2/CO		1.639			4.074		4.075		4.075	2.248		4.075		1.293									

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	11.634	26.32	1.768	29.897			
C3+*	53.759	33.86	2.274	38.453			
C4+*	46.501	18.62	1.250	21.138			
Ult. Oil		108.24	7.271	122.953	17.145	1.152	162.778
C02	22.165	145.14	9.749	164.856			
H20		115.84	7.781	131.577			

*In product gas only

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	322.074	102.031	328.616
Oil	78.39		78.39
Water	114.46		114.46
Total	514.924	98.745	521.466

H_2+CO=14887 SCFH

	#/hr	#/M	gal/hr	GPM
C_3+	33.860	2.274	7.117	0.478
Rec	01178.39	5.266	12.090	0.812
WSC	9.157	0.615	1.098	0.074
	121.407	8.155	20.305	1.364
H_2O	105.303	7.073	12.626	0.848

EFFLUENT RATIOS	
H2/H20	4.601
C02/C0	2.383
(H2) (C02) / (H20) (C0)	10.964

CONTRACTION:	60.468
C0 Conversion:	87.560
H2 Conversion:	69.082
H_2+C0=	76.083

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 48 D From _____ Hr. 0700 to _____ Hr. 0700 Hrs. 71-94

FLOWS	SCFH	%
Oxygen	4176	42.5
Nat. Gas	5655	
Total	9831	
Fresh Feed	16465	
F. F. by C	17154	
Avg. F. F.		
Wet Gas	6600	
Contraction		57.9
Recycle	15722	
Bleed	1117	
Total	16839	
Total Feed	33304	
Recycle/F.F.	1.02	
Inlet Vel.	1.12	
Steam Flow		

RUN CONDITIONS	
Generator Press.	413
O_2 Preheat, °F	488
Gas Preheat, °F	723
Reactor Press.	379
Steam Back Press.	733
Temperatures, °F	
Heater Outlet	150
Catalyst #1	658
#2	643
#3	664
#4	625
#5	653
Average	649
Product Separator	70.8

DISTILLATIONS	ASTM				Hempel Dist.		
Prod.	Naph				°F	%	A.P.I.
A.P.I.	55.2				to 400	69.3	55.2
I.B.P.	108				400-550	16.6	36.2
5%					550+	14.1	
10%	138						
20	168						
30	194				WATER		
40	216				Temp.	%	
50	236				200		
60	260				203		
70	284				208		
80	316						
90	350						
95	376						
E.P.	396						
Rec.	98.0						
Res.	1.5						
Loss.	0.5						

CATALYST DATA	
In Reactor at Start of Period	960
Fresh Catalyst Charged	100
Catalyst Recharged	113
Total	1173
Catalyst Taken Out	224
In Reactor at End of Period	949
Reactor d-P, H_2O	
Pounds in Reactor	1148
Density, lbs./cu. ft.	138
Bed Height, Feet	12.6
Space Vel. SCFH/lb. cat.	
Inventory Figures	17.350
From d-P Meters	14.342
V/hr/V	1980

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	21.3	80+	
100	419-150	67.4	80-40	
150	149-105	7.2	40-20	
200	104-74	3.2	20-10	
250	73-62	0.4	10-0	
325	61-44	0.2		
<325	43-0	0.2		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated	147		% Fe	
Settled	149		% C	
Compacted	163		% Oil	
Sp. Grav.	4.6		Specific Surface	
				m²/gm
			2.73	ml.NH_3/gm

NATURAL GAS	%
CO_2	2.30
CH_4	82.64
C_2H_6	8.53
C_3H_8	4.63
C_4H_{10}	0.27
N_2	1.312
O_2	0.318
MW	19.5032

PRODUCT INSPECTION						
	Oil	Water	Product	Pour °F	SUS @ °F	
Neut. No.	38.3	39.4				
Sap. No.	43.3	41.3				
Hydrox. No.						
Bromine No.	94.1					
% Fe						
% Alc		10.0				
°API	49.7	10.6				

GENERATOR ELEMENTAL BALANCE

IN	Mol %	[redacted] m/hr	C	H	O
O_2		0.047 11.017			22.128
CO_2		0.343	0.34		0.686
CH_4		12.327	12.33	49.308	
C_2H_6		1.272	2.54	7.632	
C_3H_8		0.691	1.98	5.528	
C_4H_{10}		0.040	0.16	0.400	
N_2		0.195			
Total		25.932	17.36	62.868	22.814

OUT	Mol %	[redacted] m/hr	C	H	O
CO_2	2.98	1.294	1.29		2.6
CO	35.48	15.409	15.41		15.4
CH_4	0.10	0.043	0.04	0.172	
H_2	60.79	26.401		52.802	
N_2	0.65	0.282			
H_2O				9.764	4.9
Total		43.429	16.75	62.738	
Balance			96.48	99.79	100.3

