VII. APPENDIX II

DETAILED EXPERIMENTAL DATA

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 394 From April-22-48 Hr. 1200 to April-23-48 Hr. 0300

FLOWS	SCFH	%
Oxygen	3361	
Nat. Gas	5019	
Total	8380	40.1
Fresh Feed	12065	
F. F. by C	13634	
Avg. F. F.		
Wet Gas	7224	
Contraction	–	40.1
Recycle	24728	
Bleed	3403	
Total	28131	
Total Feed	40196	
Recycle/F.F.	2.33	
Inlet Vel.		
Steam Flow		

RUN CONDITIONS	
Generator Press.	275
O_2 Preheat, °F	333
Gas Preheat, °F	725
Reactor Press.	253
Steam Back Press.	
Temperatures, °F	
Heater Outlet	
Catalyst #1	621
#2	514
PRE-HEAT #3	769
" #4	744
#5	
Average	
Product Separator	

DISTILLATIONS	A S T M				Hempel Dist.		
					°F	%	A.P.I.
Prod.	GAS OIL						
A.P.I.	38.5				to 400	56.6	50.5
I.B.P.	138				400-550	24.6	35.1
5%					550+	18.8	
10%	198						
20	222						
30	242				WATER		
40	258				Temp.	%	
50	278				200		
60	294				203		
70	318				208		
80	338				WATER A.P.I.	9.3	
90	362						
95	386						
E.P.	406						
Rec.	98.0						
Res.	1.0						
Loss.	1.0						

CATALYST DATA	
In Reactor at Start of Period	638
Fresh Catalyst Charged	–
Catalyst Recharged	–
Total	638
Catalyst Taken Out	10
In Reactor at End of Period	628
Reactor d-P, H_2O	84.0
Pounds in Reactor	
Density, lbs./cu. ft.	
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	64.01
From d-P Meters	

CATALYST ANALYSIS	Particle Size				
	Screen			Sedimentation	
	Frac.	M	%	M	%
	On 40	420+	18.0	80+	
	100	419-150	19.4	80-40	
	150	149-105	34.4	40-20	
	200	104-74	10.8	20-10	
	250	73-62	2.2	10-0	
	325	61-44	6.8		
	<325	43-0	8.4		
	Density, lbs./cu. ft.			Chem. Anal.	
	Aerated			% Fe	
	Settled			% C	
	Compacted			% Oil	
	Sp. Grav. 5.1			Specific Surface	
					m^2/gm

NATURAL GAS	%
CO_2	1.45
CH_4	85.74
C_2H_6	8.77
C_3H_8	3.64
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	45.0	42.7			
Sap. No.	52.6	40.5			
Hydrox. No.	46.1				
Bromine No.	66.9				
% Fe					
% Alc					

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2	285.18	8.87			17.74
CO_2	8.36	.19	.19		.38
CH_4	182.08	11.38	11.38	45.52	
C_2H_6	35.70	1.19	2.38	7.14	
C_3H_8	21.12	.48	1.44	3.84	
C_4H_{10}					
N_2					
Total		22.11	15.39	56.50	18.12

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	2.27	.72	.72		1.44
CO	55.48	11.29	11.29		11.29
CH_4	4.47	1.58	1.58	6.32	
H_2	36.83	18.07		36.18	
N_2	.45	.14			
H_2O				10.78	5.39
Total		31.82	13.59	53.28	18.12

	FRESH FEED			WET GAS					RECYCLE	COMB. FEED		EFFLUENT		NET CHANGE ON REACTION									
					Measured		At Wt. Balance							Carbon		Hydrogen		Oxygen	Ultimate Oil			Unsats.
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	#/hr	m/hr	m/hr	%	m/hr	%	a/hr	%	a/hr	%	a/hr	#/hr	#/gal	gal/hr	%
CO	35.48	11.29	316.12	13.88	2.65	74.20			10.16	21.45	19.87	12.81	13.14	-8.64	-8.64	23.47		-8.64				
H2	56.83	18.09	36.18	44.79	8.54	17.08			32.79	50.88	47.14	41.33	42.40	-9.55			-19.10					
CO2	2.27	.72	31.68	12.76	2.43	106.92			9.34	10.06	9.32	11.77	12.07	1.71	1.71	15.15		3.42				
N2	.45	.14	3.92	1.45	.28	7.84			1.06	1.20	1.11	1.34	1.37	.14								
CH4	4.47	1.58	25.28	20.68	3.98	63.68			15.29	19.87	18.41	19.27	19.77	2.40	2.40	21.26	9.60					
C2H4				.97	.18	5.04			.71	.71	.66	.84	.91	.18	.36	3.19	.72					
C2H6				1.65	.31	9.30			1.21	1.21	1.12	1.52	1.56	.31	.62	5.49	1.86					
C3H6				.97	.18	7.56			.71	.71	.66	.89	.91	.18	.54	4.78	1.08		6.50	6.25	1.09	
C3H8				1.00	.19	8.36			.73	.73	.68	.92	.94	.19	.57	5.05	1.52					
C4H8				.68	.13	7.28			.50	.50	.46	.63	.65	.13	.32	4.61	1.04		6.92	6.10	1.13	
C4H10				.11	.02	1.16			.08	.08	.07	.10	.10	.02	.08	.71	.20		1.16	4.96	.24	
C5H10				.48	.09	6.30			.35	.35	.32	.44	.45	.09	.45	3.99	.90		6.30	5.43	1.17	
C6H12				.26	.05	4.20			.19	.19	.18	.24	.25	.05	.30	2.66	.60		4.20	5.50	.76	
OIL						(15.26)						.11	.11		1.09	9.65	2.18		15.26	6.50	2.35	
WATER												5.22	5.35				-.40	5.22				
TOTAL		31.83	413.18		19.06	318.92			73.12	107.94	100.00	97.48	99.99	12.79		100.01			40.64		6.74	
H2+CO		29.38																				
H2/CO		1.60			3.22					2.37		3.23										

ULTIMATE YIELDS	% CO Fed	#/hr	H2 / CO #/MCF	H2 / CO g/M3	Gal/hr	H2 / CO Gal/MCF	H2 / CO cc/M3
C1+C2	29.94	52.74	4.37	77.90			
C3+	31.45	50.12	9.16	70.35			
C4+	21.62	34.20	2.84	48.02			
Ult. Oil		40.64	3.37	56.99	6.74	.56	79.13
C02	15.15	75.24	6.24	105.52			
H20		93.96	7.79	131.73			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas			
Oil			
Water			
Total			

EFFLUENT RATIOS	
H2/H20	7.92
C02/C0	.92
(H2) (C02) / (H20) (C0)	7.27

CONTRACTION: 40.2

C0 Conversion: 76.5

H2 Conversion: 52.8

$H_2 + CO = 57.1$

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 39B From April 23 48 Hr. 2300 to April 24 48 Hr. 0700

FLOWS	SCFH	%
Oxygen	3130	
Nat. Gas	4470	
Total	7600	41.2
Fresh Feed	13000	
F. F. by C	13100	
Avg. F. F.		
Wet Gas	5060	
Contraction		61.1
Recycle	23200	
Bleed	3334	
Total	26534	
Total Feed	39534	
Recycle/F.F.	2.02	
Inlet Vel.		
Steam Flow		

RUN CONDITIONS	
Generator Press.	272
O_2 Preheat, °F	350
Gas Preheat, °F	722
Reactor Press.	252
Steam Back Press.	
Temperatures, °F	
Heater Outlet	
Catalyst #1	645
#2	642
Pre-Heat #3	819
" #4	800
#5	
Average	
Product Separator	

DISTILLATIONS	A S T M					Hempel Dist.		
	Prod.	645 OIL				°F	%	A.P.I.
	A.P.I.	42.8				to 400	7.23	54.4
	I.B.P.	112				400-550	20.6	31.9
	5%					550+		
	10%	162						
	20	192						
	30	216				WATER		
	40	236				Temp.	%	
	50	256				200		
	60	276				203		
	70	300				208		
	80	328				WATER APP.	9.9	
	90	216						
	95	266						
	E.P.	409						
	Rec.	98.0						
	Res.	1.0						
	Loss.	1.0						

CATALYST DATA	
In Reactor at Start of Period	628
Fresh Catalyst Charged	-
Catalyst Recharged	-
Total	628
Catalyst Taken Out	16
In Reactor at End of Period	612
Reactor d-P, H_2O	96.0
Pounds in Reactor	
Density, lbs./cu. ft.	
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	664.6
From d-P Meters	

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

NATURAL GAS	%
CO_2	1.37
CH_4	85.84
C_2H_6	9.19
C_3H_8	3.59
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION						
		Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	42.1	34.2				
Sap. No.	45.5	34.9				
Hydrox. No.	43.2					
Bromine No.	62.3					
% Fe						
% Alc			3.5			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2	264.32	8.26			16.52
CO_2	7.04	.16	.16		.32
CH_4	161.92	10.12	10.12	40.48	
C_2H_6	32.40	1.08	2.16	6.48	
C_3H_8	18.48	.42	1.26	3.36	
C_4H_{10}					
N_2					
Total		19.04	13.70	50.32	16.84

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	2.15	.74	.74		1.48
CO	35.66	12.23	12.23		12.23
CH_4	.69	.24	.24	.96	
H_2	61.44	21.07		42.14	
N_2	.05	.02			
H_2O				6.26	3.13
Total		34.30	13.21	49.36	16.84

FRESH FEED	%	m/hr	#/hr
CO	35.66	12.23	342.44
H2	61.44	21.07	42.14
CO2	2.15	.74	32.56
N2	.05	.02	.56
CH4	.69	.24	3.84
C2H4			
C2H6			
C3H6			
C3H8			
C4H8			
C4H10			
C5H10			
C6H12			
OIL			
WATER			
TOTAL		34.30	421.54
H2+CO		33.30	
H2/CO		1.72	

WET GAS	%	Measured m/hr	Measured #/hr	At Wt. Balance m/hr	At Wt. Balance #/hr
CO	11.80	1.58	44.24		
H2	48.37	6.46	12.92		
CO2	20.42	2.73	120.12		
N2	1.12	.15	4.20		
CH4	9.87	1.32	21.12		
C2H4	1.93	.26	7.28		
C2H6	1.76	.19	5.70		
C3H6	1.98	.26	10.92		
C3H8	.52	.07	3.08		
C4H8	1.25	.17	9.52		
C4H10	.26	.03	1.74		
C5H10	.55	.07	4.90		
C6H12	.45	.06	5.04		
OIL			(58.52)		
WATER					
TOTAL		13.35	250.78		
H2+CO		8.04			
H2/CO		4.09			

RECYCLE	m/hr
CO	8.18
H2	33.52
CO2	14.15
N2	.78
CH4	6.84
C2H4	1.34
C2H6	1.01
C3H6	1.37
C3H8	.76
C4H8	.87
C4H10	.18
C5H10	.38
C6H12	.31
OIL	
WATER	
TOTAL	69.29
H2+CO	
H2/CO	

COMB. FEED	m/hr	%
CO	20.41	19.70
H2	54.54	52.70
CO2	14.89	14.37
N2	.80	.77
CH4	7.08	6.83
C2H4	1.34	1.29
C2H6	1.01	.97
C3H6	1.37	1.32
C3H8	.36	.35
C4H8	.87	.84
C4H10	.18	.17
C5H10	.38	.37
C6H12	.31	.30
OIL		
WATER		
TOTAL	103.59	99.98
H2+CO		
H2/CO	2.67	

EFFLUENT	m/hr	%
CO	9.76	10.88
H2	39.88	44.56
CO2	16.88	18.81
N2	.93	1.04
CH4	8.16	9.09
C2H4	1.60	1.78
C2H6	1.20	1.34
C3H6	1.63	1.82
C3H8	.43	.48
C4H8	1.04	1.16
C4H10	.21	.23
C5H10	.45	.50
C6H12	.37	.41
OIL	.42	.47
WATER	6.67	7.43
TOTAL	89.73	100.00
H2+CO		
H2/CO	4.10	

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	-10.65	-10.65	12.92			-10.65				
H2	-14.61			-29.22						
CO2	1.99	1.99	16.27			3.98				
N2	.13									
CH4	1.09	1.08	8.83	4.32						
C2H4	.26	.52	4.25	1.04						
C2H6	.19	.38	3.11	1.14						
C3H6	.26	.78	6.38	1.56			9.83	6.25	1.57	
C3H8	.07	.21	1.72	.56						
C4H8	.17	.68	5.56	1.36			9.04	6.10	1.48	
C4H10	.03	.12	.98	.30			1.74	4.86	.36	
C5H10	.07	.35	2.86	.70			4.90	5.40	.91	
C6H12	.06	.36	2.94	.72			5.04	5.50	.92	
OIL	4.18	34.18		8.36			58.52	6.50	9.00	
WATER				9.16		(4.38) 6.67				
TOTAL	20.95		100.00				89.07		14.24	
H2+CO										
H2/CO										

ULTIMATE YIELDS	% C0 Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	16.19	30.26	2.33	39.40			
C3+	54.62	93.72	7.21	121.92			
C4+	46.52	79.72	6.13	103.66			
Ult. Oil		89.07	6.85	115.83	14.24	1.10	155.43
C02	16.27	87.56	6.74	113.97			
H20		120.06	9.24	156.25			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas			
Oil			
Water			
Total			

EFFLUENT RATIOS	
H2/H20	5.49
C02/C0	1.73
(H2) (C02) / (H20) (C0)	10.37

CONTRACTION: 61.1

C0 Conversion: 87.1

H2 Conversion: 69.3

$H_2 + CO = 73.6$

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 390 From April 24-48 Hr. 0800 to April 25-48 Hr. 0700
Shut Down Four (4) Hours

FLOWS	SCFH	%
Oxygen	3000	
Nat. Gas	4466	
Total	7466	40.2
Fresh Feed	14650	
F. F. by C	13175	
Avg. F. F.		
Wet Gas	3832	
Contraction		70.9
Recycle	25070	
Bleed	3256	
Total	28326	
Total Feed	41501	
Recycle/F.F.	2.15	
Inlet Vel.	1.49	
Steam Flow		

RUN CONDITIONS	
Generator Press.	275
O_2 Preheat, °F	369
Gas Preheat, °F	760
Reactor Press.	252
Steam Back Press.	
Temperatures, °F	
Heater Outlet	
Catalyst #1	623
#2	622
Pre-Heat #3	759
" #4	756
#5	
Average	
Product Separator	

DISTILLATIONS	A S T M					Hempel Dist.		
	Prod.	GAS OIL				°F	%	A.P.I.
	A.P.I.	43.8				to 400	76.6	52.7
	I.B.P.	110				400-550	17.3	33.8
	5%					550+		
	10%	156						
	20	186						
	30	210				WATER		
	40	230				Temp.	%	
	50	252				200		
	60	272				203		
	70	296				208		
	80	324				WATER A.P.I.	10.0	
	90	352						
	95	394						
	E.P.	400						
	Rec.	98.0						
	Res.	1.0						
	Loss.	1.0						

CATALYST DATA	
In Reactor at Start of Period	612
Fresh Catalyst Charged	—
Catalyst Recharged	—
Total	612
Catalyst Taken Out	40
In Reactor at End of Period	572
Reactor d-P, H_2O	
Pounds in Reactor	98.0
Density, lbs./cu. ft.	
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	72.55
From d-P Meters	

CATALYST ANALYSIS	Particle Size				
	Screen			Sedimentation	
	Frac.	M	%	M	%
	On 40	420+	4.8	80+	
	100	419-150	2.0	80-40	
	150	149-105	.0	40-20	
	200	104-74	.1	20-10	
	250	73-62	.1	10-0	
	325	61-44	.0		
	<325	43-0	93.0		
	Density, lbs./cu. ft.			Chem. Anal.	
	Aerated			% Fe	
	Settled			% C	
	Compacted			% Oil	
	Sp. Grav. 4.7			Specific Surface	
					m^2/gm

NATURAL GAS	%
CO_2	1.56
CH_4	86.21
C_2H_6	8.83
C_3H_8	3.39
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	42.4	38.6			
Sap. No.	43.2	37.9			
Hydrox. No.	57.6				
Bromine No.	63.8				
% Fe					
% Alc		3.0			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2	253.44	7.92			15.84
CO_2	7.92	.18	.18		.36
CH_4	162.56	10.16	10.16	40.64	
C_2H_6	31.20	1.04	2.08	12.48	
C_3H_8	17.60	.40	1.20	9.60	
C_4H_{10}					
N_2	1990	13.62	62.72	16.20	
Total					

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	2.07	.72	.72		1.44
CO	34.27	11.91	11.91		11.91
CH_4	2.30	.80	.80	3.20	
H_2	60.87	21.19		42.38	
N_2	.39	.14			
H_2O				5.70	2.85
Total		34.76	13.43	51.28	16.20

	FRESH FEED %	m/hr	#/hr	WET GAS %	Measured m/hr	Measured #/hr	At Wt. Balance m/hr	At Wt. Balance #/hr	RECYCLE m/hr	COMB. FEED m/hr	COMB. FEED %	EFFLUENT m/hr	EFFLUENT %
CO	34.39	11.95	334.60	14.70	1.49	41.72			10.99	22.94	20.96	12.48	13.22
H2	61.29	21.30	42.60	51.42	5.20	10.40			38.43	59.73	54.56	43.63	46.22
CO2	1.82	.63	27.72	14.29	1.44	63.36			10.68	11.31	10.33	14.12	12.64
N2	.10	.03	.84	.19	.02	.56			.14	.17	.16	.16	.17
CH4	2.40	.83	13.28	11.92	1.21	19.36			8.91	9.74	8.90	10.12	10.72
C2H4				1.47	.15	4.20			1.10	1.10	1.00	1.35	1.32
C2H6				1.25	.13	3.90			.93	.93	.85	1.06	1.12
C3H6				1.50	.15	6.30			1.12	1.12	1.02	1.27	1.35
C3H8				1.22	.12	5.28			.91	.91	.83	1.03	1.09
C4H8				1.03	.10	5.60			.77	.77	.70	.87	.92
C4H10				.28	.03	1.74			.21	.21	.19	.24	.25
C5H10				.47	.05	3.50			.35	.35	.32	.40	.42
C6H12				.25	.03	2.52			.19	.19	.17	.22	.23
OIL						(97.30)						.70	.74
WATER												8.84	9.37
TOTAL		34.76	419.04		10.11	168.44			74.73	109.47	99.99	94.39	99.98
H2+CO		33.25			6.69								
H2/CO		1.78			3.49					2.60		3.49	

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	-10.46	-10.46	12.47			-10.46				
H2	-16.10			-32.20						
CO2	.81	.81	6.78			1.62				
N2	-.01									
CH4	.38	.38	3.18	1.52						
C2H4	.15	.30	2.51	.60						
C2H6	.13	.26	2.18	.78						
C3H6	.15	.45	3.77	.90			5.67	6.25	.91	
C3H8	.12	.36	3.01	.96						
C4H8	.10	.40	3.35	.80			6.32	6.10	.87	
C4H10	.03	.12	1.00	.30			1.74	4.86	.36	
C5H10	.05	.25	2.09	.50			3.50	5.40	.65	
C6H12	.03	.18	1.51	.36			2.52	5.50	.46	
OIL		6.95	58.16	13.90		(5.79)	97.30	6.50	14.97	
WATER				11.58		8.84				
TOTAL	27.62		100.01				116.05		18.22	