	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	35.48	15.410	431.634	13.61	2.37	66.38	2.490	69.735	6.046	21.456	24.42	8.535	12.17
H2	60.79	26.403	53.228	49.18	8.56	17.26	8.994	18.132	21.845	48.248	54.92	30.839	43.98
CO2	2.98	1.294	56.949	25.36	4.42	194.30	4.638	204.112	11.265	12.559	14.30	15.903	22.68
N2	0.65	0.282	7.901	1.34	0.23	6.53	0.245	6.858	0.595	0.877	1.00	0.840	1.20
CH4	0.10	0.043	0.690	4.58	0.80	12.79	0.837	13.430	2.034	2.077	2.36	2.872	4.10
C2H4				1.71	0.30	8.36	0.313	8.781	0.760	0.760	0.87	1.073	1.53
C2H6				0.61	0.11	3.19	0.111	3.348	0.271	0.271	0.31	0.383	0.55
C3H6				1.51	0.26	11.07	0.276	11.626	0.671	0.671	0.76	0.947	1.35
C3H8													
C4H8				1.05	0.18	10.27	0.192	10.785	0.466	0.466	0.53	0.658	0.94
C4H10				0.32	0.06	3.26	0.059	3.419	0.142	0.142	0.16	0.201	0.29
C5H10				0.56	0.10	6.80	0.102	7.146	0.249	0.249	0.28	0.351	0.50
C6H12				0.17	0.03	2.53	0.032	2.652	0.076	0.076	0.09	0.107	0.15
OIL												0.540	0.77
WATER												6.869	9.80
TOTAL		43.432	550.414		17.41	342.73	18.289	360.024	44.420	87.852		70.118	
H2+CO	96.37	41.813					11.483		27.891				
H2/CO	1.71	1.713		3.61			3.612		3.613	2.25			

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	-12.920	-12.920	16.158			-12.920				
H2	-17.409			-34.818						
CO2	3.344	3.344	21.700			6.688				
N2	- 0.037									
CH4	0.794	0.794	5.152	3.176						
C2H4	0.313	0.626	4.062	1.252						72.40
C2H6	0.111	0.222	1.441	0.666						
C3H6	0.276	0.828	5.373	1.656			11.63 10.46	4.32 6.25	2.69 1.67	100.00
C3H8										
C4H8	0.192	0.768	4.984	1.536			10.79 10.25	5.00 6.10	2.16 1.68	75.93
C4H10	0.059	0.236	1.531	0.59			3.42	4.86	0.70	
C5H10	0.102	0.510	3.310	1.02			7.15	5.45	1.31	
C6H12	0.032	0.192	1.246	0.38			2.65	5.50	0.48	
OIL		5.400	35.042	10.80			75.74	6.49	11.67	
WATER				13.74		6.869 6.232				
TOTAL	-25.143						111.37 109.67		19.01 17.52	
H2+CO	-30.329									
H2/CO	1.347									

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2/C0 #/MCF	g/M3	Gal/hr	H2/C0 Gal/MCF	cc/M3
C1+C2	10.655	24.91	1.571	26.566			
C3+*	51.486	35.63	2.248	38.014			
C4+*	46.113	24.00	1.514	25.602			
Ult. Oil		109.67	6.919	117.000	17.520	1.105	156.14
C02	21.700	147.16	9.284	156.992			
H20		112.28	7.083	119.774			

* In product gas only

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	342.783	105.04	360.033
Oil	63.923		63.923
Water	126.458		126.458
Total	533.114	96.86	550.414

H_2+C0= 15851 SCFH

	#/hr	#/M	gal/hr	GPM
C_3+	35.628	2.248	7.344	0.463
Rec 01	163.923	4.033	9.833	0.620
WSC	12.646	0.798	1.516	0.096
	112.197	7.079	18.693	1.179
H_2O	113.812	7.180	13.647	0.861

EFFLUENT RATIOS	
H2/H20	4.490
C02/C0	1.863
(H2) (C02) / (H20) (C0)	8.365

CONTRACTION:	57.890
C0 Conversion:	83.842
H2 Conversion:	65.936

H_2+C0= 72.535

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 48 E From _____ Hr. 0700 to _____ Hr. 0700 Hrs. 95-118

FLOWS	SCFH	%
Oxygen	4167	42.1
Nat. Gas	5722	
Total	9889	
Fresh Feed	16584	
F. F. by C	17299	
Avg. F. F.		
Wet Gas	6796	
Contraction		56.3
Recycle	15242	
Bleed	1079	
Total	16321	
Total Feed	32905	
Recycle/F.F.	0.984	
Inlet Vel.	1.103	
Steam Flow		

RUN CONDITIONS	
Generator Press.	415
O_2 Preheat, °F	474
Gas Preheat, °F	686
Reactor Press.	380
Steam Back Press.	727
Temperatures, °F	
Heater Outlet	145
Catalyst ±1	660
±2	643
±3	675
±4	635
±5	653
Average	653
Product Separator	72