ULTIMATE YIELDS	% C0 Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	7.59	14.18	1.13	19.11			
C3+	72.59	122.24	9.70	164.03			
C4+	66.11	110.66	8.78	148.47			
Ult. Oil		116.05	9.21	155.74	18.22	1.45	204.89
C02	6.78	35.64	2.83	47.86			
H20		159.12	12.63	213.57			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas			
Oil			
Water			
Total			

EFFLUENT RATIOS	
H2/H20	4.94
C02/C0	.97
(H2) (C02) / (H20) (C0)	4.79

CONTRACTION: 70.8
C0 Conversion: 87.5
H2 Conversion: 75.6
$N_2 + CO = 76.4$

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 391 From April 25-48 Hr. 0800 to April 26-48 Hr. 0700

FLOWS	SCFH	%
Oxygen	3020	
Nat. Gas	4420	
Total	7440	40.6
Fresh Feed	12000	
F. F. by C	13300	
Avg. F. F.		
Wet Gas	5900	
Contraction		50.8
Recycle	21600	
Bleed	5421	
Total	27021	
Total Feed	39021	
Recycle/F.F.	2.25	
Inlet Vel.		
Steam Flow		

RUN CONDITIONS	
Generator Press.	278
O_2 Preheat, °F	358
Gas Preheat, °F	760
Reactor Press.	300
Steam Back Press.	
Temperatures, °F	
Heater Outlet	
Catalyst ±1	645
±2	650
PRE-HEAT ±3	770
±4	770
±5	
Average	
Product Separator	

DISTILLATIONS	A S T M				Hempel Dist.		
					°F	%	A.P.I.
Prod.	GAS OIL						
A.P.I.	43.4				to 400	65.0	51.5
I.B.P.	126				400-550	26.0	34.4
5%					550+	9.0	
10%	182						
20	216						
30	236				WATER		
40	246				Temp.	%	
50	258				200		
60	268				203		
70	308				208		
80	338				WATER A.P.I.	10.0	
90	364						
95	388						
E.P.	408						
Rec.	98.0						
Res.	1.0						
Loss	1.0						

CATALYST DATA	
In Reactor at Start of Period	572
Fresh Catalyst Charged	105
Catalyst Recharged	—
Total	677
Catalyst Taken Out	27
In Reactor at End of Period	650
Reactor d-P, H_2O	100.0
Pounds in Reactor	
Density, lbs./cu. ft.	
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	60.03
From d-P Meters	

CATALYST ANALYSIS	Particle Size				
	Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	3.4	80+	
100	419-150	68.4	80-40	
150	149-105	6.6	40-20	
200	104-74	7.8	20-10	
250	73-62	2.0	10-0	
325	61-44	4.4		
<325	43-0	6.4		

	Density, lbs./cu. ft	Chem. Anal.
Aerated	137.0	% Fe
Settled	138.0	% C
Compacted	144.5	% Oil
Sp. Grav.	3.9	Specific Surface
		m^2 gm

NATURAL GAS	%
CO_2	1.29
CH_4	84.52
C_2H_6	9.53
C_3H_8	4.66
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	39.0	36.6			
Sap. No.	43.7	37.2			
Hydrox. No.	41.2				
Bromine No.	62.0				
% Fe					
% Alc		4.0			

GENERATOR ELEMENTAL BALANCE

	IN Mol %	IN SCFH m/hr	IN C	IN H	IN O	OUT	OUT Mol %	OUT SCFH m/hr	OUT C	OUT H	OUT O
O_2	255.04	7.97			15.94	CO_2	1.82	.58	.58		1.16
CO_2	6.60	.15	.15		.30	CO	34.39	10.89	10.89		10.89
CH_4	157.76	9.86	9.86	39.44		CH_4	2.40	.76	.76	3.04	
C_2H_6	33.30	1.11	2.22	13.32		H_2	61.24	19.40		38.80	
C_3H_8	23.76	.54	1.62	4.32		N_2	.10	.03			
C_4H_{10}						H_2O				8.38	4.19
N_2						Total		31.66	12.23	50.22	16.24
Total		19.63	13.85	57.08	16.24						

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS Measured m/hr	WET GAS Measured #/hr	WET GAS At Wt. Balance m/hr	WET GAS At Wt. Balance #/hr	RECYCLE m/hr	COMB. FEED m/hr	COMB. FEED %	EFFLUENT m/hr	EFFLUENT %
CO	34.3	10.86	304.08	12.66	1.97	55.16			9.02	19.88	19.31	10.49	12.00
H2	61.0	19.31	38.62	45.11	7.02	14.04			32.14	51.45	49.98	34.16	42.75
CO2	2.1	.66	29.04	17.43	2.79	122.76			13.77	13.43	13.05	15.56	16.49
N2	.4	.13	3.64	2.73	.43	12.04			1.94	2.07	2.01	2.37	2.54
CH4	2.3	.73	11.68	13.66	2.16	34.56			9.87	10.60	10.30	12.03	13.13
C2H4				1.45	.23	6.44			1.03	1.03	1.00	1.26	1.38
C2H6				1.59	.25	7.50			1.13	1.13	1.10	1.38	1.51
C3H6				1.39	.22	9.24			.99	.99	.96	1.21	1.32
C3H8				.67	.10	4.40			.48	.48	.47	.58	.63
C4H8				1.17	.18	10.08			.83	.83	.81	1.01	1.10
C4H10				.31	.05	2.90			.22	.22	.21	.27	.29
C5H10				.64	.10	7.00			.46	.46	.45	.56	.61
C6H12				.50	.08	6.72			.37	.37	.36	.45	.49
OIL					(91.14)							.15	.16
WATER												4.63	5.05
TOTAL		31.66	387.06		15.57	292.84			71.24	102.94	100.01	91.61	100.00
H2+CO		30.17			8.99								
H2/CO		1.28			3.56					2.59		3.56	

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	-8.89	-8.89	18.14			-8.89				
H2	12.24			-24.58						
CO2	2.13	2.13	19.61			4.26				
N2	.30									
CH4	1.43	1.43	13.17	5.72						
C2H4	.23	.46	4.24	.92						
C2H6	.25	.50	4.60	1.50						
C3H6	.22	.66	6.08	1.32			8.32	6.25	1.33	
C3H8	.10	.30	2.76	.80						
C4H8	.18	.72	6.63	1.44			9.58	6.10	1.57	
C4H10	.05	.20	1.64	.50			3.40	4.36	.60	
C5H10	.10	.50	4.60	1.00			7.00	5.40	1.30	
C6H12	.08	.48	4.42	.96			6.72	5.52	1.22	
OIL		1.51	13.90	3.02			21.14	6.52	3.25	
WATER				7.40		(3.70) 4.63				
TOTAL	16.11		99.99				55.66		9.27	

ULTIMATE YIELDS	% C0 Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	H2/C0 cc/M3
C1+C2	22.01	36.82	3.22	54.45			
C3+	40.23	61.48	5.38	90.98			
C4+	31.39	47.84	4.19	70.85			
Ult. Oil		55.66	4.87	82.35	9.27	.81	114.45
C02	19.61	93.72	8.20	138.66			
H20		83.34	7.29	123.27			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas			
Oil			
Water			
Total			

EFFLUENT RATIOS	
H2/H20	8.46
C02/C0	1.42
(H2) (C02) / (H20) (C0)	11.98

CONTRACTION: 50.9

C0 Conversion: 81.9

H2 Conversion: 63.6

H2+C0 = 66.9

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 40A From April 30-48 Hr. 0800 to May 1-48 Hr. 0700

FLOWS	SCFH	%
Oxygen	2978	
Nat. Gas	4311	
Total	7289	40.8
Fresh Feed	12437	
F. F. by C	13000	
Avg. F. F.		
Wet Gas	5700	
Contraction		54.2
Recycle	21191	
Bleed	3079	
Total	24270	
Total Feed	36707	
Recycle/F.F.	1.97	
Inlet Vel.	1.28	
Steam Flow		

RUN CONDITIONS	
Generator Press.	280
O_2 Preheat, °F	384
Gas Preheat, °F	768
Reactor Press.	250
Steam Back Press.	
Temperatures, °F	
Heater Outlet	
Catalyst #1	639
#2	640
#3	650
#4	621
#5	
Average	
Product Separator	
PRE-HEATER #3	707
#4	700

DISTILLATIONS	A S T M				Hempel Dist.		
					°F	%	A.P.I.
Prod.	Gas Oil						
A.P.I.	45.2				to 400	65.0	52.3
I.B.P.	120				400-550	19.6	35.0
5%					550+		
10%	146						
20	192						
30	218				WATER		
40	238				Temp.	%	
50	262				200		
60	282				203		
70	308				208		
80	330				WATER A.P.I.	9.7	
90	360						
95	390						
E.P.	410						
Rec.	98.0						
Res.	1.0						
Loss	1.0						

CATALYST DATA	
In Reactor at Start of Period	257
Fresh Catalyst Charged	—
Catalyst Recharged	161
Total	418
Catalyst Taken Out	28
In Reactor at End of Period	390
Reactor d-P, H_2O	170.0
Pounds in Reactor	
Density, lbs./cu. ft.	
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	9X.12
From d-P Meters	

CATALYST ANALYSIS					
Particle Size					
Screen				Sedimentation	
Frac.	M	%		M	%
On 40	420+	11.2		80+	
100	419-150	50.8		80-40	
150	149-105	7.6		40-20	
200	104-74	7.4		20-10	
250	73-62	2.2		10-0	
325	61-44	4.2			
<325	43-0	13.6			
Density, lbs./cu. ft			Chem. Anal.		
Aerated			% Fe		
Settled			% C		
Compacted			% Oil		
Sp. Grav. 4.5			Specific Surface		
					m^2 gm

NATURAL GAS	%
CO_2	1.41
CH_4	86.56
C_2H_6	8.75
C_3H_8	3.28
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	45.3	42.4			
Sap. No.	48.4	42.4			
Hydrox. No.	52.7				
Bromine No.	65.5				
% Fe					
% Alc		3.1			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2	251.52	7.86			15.73
CO_2	7.04	.16	.16		.32
CH_4	157.44	9.84	9.84	39.36	
C_2H_6	29.70	.99	1.98	5.94	
C_3H_8	16.28	.37	1.11	2.96	
C_4H_{10}					
N_2					
Total		19.22	13.09	48.26	16.04

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	1.87	.61	.61		1.22
CO	34.36	11.28	11.28		11.28
CH_4	1.68	.55	.55	2.20	
H_2	60.37	19.81		39.62	
N_2	1.71	.56			
H_2O				7.08	3.54
Total		32.81	12.44	48.90	16.04

	FRESH FEED			WET GAS					RECYCLE	COMB. FEED		EFFLUENT		NET CHANGE ON REACTION									
					Measured		At Wt. Balance							Carbon			Hydrogen		Oxygen	Ultimate Oil			Unsats.
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	#/hr	m/hr	m/hr	%	m/hr	%	m/hr	a/hr	%	a/hr	%	a/hr	#/hr	#/gal	gal/hr	%
CO	34.4	11.29	316.12	13.67	2.06	57.68			8.84	20.13	20.65	10.90	12.81	-9.23	-9.23	18.25			-9.23				
H2	60.4	19.82	39.64	51.15	7.69	15.38			33.07	52.89	54.26	40.76	47.89	-12.13			-24.26						
CO2	1.9	.62	27.28	17.87	2.69	118.36			11.55	12.17	12.48	14.24	16.73	2.07	2.07	18.33			4.14				
N2	1.7	.56	15.68	.62	.09	2.52			.40	.96	.98	.49	.58	-.47									
CH4	1.6	.53	8.48	10.51	1.58	25.28			6.80	7.33	7.52	8.38	9.85	1.05	1.05	9.30	4.20						
C2H4				1.36	.20	5.60			.88	.88	.90	1.08	1.27	.20	.40	3.54	.80						
C2H6				1.14	.17	5.10			.74	.74	.76	.91	1.07	.17	.34	3.01	1.02						
C3H6				1.48	.22	9.24			.96	.96	.98	1.18	1.39	.22	.66	5.85	1.32			8.32	6.25	1.33	
C3H8				.59	.09	3.96			.38	.38	.39	.47	.55	.09	.27	2.39	.72						
C4H8				.83	.12	6.72			.54	.54	.55	.66	.78	.12	.48	4.25	.96			6.36	6.10	1.05	
C4H10				.12	.02	1.16			.08	.08	.08	.10	.12	.02	.08	.71	.20			1.16	4.86	.24	
C5H10				.43	.06	4.20			.28	.28	.29	.34	.40	.06	.30	2.66	.60			4.20	5.40	.78	
C6H12				.29	.03	2.52			.14	.14	.14	.17	.20	.03	.18	1.59	.36			2.52	5.50	.46	
OIL						(47.60)						.34	.40		3.40	30.12	6.80			47.60	6.50	7.32	
WATER												5.09	5.98				7.28		(3.64) 5.09				
TOTAL		33.82	407.20		15.04	257.72			64.66	97.48	99.98	85.11	100.02	17.80		100.00				70.18		11.18	
H2+CO		31.11			9.75																		
H2/CO		1.76			3.73					2.63		3.74											

ULTIMATE YIELDS	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	15.85	27.50	2.33	39.40			
C3+	47.57	75.40	6.40	106.22			
C4+	39.33	62.20	5.28	89.28			
Ult. Oil		70.18	5.95	100.61	11.18	.95	134.24
C02	16.33	41.08	7.73	130.71			
H20		41.62	7.77	131.39			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas			
Oil			
Water			
Total			

EFFLUENT RATIOS	
H2/H20	8.01
C02/C0	1.31
(H2) (C02) / (H20) (C0)	10.46

CONTRACTION: 54.2

C0 Conversion: 81.8

H2 Conversion: 61.2

$H_2 + CO = 65.1$

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 40B From May 1-48 Hr. 0800 to May 2-48 Hr. 0700

FLOWS	SCFH	%
Oxygen	2959	
Nat. Gas	4317	
Total	7276	40.7
Fresh Feed	12811	
F. F. by C	13887	
Avg. F. F.		
Wet Gas	5105	
Contraction		60.2
Recycle	20552	
Bleed	4068	
Total	24620	
Total Feed	37431	
Recycle F.F.	1.87	
Inlet Vel	1.17	
Steam Flow		

RUN CONDITIONS	
Generator Press.	285
O_2 Preheat, °F	440
Gas Preheat, °F	735
Reactor Press.	298
Steam Back Press.	
Temperatures, °F	
Heater Outlet	
Catalyst #1	640
#2	650
Pre-Heat #3	778
#4	784
#5	
Average	
Product Separator	

DISTILLATIONS	A S T M				Hempel Dist.		
					°F	%	A.P.I.
Prod.	645						
A.P.I.	44.5				to 400	69.3	57.8
I.B.P.	118				400-550	20.3	35.1
5%					550+		
10%	152						
20	186						
30	202				WATER		
40	226				Temp.	%	
50	248				200		
60	268				203		
70	302				208		
80	336				WATER A.P.I.	9.8	
90	362						
95	390						
E.P.	413						
Rec.	980						
Res.	1.0						
Loss.	1.0						

CATALYST DATA	
In Reactor at Start of Period	390
Fresh Catalyst Charged	107
Catalyst Recharged	—
Total	497
Catalyst Taken Out	31
In Reactor at End of Period	466
Reactor d-P, H_2O	176.0
Pounds in Reactor	
Density, lbs./cu. ft.	
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	80.30
From d-P Meters	

CATALYST ANALYSIS	Particle Size				
	Screen			Sedimentation	
	Frac.	M	%	M	%
	On 40	420+	7.4	80+	
	100	419-150	36.8	80-40	
	150	149-105	7.2	40-20	
	200	104-74	7.8	20-10	
	250	73-62	3.4	10-0	
	325	61-44	4.6		
	<325	43-0	12.8		
	Density, lbs./cu. ft			Chem. Anal.	
	Aerated			% Fe	
	Settled			% C	
	Compacted			% Oil	
	Sp. Grav. 4.2			Specific Surface	
					m^2 gm

NATURAL GAS	%
CO_2	1.36
CH_4	85.77
C_2H_6	9.49
C_3H_8	3.39
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut No.	50.8	43.9			
Sap. No.	53.3	44.6			
Hydrox No.	52.8				
Bromine No.	68.7				
% Fe					
% Alc		2.6			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2	249.92	7.81			15.62
CO_2	6.60	.15	.15		.30
CH_4	156.32	9.77	9.77	39.08	
C_2H_6	32.40	1.08	2.16	6.48	
C_3H_8	17.16	.39	1.17	3.12	
C_4H_{10}					
N_2					
Total		19.20	13.25	48.68	15.92

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	1.85	.63	.63		1.26
CO	32.37	10.44	10.44		10.44
CH_4	1.98	.67	.67	2.68	
H_2	61.67	20.84		41.68	
N_2	2.12	.72			
H_2O				7.44	3.72
Total		33.80	12.24	51.80	15.92

	FRESH FEED			WET GAS					RECYCLE	COMB. FEED		EFFLUENT		NET CHANGE ON REACTION									
					Measured		At Wt. Balance							Carbon			Hydrogen		Oxygen	Ultimate Oil			Unsats.
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	#/hr	m/hr	m/hr	%	m/hr	%	m/hr	a/hr	%	a/hr	%	a/hr	#/hr	#/gal	gal/hr	%
CO	32.4	10.93	306.60	12.97	1.75	49.00			8.20	19.15	19.74	9.95	12.05	-9.20	-9.20	15.98			-9.20				
H2	61.7	20.85	41.70	51.00	6.87	13.74			32.24	53.09	54.72	39.11	47.38	-13.98			-27.96						
CO2	1.8	.61	26.84	18.41	2.48	109.12			11.64	12.25	12.63	14.12	17.10	1.87	1.87	17.08			3.74				
N2	2.1	.71	19.88	.77	.10	2.80			.49	1.20	1.24	.59	.71	-.61									
CH4	2.0	.68	10.88	10.51	1.42	22.72			6.64	7.32	7.54	8.06	9.76	.74	.74	6.76	2.96						
C2H4				1.48	.20	5.60			.94	.94	.97	1.14	1.38	.20	.40	3.65	.80						
C2H6				1.14	.15	4.50			.72	.72	.74	.87	1.05	.15	.30	2.74	.90						
C3H6				1.48	.20	8.40			.94	.94	.97	1.14	1.38	.20	.60	5.48	1.20			7.56	6.25	1.21	
C3H8				.24	.04	1.76			.18	.18	.19	.22	.27	.04	.12	1.10	.32						
C4H8				.95	.13	7.28			.60	.60	.62	.73	.88	.13	.52	4.75	1.04			6.92	6.10	1.13	
C4H10				.18	.02	1.16			.11	.11	.11	.13	.16	.02	.08	.73	.20			1.16	4.86	.24	
C5H10				.50	.07	4.90			.32	.32	.33	.39	.47	.07	.35	3.20	.70			4.90	5.40	.91	
C6H12				.32	.04	3.36			.20	.20	.21	.24	.29	.04	.24	2.19	.48			3.36	5.50	.61	
OIL						(58.72)						.40	.48		3.98	36.35	7.96			53.72	6.50	8.57	
WATER												5.46	6.61				11.40		(5.70) 5.46				
TOTAL		33.80	405.90		13.47	234.34			63.21	97.02	100.00	82.55	99.97	20.33		100.01				79.62		12.67	
H2+CO		31.80			8.62																		
H2/CO		1.90			3.93					2.77		3.93											