DISTILLATIONS	ASTM				Hempel Dist. °F	%	A.P.I.
Prod.	Naph						
A.P.I.	55.1				to 400	72.6	55.1
I.B.P.	103				400-550	14.6	36.9
5%					550+	12.8	
10%	142						
20	166						
30	190						
40	214						
50	256						
60	261						
70	286						
80	322						
90	360						
95	386						
E.P.	409						
Rec.	97.5						
Res.	1.5						
Loss.	1.0						

WATER	
Temp.	%
200	
203	
208	

CATALYST DATA	
In Reactor at Start of Period	949
Fresh Catalyst Charged	40
Catalyst Recharged	
Total	989
Catalyst Taken Out	115
In Reactor at End of Period	874
Reactor d-P, H_2O	
Pounds in Reactor	1075
Density, lbs./cu. ft.	139.2
Bed Height, Feet	11.7
Space Vel. SCFH/lb. cat.	
Inventory Figures	18.975
From d-P Meters	15.427
V/hr/V	2148

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	14.3	80+	
100	419-150	67.1	80-40	
150	149-105	10.7	40-20	
200	104-74	6.5	20-10	
250	73-62	1.0	10-0	
325	61-44	0.2		
<325	43-0	0.2		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated	147		% Fe	
Settled	149		% C	
Compacted	165		% Oil	
Sp. Grav.	4.4		Specific Surface	
				m^2/gm
			3.05	ml.NH_3/gm

NATURAL GAS	%
CO_2	2.30
CH_4	82.64
C_2H_6	8.53
C_3H_8	4.63
C_4H_{10}	0.27
N_2	1.312
O_2	0.318
MW	19.5032

PRODUCT INSPECTION						
	Oil	Water	Product	Pour °F	SUS @ °F	
Neut. No.	37.7	39.6				
Sap. No.	41.8	36.0				
Hydrox. No.						
Bromine No.	74.6					
% Fe						
% Alc		10.00				
°API	49.8	10.7				

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		0.048 10.993			22.082
CO_2		0.347	0.35		0.694
CH_4		12.473	12.47	49.892	
C_2H_6		1.287	2.57	7.722	
C_3H_8		0.699	2.10	5.592	
C_4H_{10}		0.041	0.16	0.410	
N_2		0.198			
Total		26.087	17.66	63.616	22.776

OUT	Mol %	m/hr	C	H	O
CO_2	2.940	1.286	1.29		2.6
CO	35.537	15.546	15.55		15.5
CH_4	0.210	0.092	0.09	0.368	
H_2	60.787	26.591		53.182	
N_2	0.523	0.229			
H_2O				9.691	4.8
Total		43.744	16.92	63.241	23.0
Balance			95.86	99.41	100.8

	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	35.54	15.546	435.443	12.73	2.282	63.92	2.436	68.232	5.481	21.027	24.23	7.917	11.45
H2	60.79	26.592	53.607	50.26	9.010	18.16	9.618	19.390	21.638	48.229	55.56	31.256	45.20
CO2	2.94	1.286	56.597	25.39	4.552	200.33	4.858	213.801	10.931	12.217	14.08	15.789	22.83
N2	0.52	0.229	6.416	1.04	0.186	5.21	0.199	5.575	0.448	0.677	0.78	0.647	0.94
CH4	0.21	0.092	1.476	4.92	0.882	14.15	0.941	15.096	2.118	2.210	2.55	3.059	4.42
C2H4				1.71	0.307	8.61	0.327	9.173	0.736	0.736	0.85	1.063	1.54
C2H6				0.57	0.102	3.07	0.109	3.277	0.245	0.245	0.28	0.354	0.51
C3H6				1.48	0.265	11.15	0.283	11.908	0.637	0.637	0.73	0.920	1.33
C3H8													
C4H8				0.96	0.172	9.65	0.184	10.323	0.413	0.413	0.48	0.597	0.86
C4H10				0.29	0.052	3.02	0.055	3.197	0.125	0.125	0.14	0.180	0.26
C5H10				0.50	0.090	6.31	0.096	6.732	0.215	0.215	0.25	0.311	0.45
C6H12				0.15	0.027	2.27	0.029	2.441	0.065	0.065	0.07	0.094	0.14
OIL												0.536	0.78
WATER												6.423	9.29
TOTAL		43.745	553.539		17.927	345.86	19.135	368.974	43.052	86.797		69.146	
H2+CO		42.137			11.292		12.054		27.119				
H2/CO		1.711			3.948		3.948		3.948				

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	-13.11	-13.11	15.670			-13.110				
H2	-16.97			-33.948						
CO2	3.57	3.57	22.977			7.144				
N2	- 0.03									
CH4	0.85	0.85	5.461	3.396						
C2H4	0.33	0.65	4.207	1.308						73.68
C2H6	0.11	0.22	1.402	0.654						
C3H6	0.28	0.85	5.461	1.698			11.9 10.7	4.32 6.25	2.76 1.72	100.00
C3H8										
C4H8	0.18	0.74	4.734	1.472			10.3 9.8	5.00 6.10	2.07 1.61	76.35
C4H10	0.06	0.22	1.415	0.55			3.2	4.86	0.66	
C5H10	0.10	0.48	3.088	0.96			6.7	5.45	1.22	
C6H12	0.03	0.17	1.119	0.348			2.4	5.50	0.45	
OIL		5.36	34.465	10.716			66.1	6.498	10.18	
WATER				12.846		6.423 5.966				
TOTAL	-24.61						100.7 99.0		17.33 15.83	
H2+CO	-30.08									
H2/CO	1.30									