ULTIMATE YIELDS	% CO Fed	#/hr	H2 / CO #/MCF	H2 / CO g/M3	Gal/hr	H2 / CO Gal/MCF	H2 / CO cc/M3
C1+C2	13.15	21.94	1.82	30.78			
C3+	53.80	82.58	6.85	115.83			
C4+	47.22	72.42	6.01	101.63			
Ult. Oil		79.62	6.61	111.78	12.67	1.05	148.37
C02	17.08	82.28	6.83	115.50			
H20		98.28	8.16	137.99			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas			
Oil			
Water			
Total			

EFFLUENT RATIOS	
H2/H20	7.16
C02/C0	1.42
(H2) (C02) / (H20) (C0)	10.16

CONTRACTION: 60.1

C0 Conversion: 85.0

H2 Conversion: 67.1

H2+C0 = 65.6

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 40C From May 2-48 Hr. 0600 to May 3-48 Hr. 0700

FLOWS	SCFH	%
Oxygen	3025	
Nat. Gas	4023	
Total	7048	42.9
Fresh Feed	12272	
F. F. by C	11710	
Avg. F. F.		
Wet Gas	5261	
Contraction		57.1
Recycle	19243	
Bleed	4026	
Total	23269	
Total Feed	35541	
Recycle/F.F.	1.64	
Inlet Vel.	1.11	
Steam Flow		

RUN CONDITIONS	
Generator Press.	285
O_2 Preheat, °F	430
Gas Preheat, °F	715
Reactor Press.	250
Steam Back Press.	
Temperatures, °F	
Heater Outlet	
Catalyst ±1	640
±2	643
PRE-HEAT ±3	770
" ±4	772
±5	
Average	
Product Separator	

DISTILLATIONS — A S T M					Hempel Dist.		
					°F	%	A.P.I.
Prod.	GAS OIL						
A.P.I.	43.9				to 400	64.6	51.2
I.B.P.	128				400-550	20.0	36.7
5%					550+		
10%	162						
20	198						
30	222				WATER		
40	242				Temp.	%	
50	268				200		
60	288				203		
70	310				208		
80	332				WATER A.P.I.	9.9	
90	360						
95	390						
E.P.	409						
Rec.	98.0						
Res.	1.0						
Loss.	1.0						

CATALYST DATA	
In Reactor at Start of Period	466
Fresh Catalyst Charged	93
Catalyst Recharged	
Total	559
Catalyst Taken Out	30
In Reactor at End of Period	529
Reactor d-P, H_2O	160.0
Pounds in Reactor	
Density, lbs./cu. ft.	
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	67.2
From d-P Meters	

CATALYST ANALYSIS — Particle Size					
	Screen			Sedimentation	
Frac.	M	%	M	%	
On 40	420+	10.6	80+		
100	419-150	57.1	80-40		
150	149-105	7.4	40-20		
200	104-74	8.0	20-10		
250	73-62	2.4	10-0		
325	61-44	3.4			
<325	43-0	11.0			
Density, lbs./cu. ft.			Chem. Anal.		
Aerated			% Fe		
Settled			% C		
Compacted			% Oil		
Sp. Grav. 3.6			Specific Surface		
					m^2 gm

NATURAL GAS	%
CO_2	1.75
CH_4	85.71
C_2H_6	8.89
C_3H_8	3.55
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	58.6	46.0			
Sap. No.	57.1	48.3			
Hydrox. No.	55.7				
Bromine No.	76.4				
% Fe					
% Alc		2.6			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2	255.36	7.98			15.96
CO_2	8.36	.19	.19		.38
CH_4	145.44	9.09	9.09	36.36	
C_2H_6	28.20	.94	1.88	5.64	
C_3H_8	16.72	.38	1.14	3.04	
C_4H_{10}					
N_2					
Total		18.58	12.30	45.04	16.34

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	1.96	.63	.63		1.26
CO	34.34	11.19	11.12		11.12
CH_4	3.18	1.03	1.03	4.12	
H_2	58.80	19.04		38.08	
N_2	1.73	.56			
H_2O				7.92	3.96
Total		32.38	12.78	50.12	16.34

	FRESH FEED %	m/hr	#/hr	WET GAS %	Measured m/hr	Measured #/hr	At Wt. Balance m/hr	At Wt. Balance #/hr	RECYCLE m/hr	COMB. FEED m/hr	COMB. FEED %	EFFLUENT m/hr	EFFLUENT %
CO	34.3	11.11	311.08	16.17	2.24	62.72			9.63	20.74	22.69	11.87	15.13
H2	58.8	19.04	38.08	46.53	6.46	12.92			27.72	46.76	51.16	34.18	43.56
CO2	2.0	.65	28.60	19.69	2.73	120.12			11.73	12.38	13.54	14.46	18.43
N2	1.7	.55	15.40	—	—	—							
CH4	3.2	1.04	16.64	10.48	1.45	23.20			6.24	7.28	7.96	7.69	9.80
C2H4				1.64	.23	6.44			.98	.98	1.07	1.21	1.54
C2H6				1.03	.14	4.20			.61	.61	.67	.75	.96
C3H6				1.70	.24	10.08			1.01	1.01	1.11	1.25	1.59
C3H8				.30	.04	1.76			.18	.18	.20	.22	.28
C4H8				1.12	.16	8.96			.67	.67	.73	.83	1.06
C4H10				.30	.04	2.37			.18	.18	.20	.22	.28
C5H10				.64	.09	6.30			.38	.38	.42	.47	.60
C6H12				.39	.05	4.20			.23	.23	.25	.28	.36
OIL						(45.50)						.33	.42
WATER												4.71	6.00
TOTAL		32.38	409.60		13.68	262.22			59.38	91.40	100.00	78.47	100.01
H2+CO		30.15			8.70								
H2/CO		1.71			2.58					2.25		2.68	

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	-8.87	-8.87	20.16			-8.87				
H2	-12.58			-25.16						
CO2	2.08	2.08	18.77			4.16				
N2	-.55									
CH4	.41	.41	3.69	1.64						
C2H4	.83	.46	4.14	.92						
C2H6	.14	.28	2.52	.84						
C3H6	.24	.72	6.48	1.44			9.07	6.25	1.45	
C3H8	.04	.12	1.08	.32						
C4H8	.16	.64	5.76	1.28			8.51	6.10	1.40	
C4H10	.04	.16	1.44	.40			2.32	4.86	.48	
C5H10	.09	.45	4.05	.90			6.30	5.40	1.17	
C6H12	.05	.30	2.70	.60			4.20	5.50	.76	
OIL		3.25	29.25	6.50			45.50	6.50	7.00	
WATER				10.32		(3.16) 4.71				
TOTAL	18.52		99.99				75.90		12.26	

ULTIMATE YIELDS	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	10.35	17.20	1.50	25.37			
C3+	50.76	79.12	6.92	117.02			
C4+	43.20	67.28	5.89	99.60			
Ult. Oil		75.90	6.64	112.28	12.26	1.07	157.19
C02	18.79	91.52	8.01	135.45			
H20		84.78	7.42	125.47			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas			
Oil			
Water			
Total			

EFFLUENT RATIOS	
H2/H20	7.26
C02/C0	1.22
(H2) (C02) / (H20) (C0)	8.84

CONTRACTION: 57.2

C0 Conversion: 74.8

H2 Conversion: 66.1

$H_2 + CO = 66.2$

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 40D From May 3-48 Hr. 0800 to May 4-48 Hr. 0700

FLOWS	SCFH	%
Oxygen	2950	
Nat. Gas	4370	
Total	7320	40.3
Fresh Feed	12400	
F. F. by C	14000	
Avg. F. F.		
Wet Gas	5560	
Contraction		55.2
Recycle	19780	
Bleed	3750	
Total	27530	
Total Feed	35930	
Recycle/F.F.	1.93	
Inlet Vel.		
Steam Flow		

RUN CONDITIONS	
Generator Press.	292
O_2 Preheat, °F	460
Gas Preheat, °F	740
Reactor Press.	248
Steam Back Press.	
Temperatures, °F	
Heater Outlet	
Catalyst #1	640
#2	645
#3	656
#4	635
#5	
Average	
Product Separator	
Pre-Heat #3	785
" #4	790

DISTILLATIONS — A S T M					Hempel Dist.		
					°F	%	A.P.I.
Prod.	GAS OIL						
A.P.I.	45.4				to 400	71.3	57.9
I.B.P.	132				400-550	20.0	36.5
5%					°550+		
10%	166						
20	195						
30	218						
40	240						
50	258						
60	278						
70	296						
80	318						
90	348						
95	376						
E.P.	400						
Rec.	98.0						
Res.	1.0						
Loss	1.0						

WATER	
Temp.	%
200	
203	
208	
Water A.P.I.	9.7

CATALYST DATA	
In Reactor at Start of Period	529
Fresh Catalyst Charged	—
Catalyst Recharged	—
Total	529
Catalyst Taken Out	30
In Reactor at End of Period	499
Reactor d-P, H_2O	162.0
Pounds in Reactor	
Density, lbs./cu. ft.	
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	72.0
From d-P Meters	

CATALYST ANALYSIS — Particle Size				
	Screen		Sedimentation	
Frac.	M	%	M	%
On 40	420+	8.0	80+	
100	419-150	65.6	80-40	
150	149-105	8.2	40-20	
200	104-74	6.8	20-10	
250	73-62	1.7	10-0	
325	61-44	2.7		
<325	43-0	6.8		