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	11.070	26.070	1.632	27.597			
C3+*	50.282	34.601	2.166	36.627			
C4+*	44.821	22.693	1.421	24.029			
Ult. Oil		99.039	6.200	104.842	15.832	0.991	140.026
C02	22.977	157.204	9.841	166.411			
H20		107.483	6.729	113.787			

* In product gas only

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	345.805	106.74	368.974
Oil	66.145		66.145
Water	118.420		118.420
Total	530.370	95.814	553.539

EFFLUENT RATIOS	
H2/H20	4.866
C02/C0	1.994
(H2) (C02) / (H20) (C0)	9.703

CONTRACTION: 56.258

C0 Conversion: 84.330

H2 Conversion: 63.831

$CO+H_2$=71.396

H_2+C0= 15974 SCFH

	#/hr	#/M	gal/hr	GPM
C_3+	34.601	2.166	7.151	0.448
Rec	01166.145	4.141	10.179	0.637
WSC	11.842	0.741	1.420	0.089
	112.588	7.048	18.750	1.174
H_2O	106.578	6.672	12.779	0.800

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 48 F From _____ Hr. 0700 to _____ Hr. 0700 Hrs. 119-142

FLOWS	SCFH	%
Oxygen	4161	41.8
Nat. Gas	5787	
Total	9948	
Fresh Feed	16535	
F. F. by C	16896	
Avg. F. F.		
Wet Gas	7005	
Contraction		55.1
Recycle	15989	
Bleed	1129	
Total	17118	
Total Feed	33653	
Recycle/F.F.	1.04	
Inlet Vel.	1.13	
Steam Flow		

RUN CONDITIONS	
Generator Press.	415
O_2 Preheat, °F	449
Gas Preheat, °F	700
Reactor Press.	378
Steam Back Press.	710
Temperatures, °F	
Heater Outlet	185
Catalyst #1	659
#2	648
#3	677
#4	641
#5	656
Average	656
Product Separator	68.6

DISTILLATIONS	ASTM					Hempel Dist.		
Prod.	Naph					°F	%	A.P.I.
A.P.I.	55.4					to 400	74.0	55.4
I.B.P.	108					400-550	15.6	37.6
5%						550+	10.4	
10%	144							
20	171							
30	194					WATER		
40	217					Temp.	%	
50	240					200		
60	261					203		
70	288					208		
80	322							
90	358							
95	391							
E.P.	401							
Rec.	97.0							
Res.	1.5							
Loss.	1.5							

CATALYST DATA	
In Reactor at Start of Period	874
Fresh Catalyst Charged	
Catalyst Recharged	
Total	874
Catalyst Taken Out	26
In Reactor at End of Period	848
Reactor d-P, H_2O	
Pounds in Reactor	1027
Density, lbs./cu. ft.	139
Bed Height, Feet	11.2
Space Vel. SCFH/lb. cat.	
Inventory Figures	19.499
From d-P Meters	16.100
V/hr/V	2237

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	15.4	80+	
100	419-150	65.5	80-40	
150	149-105	10.9	40-20	
200	104-74	5.2	20-10	
250	73-62	0.8	10-0	
325	61-44	0.6		
<325	43-0	1.6		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated	148		% Fe	
Settled	150		% C	
Compacted	162		% Oil	
Sp. Grav.	4.35		Specific Surface	
				m^2/gm
			6.62	ml.NH_3/gm

NATURAL GAS	%
CO_2	2.38
CH_4	83.13
C_2H_6	8.19
C_3H_8	3.65
C_4H_{10}	0.22
N_2	2.014
O_2	0.416
MW	19.2804

PRODUCT INSPECTION						
		Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.		42.6	39.8			
Sap. No.		45.4	39.8			
Hydrox. No.						
Bromine No.		85.1				
% Fe						
% Alc			11.5			
*API		49.7	10.8			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		0.064 10.976			22.080
CO_2		0.363	0.36		0.726
CH_4		12.690	12.69	50.760	
C_2H_6		1.250	2.50	7.500	
C_3H_8		0.557	1.67	4.456	
C_4H_{10}		0.034	0.14	0.340	
N_2		0.307			
Total		26.241	17.36	63.056	22.806

OUT	Mol %	m/hr	C	H	O
CO_2		1.239	1.24		2.5
CO		15.628	15.63		15.6
CH_4		0.122	0.12	0.488	
H_2		26.292		52.584	
N_2		0.336			
H_2O				9.692	4.8
Total		43.617	16.99	62.764	23.0
Balance			97.86	99.54	100.6

	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	35.83	15.628	437.740	15.19	2.807	78.62	2.976	83.358	6.859	22.487	25.33	9.835	13.75
H2	60.28	26.291	53.003	49.96	9.232	18.61	9.787	19.731	22.560	48.851	55.04	32.347	45.22
CO2	2.84	1.239	54.528	22.60	4.176	183.79	4.427	194.832	10.205	11.444	12.89	14.632	20.46
N2	0.77	0.336	9.413	1.30	0.240	6.72	0.255	7.144	0.587	0.923	1.04	0.842	1.18
CH4	0.28	0.122	1.957	5.01	0.926	14.86	0.982	15.737	2.262	2.384	2.69	3.244	4.54
C2H4				1.60	0.296	8.30	0.313	8.780	0.722	0.722	0.81	1.035	1.45
C2H6				0.55	0.102	3.07	0.108	3.247	0.248	0.248	0.28	0.356	0.50
C3H6				1.46	0.270	11.36	0.286	12.034	0.659	0.659	0.74	0.945	1.32
C3H8				0.52	0.096	4.23	0.102	4.498	0.235	0.235	0.26	0.337	0.47
C4H8				0.96	0.177	9.93	0.188	10.548	0.433	0.433	0.49	0.621	0.87
C4H10				0.25	0.046	2.67	0.049	2.848	0.113	0.113	0.13	0.162	0.23
C5H10				0.48	0.089	6.24	0.094	6.592	0.217	0.217	0.24	0.311	0.44
C6H12				0.12	0.022	1.85	0.024	2.020	0.054	0.054	0.06	0.078	0.11
OIL												0.504	0.70
WATER												6.276	8.77
TOTAL		43.616	556.627		18.476	350.29	19.591	371.369	45.154	88.770		71.525	
H2+CO		41.919			12.039		12.763		29.419	71.338		42.182	
H2/CO		1.682			3.289		3.289		3.289	2.172		3.289	

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	-12.652	-12.652	19.043			-12.652				
H2	-16.504			-33.008						
CO2	3.188	3.188	20.399			6.376				
N2	- 0.081									
CH4	0.860	0.860	5.503	3.440						
C2H4	0.313	0.626	4.006	1.252						73.00
C2H6	0.108	0.216	1.382	0.648						
C3H6	0.286	0.858	5.490	1.716			12.0 10.3	4.32 6.25	2.79 1.65	72.79
C3H8	0.102	0.306	1.958	0.816			4.5	4.24	1.06	
C4H8	0.188	0.752	4.812	1.504			10.5 10.0	5.00 6.10	2.11 1.64	78.74
C4H10	0.049	0.196	1.254	0.490			2.8	4.86	0.59	
C5H10	0.094	0.470	3.007	0.940			6.6	5.45	1.20	
C6H12	0.024	0.144	0.921	0.288			2.0	5.50	0.37	
OIL		5.036	32.224	10.072			70.6	6.50	10.87	
WATER				11.842		5.921 6.276				
TOTAL	-24.025						109.2 102.4		18.98 16.32	
H2+CO	-29.156									
H2/CO	1.304									

ULTIMATE YIELDS

	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	10.891	25.81	1.6239	27.460			
C3+*	49.666	38.54	2.425	41.007			
C4+*	42.218	22.01	1.385	23.420			
Ult. Oil		102.45	6.446	109.002	16.317	1.027	145.12
C02	20.399	140.30	8.829	149.298			
H20		113.07	7.115	120.315			

* In product gas only

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	350.287	106.02	371.378
Oil	63.011		63.011
Water	122.238		122.238
Total	535.536	96.21	556.627

H_2+CO= 15892 SCFH

	#/hr	#/M	gal/hr	GPM
C_3+	38.540	2.425	8.113	0.511
Reg	01163.011	3.965	9.693	0.610
WSC	14.057	0.885	1.685	0.106
	115.608	7.275	19.491	1.227
H_2O	108.181	6.807	12.971	0.816

EFFLUENT RATIOS	
H2/H20	5.154
C02/C0	1.488
(H2) (C02) / (H20) (C0)	7.669

CONTRACTION:	55.083
C0 Conversion:	80.957
H2 Conversion:	62.774

H_2+C0= 69.553

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 48 G From _____ Hr. 0700 to _____ Hr. 0700 Hrs. 143-166

FLOWS	SCFH	%
Oxygen	4176	42.0
Nat. Gas	5771	
Total	9947	
Fresh Feed	16501	
F. F. by C	16588	
Avg. F. F.		
Wet Gas	7243	
Contraction		53.6
Recycle	17181	
Bleed	1164	
Total	18345	
Total Feed	34846	
Recycle/F.F.	1.11	
Inlet Vel.	1.210	
Steam Flow		

RUN CONDITIONS	
Generator Press.	410
O_2 Preheat, °F	517
Gas Preheat, °F	693
Reactor Press.	367
Steam Back Press.	697
Temperatures, °F	
Heater Outlet	189
Catalyst #1	656
#2	645
#3	673
#4	644
#5	650
Average	654
Product Separator	67.7