Density, lbs./cu. ft.		Chem. Anal.	
Aerated	144.5	% Fe	
Settled	158.3	% C	
Compacted	158.3	% Oil	
Sp. Grav.	4.1	Specific Surface	
			m^2/gm

NATURAL GAS	%
CO_2	1.32
CH_4	87.10
C_2H_6	8.37
C_3H_8	3.25
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	49.5	46.0			
Sap. No.	50.0	47.0			
Hydrox. No.	48.7				
Bromine No.	68.5				
% Fe					
% Alc		1.3			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2	248.96	7.78			15.56
CO_2	6.60	.15	.15		.30
CH_4	160.64	10.04	10.04	40.16	
C_2H_6	28.80	.96	1.92	8.64	
C_3H_8	16.28	.37	1.11	3.96	
C_4H_{10}					
N_2					
Total		19.30	13.22	51.76	15.86

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	1.99	.65	.65		1.30
CO	34.13	11.17	11.17		11.17
CH_4	2.80	.92	.92	3.68	
H_2	54.77	19.56		39.12	
N_2	1.31	.43			
H_2O				6.78	3.39
Total		32.73	12.74	49.58	15.86

	FRESH FEED			WET GAS					RECYCLE	COMB. FEED		EFFLUENT		NET CHANGE ON REACTION									
					Measured		At Wt. Balance							Carbon			Hydrogen		Oxygen	Ultimate Oil			Unsats.
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	#/hr	m/hr	m/hr	%	m/hr	%	m/hr	a/hr	%	a/hr	%	a/hr	#/hr	#/gal	gal/hr	%
CO	34.1	11.16	312.48	13.66	2.00	56.00			8.63	19.79	20.64	10.63	12.79	-9.16	-9.16	17.92			-9.16				
H2	59.8	19.57	39.14	51.26	7.52	15.04			32.37	51.94	54.18	39.89	48.01	-12.05			-24.10						
CO2	2.0	.65	28.60	18.99	2.79	122.76			11.99	19.64	13.18	14.78	17.79	2.14	2.14	19.18			4.28				
N2	1.3	.43	12.04	1.08	.16	4.48			.68	1.11	1.16	.84	1.01	-.27									
CH4	7.8	.92	14.72	9.27	1.36	21.76			5.85	6.77	7.06	7.21	8.68	.44	.44	3.94	1.76						
C2H4				1.32	.19	5.32			.83	.83	.87	1.02	1.23	.19	.38	3.41	.76						
C2H6				1.02	.15	4.50			.64	.64	.67	.79	.95	.15	.30	3.69	.90						
C3H6				1.41	.21	8.82			.89	.89	.93	1.10	1.32	.21	.63	5.65	1.26			7.94	6.25	1.27	
C3H8				.22	.03	1.32			.14	.14	.15	.17	.20	.03	.09	.81	.24						
C4H8				.83	.12	6.72			.52	.52	.54	.64	.77	.12	.48	4.30	.96			6.38	6.10	1.05	
C4H10				.14	.02	1.16			.09	.09	.09	.11	.13	.02	.08	.72	.20			1.16	4.86	.24	
C5H10				.44	.06	4.20			.28	.28	.29	.34	.41	.06	.30	3.69	.60			4.20	5.40	.78	
C6H12				.36	.05	4.20			.23	.23	.24	.28	.34	.05	.30	3.69	.60			4.20	5.50	.76	
OIL					(56.28)							.40	.48		4.02	36.02	8.04			56.28	6.50	8.66	
WATER												4.88	5.87				8.78		(24.39) 4.88				
TOTAL		32.72	406.98		14.67	256.28			63.15	95.87	100.00	83.08	99.98	18.07		100.02				80.16		12.76	
H2+CO		30.73			9.52																		
H2/CO		1.75			3.76					2.62		3.75											

ULTIMATE YIELDS	% CO Fed	#/hr	H2/C0 #/MCF	H2/C0 g/M3	Gal/hr	H2/C0 Gal/MCF	cc/M3
C1+C2	10.04	16.86	1.45	24.52			
C3+	52.88	82.70	7.10	120.06			
C4+	46.42	72.56	6.23	105.35			
Ult. Oil		80.16	6.88	116.34	12.76	1.10	155.43
C02	19.18	94.16	8.08	136.63			
H20		87.84	7.54	127.50			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas			
Oil			
Water			
Total			

EFFLUENT RATIOS	
H2/H20	8.17
C02/C0	1.39
(H2)(C02)/(H20)(C0)	11.37

CONTRACTION: 55.2

C0 Conversion: 82.1

H2 Conversion: 61.6

N2+C0 = 64.8

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 40 E From May 4-48 Hr. 0800 to May 5-48 Hr. 0200

FLOWS	SCFH	%
Oxygen	3000	
Nat. Gas	4360	
Total	7360	40.8
Fresh Feed	12800	
F. F. by C	14100	
Avg. F. F.		
Wet Gas	5600	
Contraction		56.3
Recycle	20080	
Bleed	3516	
Total	23596	
Total Feed	36396	
Recycle F.F.	1.84	
Inlet Vel.		
Steam Flow		

RUN CONDITIONS	
Generator Press.	290
O_2 Preheat, °F	420
Gas Preheat, °F	750
Reactor Press.	249
Steam Back Press.	
Temperatures, °F	
Heater Outlet	
Catalyst ±1	645
±2	640
±3	660
±4	630
±5	
Average	
Product Separator	
Pre-Heat #3	760
" #4	780

DISTILLATIONS	A S T M				Hempel Dist.		
					°F	%	A.P.I.
Prod.	Gas Oil						
A.P.I.	44.4				to 400	64.6	52.5
I.B.P.	123				400-550	24.6	36.1
5%					550+		
10%	166						
20	196						
30	216				WATER		
40	236				Temp.	%	
50	256				200		
60	276				203		
70	296				208	10.0	
80	316				Water A.P.I.	10.0	
90	346						
95	378						
E.P.	404						
Rec.	98.0						
Res.	1.0						
Loss	1.0						

CATALYST DATA	
In Reactor at Start of Period	499
Fresh Catalyst Charged	35
Catalyst Recharged	–
Total	534
Catalyst Taken Out	10.5
In Reactor at End of Period	523.5
Reactor d-P, H_2O	144.00
Pounds in Reactor	
Density, lbs./cu. ft.	
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	69.59
From d-P Meters	

CATALYST ANALYSIS	Particle Size				
	Screen			Sedimentation	
	Frac.	M	%	M	%
	On 40	420+	6.7	80+	
	100	419-150	64.4	80-40	
	150	149-105	8.3	40-20	
	200	104-74	7.7	20-10	
	250	73-62	3.0	10-0	
	325	61-44	2.6		
	<325	43-0	7.3		
	Density, lbs./cu. ft			Chem. Anal.	
	Aerated 142.9			% Fe	
	Settled 143.4			% C	
	Compacted 149.9			% Oil	
	Sp. Grav. 4.05			Specific Surface	
					m^2 gm

NATURAL GAS	%
CO_2	1.32
CH_4	36.31
C_2H_6	9.14
C_3H_8	5.14
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	54.3	41.2			
Sap. No.	52.9	45.7			
Hydrox No.	52.8				
Bromine No.	40.0				
% Fe					
% Alc		1.5			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2	25.24	7.92			15.84
CO_2	6.60	.15	.15		.30
CH_4	158.88	9.93	9.93	39.72	
C_2H_6	31.80	1.06	2.12	12.72	
C_3H_8	16.28	.37	1.11	2.96	
C_4H_{10}					
N_2					
Total		19.43	13.31	55.40	16.14

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	2.21	.75	.75		1.50
CO	34.44	11.63	11.63		11.63
CH_4	2.02	.68	.68	2.72	
H_2	60.40	20.40		40.80	
N_2	.92	.31			
H_2O				5.48	3.01 ~~2.74~~
Total		33.77	13.06	49.50	16.14

	FRESH FEED			WET GAS					RECYCLE	COMB. FEED		EFFLUENT		NET CHANGE ON REACTION									
					Measured		At Wt. Balance							Carbon			Hydrogen		Oxygen	Ultimate Oil			Unsats.
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	#/hr	m/hr	m/hr	%	m/hr	%	m/hr	a/hr	%	a/hr	%	a/hr	#/hr	#/gal	gal/hr	%
CO	34.4	11.62	325.36	14.09	2.08	58.24			8.76	20.38	21.33	10.84	13.03	-9.54	-9.54	17.90			-9.54				
H2	60.4	20.40	40.80	52.62	7.69	15.38			32.33	52.73	55.19	40.02	48.10	-12.71			-25.42						
CO2	2.2	.74	32.56	17.44	2.58	113.52			10.84	11.22	11.74	13.42	16.13	1.84	1.84	15.83			3.68				
N2	0.9	.30	8.40	1.04	.15	4.20			.65	.95	.99	.80	.96	- .15									
CH4	2.1	.71	11.36	9.19	1.36	21.76			5.71	6.42	6.72	7.07	8.50	.65	.65	5.59	2.60						
C2H4				1.42	.21	5.88			.88	.88	.92	1.09	1.31	.21	.42	3.61	.84						
C2H6				1.00	.15	4.50			.62	.62	.65	.77	.93	.15	.30	2.58	.90						
C3H6				1.55	.23	9.66			.96	.96	1.00	1.19	1.43	.23	.69	5.94	1.38			8.69	6.25	1.39	
C3H8				.24	.04	1.76			.15	.15	.16	.19	.23	.04	.12	1.03	.32						
C4H8				.93	.14	7.84			.58	.58	.61	.72	.87	.14	.56	4.82	1.12			7.45	6.10	1.22	
C4H10				.21	.03	1.74			.13	.13	.14	.16	.19	.03	.12	1.03	.30			1.74	4.96	.36	
C5H10				.55	.08	5.60			.34	.34	.36	.42	.50	.08	.40	3.44	.80			5.60	5.40	1.04	
C6H12				.31	.05	4.20			.19	.19	.20	.24	.29	.05	.30	2.58	.60			4.20	5.50	.76	
OIL					(57.96)							.41	.49		4.14	35.63	8.28			57.96	6.50	8.92	
WATER												5.86	7.04				8.28		(14.14) 5.86				
TOTAL		33.77	418.48		14.78	254.28			62.14	95.55	100.01	83.20	100.00	18.98		99.98				85.64		13.69	
H2+CO		32.02			9.77																		
H2/CO		1.76			3.70					2.59		3.69											