DISTILLATIONS							
	A S T M				Hempel Dist.		
Prod.	Naph				°F	%	A.P.I.
A.P.I.	55.2				to 400	75.3	55.2
I.B.P.	118				400-550	13.3	37.3
5%					550+	11.4	
10%	156						
20	180						
30	202				WATER		
40	222				Temp.	%	
50	242				200		
60	265				203		
70	290				208		
80	318						
90	342						
95	382						
E.P.	406						
Rec.	97.5						
Res.	1.5						
Loss.	1.0						

CATALYST DATA	
In Reactor at Start of Period	848
Fresh Catalyst Charged	
Catalyst Recharged	
Total	848
Catalyst Taken Out	29
In Reactor at End of Period	819
Reactor d-P, H_2O	
Pounds in Reactor	987
Density, lbs./cu. ft.	136
Bed Height, Feet	11.0
Space Vel. SCFH/lb. cat.	
Inventory Figures	20.148
From d-P Meters	16.718
V/hr/V	2273

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	16.7	80+	
100	419-150	69.4	80-40	
150	149-105	8.9	40-20	
200	104-74	3.6	20-10	
250	73-62	0.4	10-0	
325	61-44	0.4		
<325	43-0	0.6		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated	147		% Fe	
Settled	149		% C	
Compacted	163		% Oil	
Sp. Grav.	4.5		Specific Surface	
				m^2/gm
			4.06	ml.NH_3/gm

NATURAL GAS	%
CO_2	2.24
CH_4	83.63
C_2H_6	7.88
C_3H_8	3.42
C_4H_{10}	0.19
N_2	2.17
O_2	0.47
MW	19.148

PRODUCT INSPECTION						
	Oil	Water	Product	Pour °F	SUS @ °F	
Neut. No.	32.4	35.2				
Sap. No.	37.6	37.3				
Hydrox. No.						
Bromine No.	85.6					
% Fe						
% Alc		10.00				
°API	50.7	10.9				

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		0.072			
		11.016			22.176
CO_2		0.341	0.34		0.682
CH_4		12.731	12.73	50.924	
C_2H_6		1.200	2.40	7.200	
C_3H_8		0.521	1.56	4.168	
C_4H_{10}		0.029	0.12	0.290	
N_2		0.330			
Total		26.240	17.15	62.582	22.858

OUT	Mol %	m/hr	C	H	O
CO_2		1.097	1.10		2.2
CO		15.909	15.91		15.9
CH_4		0.052	0.05	0.208	
H_2		26.146		52.292	
N_2		0.322			
H_2O				9.796	4.9
Total		43.526	17.06	62.296	23.0
Balance			99.46	99.54	100.6

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	Measured m/hr	Measured #/hr	At Wt. Balance m/hr	At Wt. Balance #/hr	RECYCLE m/hr	COMB. FEED m/hr	COMB. FEED %	EFFLUENT m/hr	EFFLUENT %
CO	36.55	15.91	445.6	16.69	3.19	89.32	3.367	94.310	8.076	23.99	26.10	11.44	15.16
H2	60.07	26.15	52.7	51.32	9.81	19.77	10.354	20.874	24.834	50.98	55.46	35.19	46.62
CO2	2.52	1.10	48.4	20.70	3.96	174.06	4.176	183.786	10.017	11.12	12.10	14.19	18.80
N2	0.74	0.32	9.0	1.41	0.27	7.54	0.284	79.565	0.682	1.00	1.09	0.97	1.29
CH4	0.12	0.05	0.8	4.43	0.85	13.57	0.894	14.342	2.144	2.19	2.38	3.04	4.03
C2H4				1.27	0.24	6.82	0.256	7.181	0.615	0.62	0.67	0.87	1.15
C2H6				0.57	0.11	3.28	0.115	3.458	0.276	0.28	0.31	0.39	0.52
C3H6				1.44	0.28	11.57	0.291	12.245	0.697	0.70	0.76	0.99	1.31
C3H8				0.56	0.11	4.72	0.113	4.983	0.271	0.27	0.29	0.38	0.50
C4H8				0.91	0.17	9.76	0.184	10.323	0.440	0.44	0.48	0.62	0.82
C4H10				0.25	0.05	2.79	0.050	2.906	0.121	0.12	0.13	0.17	0.23
C5H10				0.35	0.07	4.70	0.071	4.979	0.169	0.17	0.19	0.24	0.32
C6H12				0.10	0.02	1.60	0.020	1.683	0.048	0.05	0.05	0.07	0.09
OIL												0.5258	0.70
WATER												6.391	8.47
TOTAL		43.53	556.44		19.11	349.49	20.176	369.06	48.390	91.93		75.477	
H2+CO	96.62	42.05			12.99		13.721		32.910				
H2/CO	1.64	1.64			3.08		3.075		3.075	2.125		3.076	

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	-12.543	-12.543	21.163			-12.543				
H2	-15.796			-31.592						
CO2	3.076	3.076	19.334			6.152				
N2	- 0.036									
CH4	0.844	0.844	5.305	3.376						
C2H4	0.256	0.512	3.218	1.024						67.50
C2H6	0.115	0.230	1.446	0.690						
C3H6	0.291	0.873	5.487	1.746			12.2 11.0	4.32 6.25	2.83 1.76	71.08
C3H8	0.113	0.339	2.131	0.904			5.0	4.24	1.18	
C4H8	0.184	0.736	4.626	1.472			10.3 9.8	5.00 6.10	2.06 1.61	78.03
C4H10	0.050	0.200	1.257	0.50			2.9	4.86	0.60	
C5H10	0.071	0.355	2.231	0.71			5.0	5.45	0.91	
C6H12	0.020	0.120	0.754	0.24			1.7	5.50	0.31	
OIL		5.258	33.048	10.516			73.7	6.47	11.40	
WATER				10.414		5.207 6.391				
TOTAL	-23.355						110.9 104.1		19.29 16.59	
H2+CO	-28.339									
H2/CO	1.259									

ULTIMATE YIELDS	% CO Fed	#/hr	H2/CO #/MCF	H2/CO g/M3	Gal/hr	H2/CO Gal/MCF	H2/CO cc/M3
C1+C2	9.969	24.181	1.517	25.652			
C3+*	49.534	37.119	2.329	39.383			
C4+*	41.916	19.891	1.248	21.104			
Ult. Oil		104.145	6.533	110.473	16.589	1.041	147.09
C02	19.334	135.386	8.493	143.617			
H20		115.140	7.223	122.141			

* In product gas only

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	349.49	105.60	378.98
Oil	60.60		60.60
Water	116.86		116.86
Total	526.95	94.70	556.44

H_2+CO= 15941 SCFH

	#/hr	#/M	gal/hr	GPM
C_3+	37.119	2.329	7.890	0.495
Rec Oil	60.60	3.802	9.372	0.588
WSC	11.686	0.733	1.401	0.088
	109.405	6.864	18.663	1.171
H_2O	105.174	6.598	12.611	0.791

EFFLUENT RATIOS	
H2/H20	5.506
C02/C0	1.240
(H2) (C02) / (H20) (C0)	6.827

CONTRACTION:	53.646
C0 Conversion:	78.837
H2 Conversion:	60.405

H_2+CO= 67.394

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 48 H From _____ Hr. 0700 to _____ Hr. 0700 Hrs. 167-190

FLOWS	SCFH	%
Oxygen	4132	41.9
Nat. Gas	5740	
Total	9872	
Fresh Feed	16471	
F. F. by C	16729	
Avg. F. F.		
Wet Gas	6967	
Contraction		54.5
Recycle	16025	
Bleed	1176	
Total	17201	
Total Feed	33672	
Recycle/F.F.	1.04	
Inlet Vel.	1.146	
Steam Flow		

RUN CONDITIONS	
Generator Press.	407
O_2 Preheat, °F	463
Gas Preheat, °F	707
Reactor Press.	374
Steam Back Press.	702
Temperatures, °F	
Heater Outlet	187
Catalyst #1	662
#2	646
#3	665
#4	633
#5	653
Average	652
Product Separator	67

DISTILLATIONS	ASTM
Prod.	Naph
A.P.I.	54.9
I.B.P.	115
5%	
10%	150
20	178
30	197
40	221
50	243
60	265
70	288
80	317
90	350
95	384
E.P.	400
Rec.	97.5
Res.	1.5
Loss.	1.0

Hempel Dist.	°F	%	A.P.I.
	to 400	72.0	54.9
	400-550	16.6	37.9
	550+	11.4	

WATER	
Temp.	%
200	
203	
208	

CATALYST DATA	
In Reactor at Start of Period	819
Fresh Catalyst Charged	40
Catalyst Recharged	
Total	859
Catalyst Taken Out	36
In Reactor at End of Period	823
Reactor d-P, H_2O	
Pounds in Reactor	989
Density, lbs./cu. ft.	135
Bed Height, Feet	11.1
Space Vel. SCFH/lb. cat.	
Inventory Figures	20.001
From d-P Meters	16.654
V/hr/V	2248

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	13.9	80+	
100	419-150	70.5	80-40	
150	149-105	10.0	40-20	
200	104-74	3.6	20-10	
250	73-62	0.4	10-0	
325	61-44	0.6		
<325	43-0	1.0		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated	145		% Fe	
Settled	147		% C	
Compacted	161		% Oil	
Sp. Grav.	4.3		Specific Surface	
				m^2/gm
			8.95	ml.NH_3/gm

NATURAL GAS	%
CO_2	2.33
CH_4	82.67
C_2H_6	8.61
C_3H_8	3.30
C_4H_{10}	0.19
N_2	2.45
O_2	0.45
MW	19.272

PRODUCT INSPECTION			Water	Product	Pour °F	SUS @ °F
		Oil				
Neut. No.	35.6		33.0			
Sap. No.	41.8		35.8			
Hydrox. No.						
Bromine No.	82.3					
% Fe						
% Alc			10.00			
°API	50.3		10.8			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	m/hr	C	H	O
O_2		0.068 10.899			21.934
CO_2		0.353	0.35		0.706
CH_4		12.516	12.52	50.064	
C_2H_6		1.304	2.61	7.824	
C_3H_8		0.500	1.50	4.000	
C_4H_{10}		0.029	0.12	0.290	
N_2		0.371			
Total		26.040	17.09	62.178	22.640