ULTIMATE YIELDS	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	11.28	20.78	1.71	28.92			
C3+	54.47	88.76	7.31	123.61			
C4+	47.50	77.34	6.37	107.72			
Ult. Oil		85.64	7.05	119.22	13.69	113	159.67
C02	15.83	80.96	6.67	112.79			
H20		105.48	8.69	146.95			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas			
Oil			
Water			
Total			

EFFLUENT RATIOS	
H2/H20	6.83
C02/C0	1.24
(H2) (C02) / (H20) (C0)	8.46

CONTRACTION: 56.9

C0 Conversion: 84.1

H2 Conversion: 62.3

N2+CO = 68.8

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 40F From May 5-48 Hr. 0F00 to May 6-48 Hr. 0700

FLOWS	SCFH	%
Oxygen	2943	
Nat. Gas	7474	
Total	6417	45.9
Fresh Feed	12648	
F. F. by C	10262	
Avg. F. F.		
Wet Gas	5785	
Contraction		54.3
Recycle	18644	
Bleed	3486	
Total	22130	
Total Feed	34778	
Recycle/F.F.	1.20	
Inlet Vel	1.13	
Steam Flow		

RUN CONDITIONS	
Generator Press.	290
O_2 Preheat, °F	400
Gas Preheat, °F	785
Reactor Press.	250
Steam Back Press.	
Temperatures, °F	
Heater Outlet	
Catalyst #1	630
#2	640
#3	650
#4	630
#5	
Average	
Product Separator	
Pre-Heat #3	790
" #4	800

DISTILLATIONS	A S T M					Hempel Dist.		
						°F	%	A.P.I.
Prod.	Gas Oil					to 400	65.3	51.5
A.P.I.	42.4					400-550	20.0	36.2
I.B.P.	122					550+		
5%								
10%	156							
20	176							
30	216					WATER		
40	236					Temp.	%	
50	258					200		
60	276					203		
70	298					208		
80	326					Water A.P.I.	10.2	
90	352							
95	374							
E.P.	403							
Rec.	98.0							
Res.	1.0							
Loss.	1.0							

CATALYST DATA	
In Reactor at Start of Period	523.5
Fresh Catalyst Charged	—
Catalyst Recharged	—
Total	523.5
Catalyst Taken Out	19.0
In Reactor at End of Period	504.5
Reactor d-P, H_2O	140.0
Pounds in Reactor	
Density, lbs./cu. ft.	
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	69.0
From d-P Meters	

CATALYST ANALYSIS	Particle Size				
	Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	1.8	80+	
100	419-150	56.3	80-40	
150	149-105	13.6	40-20	
200	104-74	10.8	20-10	
250	73-62	2.4	10-0	
325	61-44	5.8		
<325	43-0	9.4		
Density, lbs./cu. ft			Chem. Anal.	
Aerated	139.5		% Fe	
Settled	144.0		% C	
Compacted	146.0		% Oil	
Sp. Grav.	3.8		Specific Surface	
				m^2 gm

NATURAL GAS	%
CO_2	1.95
CH_4	85.16
C_2H_6	9.35
C_3H_8	4.23
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut No.	53.7	45.8			
Sap. No.	57.1	45.7			
Hydrox. No.	59.5				
Bromine No.	59.9				
% Fe					
% Alc		1.3			

GENERATOR ELEMENTAL BALANCE

	IN					OUT					
	Mol %	SCFH m/hr	C	H	O		Mol %	SCFH m/hr	C	H	O
O_2	248.64	7.77			15.54	CO_2	1.66	.55	.55		1.10
CO_2		.11	.11		.22	CO	35.44	11.83	11.83		11.83
CH_4		7.81	7.81	31.24		CH_4	2.78	.93	.93	3.72	
C_2H_6		.86	1.72	5.16		H_2	59.02	19.69		39.38	
C_3H_8		.39	1.17	3.12		N_2	1.09	.36			
C_4H_{10}						H_2O				5.66	2.83
N_2						Total		25.36	13.21	48.76	15.76
Total		16.94	10.81	39.52	15.76						

	FRESH FEED			WET GAS					RECYCLE	COMB. FEED		EFFLUENT		NET CHANGE ON REACTION									
					Measured		At Wt. Balance							Carbon			Hydrogen		Oxygen	Ultimate Oil			Unsats.
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	#/hr	m/hr	m/hr	%	m/hr	%	m/hr	a/hr	%	a/hr	%	a/hr	#/hr	#/gal	gal/hr	%
CO	35.4	11.81	330.68	15.37	2.35	65.80			8.72	20.53	22.79	11.07	14.22	-9.46	-9.46	19.90			-4.46				
H2	59.0	19.69	39.38	52.48	8.01	16.02			29.77	49.46	54.91	37.78	48.54	-11.68			-23.36						
CO2	1.7	.57	23.08	17.04	2.60	114.40			9.67	10.24	11.37	12.27	15.76	2.03	2.03	17.19			4.06				
N2	1.1	.37	10.36	.89	.14	3.92			.50	.87	.97	.64	.82	-.23									
CH4	2.8	.93	14.88	9.08	1.39	22.24			5.15	6.08	6.75	6.54	8.40	.46	.46	3.90	1.84						
C2H4				1.26	.19	5.32			.71	.71	.79	.90	1.16	.19	.38	3.22	.76						
C2H6				.89	.14	4.20			.50	.50	.56	.64	.82	.14	.28	2.37	.84						
C3H6				1.24	.19	7.98			.70	.70	.78	.89	1.14	.19	.57	4.83	1.14			7.18	6.25	1.15	
C3H8				.14	.02	.88			.08	.08	.09	.10	.13	.02	.06	.51	.16						
C4H8				.72	.11	6.16			.41	.41	.46	.52	.67	.11	.44	3.73	.88			5.85	6.10	.96	
C4H10				.20	.03	1.74			.11	.11	.12	.14	.18	.03	.12	1.02	.30			1.74	4.86	.35	
C5H10				.46	.07	4.90			.26	.26	.29	.33	.42	.07	.35	2.96	.70			4.90	5.40	.91	
C6H12				.23	.04	3.36			.13	.13	.14	.17	.22	.04	.24	2.03	.48			3.36	5.50	.61	
OIL						(63.42)						.45	.58		4.53	38.36	9.06			63.42	6.50	9.76	
WATER												5.40	6.94				7.20		(3.60) 5.40				
TOTAL		33.37	470.38		15.26	256.82			56.73	90.08	100.02	77.84	100.00	18.09		100.62				86.45		13.74	
H2+CO		31.50			10.36																		
H2/CO		1.67			3.41					2.41		3.41											

ULTIMATE YIELDS	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	9.49	16.88	1.41	23.83			
C3+	53.44	88.44	7.41	125.23			
C4+	48.10	79.58	6.66	112.55			
Ult. Oil		86.45	7.24	122.36	13.74	1.15	162.50
C02	17.19	88.32	7.48	126.41			
H20		97.20	8.14	137.57			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas			
Oil			
Water			
Total			

EFFLUENT RATIOS	
H2/H20	7.00
C02/C0	1.11
(H2) (C02) / (H20) (C0)	7.75

CONTRACTION: 54.2

C0 Conversion: 80.1

H2 Conversion: 59.3

N2+CO = 63.4

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 40G From May 6-48 Hr. 0800 to May 7-48 Hr. 0700

FLOWS	SCFH	%
Oxygen	2928	
Nat. Gas	4320	
Total	7248	40.4
Fresh Feed	12732	
F. F. by C	12700	
Avg. F. F.		
Wet Gas	5488	
Contraction		56.9
Recycle	18880	
Bleed	4057	
Total	22937	
Total Feed	35669	
Recycle/F.F.	1.80	
Inlet Vel.		
Steam Flow		

RUN CONDITIONS	
Generator Press.	289
O_2 Preheat, °F	445
Gas Preheat, °F	820
Reactor Press.	250
Steam Back Press.	
Temperatures, °F	
Heater Outlet	
Catalyst ±1	685
±2	660
±3	675
±4	660
±5	
Average	
Product Separator	
Pre-Heat #3	795
" #4	810

DISTILLATIONS	A S T M				Hempel Dist.		
					°F	%	A.P.I.
Prod.	Gas 0.2						
A.P.I.	42.9				to 400	65.6	51.3
I.B.P.	114				400-550	18.6	35.1
5%					550+		
10%	156						
20	196						
30	222				WATER		
40	247				Temp.	%	
50	263				200		
60	282				203		
70	302				208		
80	326				Water A.P.I.	10.1	
90	346						
95	386						
E.P.	405						
Rec.	98.0						
Res.	1.0						
Loss	1.0						

CATALYST DATA	
In Reactor at Start of Period	504.5
Fresh Catalyst Charged	—
Catalyst Recharged	50.0
Total	554.5
Catalyst Taken Out	18.0
In Reactor at End of Period	536.5
Reactor d-P, H_2O	
Pounds in Reactor	
Density, lbs./cu. ft.	
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	66.5
From d-P Meters	