OUT	Mol %	m/hr	C	H	O
CO_2		1.117	1.12		2.23
CO		15.624	15.62		15.62
CH_4		0.087	0.09	0.35	
H_2		26.243		52.49	
N_2		0.378			
H_2O				9.45	4.73
Total		43.449	16.83	62.29	22.59
			98.45	100.18	99.76

	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	35.96	15.62	437.63	15.92	2.93	81.96	3.149	88.20	7.223	22.847	25.72	10.372	14.46
H2	60.40	26.24	52.90	50.08	9.20	18.56	9.905	19.97	22.723	48.965	55.13	32.628	45.48
CO2	2.57	1.12	49.16	21.78	4.00	176.17	4.308	189.59	9.882	10.999	12.38	14.190	19.78
N2	0.87	0.38	10.59	1.58	0.29	8.13	0.312	8.74	0.717	1.095	1.23	1.029	1.43
CH4	0.20	0.09	1.40	5.01	0.92	14.78	0.991	15.90	2.273	2.360	2.66	3.264	4.55
C2H4				1.24	0.23	6.40	0.245	6.88	0.563	0.563	0.63	0.808	1.13
C2H6				0.66	0.12	3.64	0.130	3.92	0.299	0.299	0.34	0.429	0.60
C3H6				1.36	0.25	10.52	0.269	11.32	0.617	0.617	0.69	0.886	1.24
C3H8				0.55	0.10	4.45	0.109	4.79	0.250	0.250	0.28	0.359	0.50
C4H8				0.92	0.17	9.48	0.182	10.20	0.417	0.417	0.47	0.599	0.84
C4H10				0.31	0.06	3.31	0.061	3.57	0.141	0.141	0.16	0.202	0.28
C5H10				0.48	0.09	6.17	0.095	6.64	0.218	0.218	0.25	0.313	0.44
C6H12				0.11	0.02	1.68	0.022	1.81	0.050	0.050	0.06	0.072	0.10
OIL												0.492	0.69
WATER												6.093	8.49
TOTAL		43.45	551.66		18.38	345.30	19.778	371.60	45.373	88.821		71.736	
H2+CO		41.87			12.13		13.054		29.946				
H2/CO		1.68			3.15		3.145		3.146	2.143		3.146	

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	-12.475	-12.475	20.16			-12.475				
H2				-32.674						
CO2	3.191	3.191	20.42			6.382				
N2	- 0.066									
CH4	0.904	0.904	5.79	3.616						
C2H4	0.245	0.490	3.14	0.980						63.74
C2H6	0.130	0.260	1.66	0.780						
C3H6	0.269	0.807	5.17	1.614			11.3 10.2	4.32 6.25	2.62 1.63	70.26
C3H8	0.109	0.327	2.09	0.872			4.8	4.24	1.13	
C4H8	0.182	0.728	4.66	1.456			10.2 9.7	5.00 6.10	2.04 1.59	74.11
C4H10	0.061	0.244	1.56	0.61			3.6	4.86	0.73	
C5H10	0.095	0.475	3.04	0.95			6.6	5.45	1.21	
C6H12	0.022	0.132	0.85	0.26			1.8	5.50	0.33	
OIL		4.917	31.47	9.83			69.0	6.47	10.66	
WATER				11.70		5.849 6.093				
TOTAL	-26.670						107.3 100.9		18.72 16.15	
H2+CO	-28.812									
H2/CO	1.310									

ULTIMATE YIELDS	% C0 Fed	#/hr	H2 / C0 #/MCF	g/M3	Gal/hr	H2 / C0 Gal/MCF	cc/M3
C1+C2	10.586	25.30	1.594	26.955			
C3+*	48.835	38.33	2.415	40.838			
C4+*	41.577	22.22	1.400	23.674			
Ult. Oil		100.87	6.355	107.463	16.150	1.018	143.843
C02	20.424	140.43	8.848	149.620			
H20		109.77	6.916	116.950			

* In product gas only

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas	345.304	107.62	371.604
Oil	60.235		60.235
Water	119.820		119.820
Total	525.359	95.23	551.659

EFFLUENT RATIOS	
H2/H20	5.355
C02/C0	1.368
(H2) (C02) / (H20) (C0)	7.326

CONTRACTION: 54.479

C0 Conversion: 79.845

H2 Conversion: 62.255

H_2+C0= 68.820

H_2+C0= 15850 SCFH

	#/hr	#/M	gal/hr	GPM
C_3+	38.334	2.415	8.065	0.508
Rec 01160.235		3.795	9.296	0.586
NSC	11.982	0.755	1.437	0.091
	110.551	6.965	18.798	1.185
H_2O	107.858	6.795	12.930	0.815

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.