CATALYST ANALYSIS	Particle Size				
	Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	1.6	80+	
100	419-150	62.7	80-40	
150	149-105	12.2	40-20	
200	104-74	7.6	20-10	
250	73-62	1.6	10-0	
325	61-44	3.2		
<325	43-0	6.0		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated 133.5			% Fe	
Settled 137.3			% C	
Compacted 139.2			% Oil	
Sp. Grav. 3.7			Specific Surface	
				m^2 gm

NATURAL GAS	%
CO_2	1.19
CH_4	85.22
C_2H_6	7.59
C_3H_8	4.20
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	47.2	42.6			
Sap. No.	50.6	45.5			
Hydrox. No.	00.5				
Bromine No.	58.9				
% Fe					
% Alc		3.3			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2	247.36	7.73			15.46
CO_2	6.16	.14	.14		.28
CH_4	155.52	9.72	9.72	38.88	
C_2H_6	32.10	1.07	2.14	6.42	
C_3H_8	21.12	.48	1.44	3.04	
C_4H_{10}					
N_2					
Total		19.14	13.44	48.34	15.74

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	1.63	.55	.55		1.10
CO	34.53	11.60	11.60		11.60
CH_4	2.64	.89	.89	3.56	
H_2	59.35	19.94		39.88	
N_2	1.86	.62			
H_2O				6.08	3.04
Total		33.60	13.04	49.52	15.74

	FRESH FEED			WET GAS					RECYCLE	COMB. FEED		EFFLUENT		NET CHANGE ON REACTION									
					Measured		At Wt. Balance							Carbon			Hydrogen		Oxygen	Ultimate Oil			Unsats.
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	#/hr	m/hr	m/hr	%	m/hr	%	m/hr	a/hr	%	a/hr	%	a/hr	#/hr	#/gal	gal/hr	%
CO	34.5	11.59	32.452	14.77	2.14	59.92			8.93	20.52	21.52	16.07	13.64	-9.45	-9.45	18.46			-9.45				
H2	59.4	19.95	39.90	51.10	7.40	14.80			30.90	50.85	54.07	38.30	47.18	12.55			-25.10						
CO2	1.6	.54	23.76	16.24	2.35	103.40			9.82	10.36	11.02	13.17	14.99	1.81	1.81	15.62			3.62				
N2	1.9	.64	17.92	.40	.06	1.68			.24	.88	.94	.30	.37	- .58									
CH4	2.6	.87	13.92	11.02	1.60	25.60			6.66	7.53	8.01	8.26	10.17	.73	.73	6.30	2.92						
C2H4				1.39	.20	5.60			.84	.84	.89	1.04	1.28	.20	.40	3.45	.80						
C2H6				1.26	.18	5.40			.76	.76	.81	.94	1.16	.18	.36	3.11	1.08						
C3H6				1.47	.21	8.82			.89	.89	.95	1.11	1.37	.21	.63	5.44	1.26			7.94	6.25	1.27	
C3H8				.27	.04	1.76			.16	.16	.17	.20	.25	.04	.12	1.04	.32						
C4H8				1.07	.15	8.40			.65	.65	.69	.80	.99	.15	.60	5.18	1.20			7.98	6.10	1.31	
C4H10				.19	.03	1.74			.11	.11	.12	.14	.17	.03	.12	1.04	.30			1.74	4.86	.36	
C5H10				.56	.08	5.60			.34	.34	.36	.42	.52	.08	.40	3.45	.80			5.60	5.40	1.04	
C6H12				.27	.04	3.36			.16	.16	.17	.20	.25	.04	.24	2.07	.48			3.36	5.50	.61	
OIL					(56.56)							.40	.49		4.04	34.86	8.08			56.56	6.50	8.70	
WATER												5.83	7.18				7.86		(5.93) 5.83				
TOTAL		33.59	420.02		14.48	246.08			60.46	94.05	100.02	81.18	100.01	19.11		100.82				83.18		13.29	
H2+CO		31.54			9.54																		
H2/CO		1.72			3.46					2.48		3.46											

ULTIMATE YIELDS	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	12.86	22.68	1.90	32.13			
C3+	53.08	86.24	7.22	122.09			
C4+	46.60	75.66	6.33	107.04			
Ult. Oil		83.18	6.96	117.69	13.29	1.11	156.84
C02	15.62	79.64	6.66	112.62			
H20		104.94	8.78	148.47			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas			
Oil			
Water			
Total			

EFFLUENT RATIOS	
H2/H20	6.57
C02/C0	1.10
(H2) (C02) / (H20) (C0)	7.22

CONTRACTION: 56.9

C0 Conversion: 81.8

H2 Conversion: 62.9

H2+CO = 65.5

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 40N From May 7-48 Hr. 0800 to May 8-48 Hr. 0700

FLOWS	SCFH	%
Oxygen	2942	
Nat. Gas	4320	
Total	7262	40.5
Fresh Feed	12797	
F. F. by C	12150	
Avg. F. F.		
Wet Gas	5096	
Contraction		60.2
Recycle	18624	
Bleed	3441	
Total	22065	
Total Feed	24862	
Recycle/F.F.	1.67	
Inlet Vel.	1.20	
Steam Flow		

RUN CONDITIONS	
Generator Press.	288
O_2 Preheat, °F	504
Gas Preheat, °F	790
Reactor Press.	250
Steam Back Press.	
Temperatures, °F	
Heater Outlet	
Catalyst #1	666
#2	672
#3	684
#4	667
#5	
Average	
Product Separator	
Pre-Heat #3	796
" #4	800

DISTILLATIONS	A S T M			Hempel Dist.		
				°F	%	A.P.I.
Prod.	GAS OIL					
A.P.I.	44.7			to 400	66.0	51.3
I.B.P.	112			400-550	19.3	33.9
5%				550+		
10%	154					
20	194					
30	218			WATER		
40	240			Temp.	%	
50	258			200		
60	278			203		
70	300			208		
80	320			water & P.T.	10.2	
90	352					
95	378					
E.P.	405					
Rec.	96.0					
Res.	1.0					
Loss.	2.0					

CATALYST DATA	
In Reactor at Start of Period	536.5
Fresh Catalyst Charged	–
Catalyst Recharged	75.0
Total	611.5
Catalyst Taken Out	16.0
In Reactor at End of Period	595.5
Reactor d-P, H_2O	
Pounds in Reactor	
Density, lbs./cu. ft.	
Bed Height, Feet	
Space Vel. SCFH/lb. cat.	
Inventory Figures	58.5
From d-P Meters	

CATALYST ANALYSIS				
Particle Size				
Screen			Sedimentation	
Frac.	M	%	M	%
On 40	420+	1.4	80+	
100	419-150	61.2	80-40	
150	149-105	14.3	40-20	
200	104-74	9.7	20-10	
250	73-62	1.4	10-0	
325	61-44	4.2		
<325	43-0	6.8		
Density, lbs./cu. ft.			Chem. Anal.	
Aerated	128.5		% Fe	
Settled	130.4		% C	
Compacted	131.0		% Oil	
Sp. Grav.	3.6		Specific Surface	
				m^2 gm

NATURAL GAS	%
CO_2	1.51
CH_4	86.93
C_2H_6	8.80
C_3H_8	2.76
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	45.3	38.3			
Sap. No.	48.4	37.5			
Hydrox No.	52.8				
Bromine No.	65.9				
% Fe					
% Alc		7.0			

GENERATOR ELEMENTAL BALANCE

IN	Mol %	SCFH m/hr	C	H	O
O_2	248.32	7.76			15.52
CO_2	7.48	.17	.17		.28
CH_4	158.56	9.91	9.91	39.64	
C_2H_6	30.00	1.00	2.00	6.00	
C_3H_8	13.64	.31	.93	2.48	
C_4H_{10}					
N_2					
Total		19.15	13.01	49.12	15.80

OUT	Mol %	SCFH m/hr	C	H	O
CO_2	2.12	.72	.72		1.44
CO	35.53	12.00	12.00		12.00
CH_4	2.58	.97	.97	3.88	
H_2	59.41	20.06		40.12	
N_2	.07	.02			
H_2O				4.72	2.36
Total		33.74	13.69	48.72	15.80

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS Measured m/hr	WET GAS Measured #/hr	WET GAS At Wt. Balance m/hr	WET GAS At Wt. Balance #/hr	RECYCLE m/hr	COMB. FEED m/hr	COMB. FEED %	EFFLUENT m/hr	EFFLUENT %
CO	35.5	11.99	335.72	12.76	1.72	48.16			7.20	19.19	21.28	8.92	11.51
H2	59.4	20.06	40.12	48.68	6.55	13.10			27.46	47.52	52.69	34.01	43.88
CO2	2.1	.71	31.24	16.47	2.28	100.32			9.57	10.28	11.40	11.85	15.29
N2	0.1	.03	.84	.59	.08	2.24			.33	.36	.40	.41	.53
CH4	2.9	.98	15.68	14.42	1.94	31.04			8.13	9.11	10.10	10.07	12.99
C2H4				1.39	.19	5.32			.78	.78	.86	.97	1.25
C2H6				1.45	.20	6.00			.82	.82	.91	1.02	1.32
C3H6				1.69	.23	9.66			.95	.95	1.05	1.18	1.52
C3H8				.33	.04	1.76			.19	.19	.21	.23	.30
C4H8				.86	.12	6.72			.49	.49	.54	.61	.79
C4H10				.24	.03	1.24			.14	.14	.16	.17	.22
C5H10				.44	.06	4.20			.25	.25	.28	.31	.40
C6H12				.18	.02	1.68			.10	.10	.11	.12	.15
OIL						(71.82)						.51	.66
WATER												7.13	9.20
TOTAL		33.77	423.60		13.45	231.94			56.40	90.18	99.99	77.51	100.01
H2+CO		32.05			8.27								
H2/CO		1.67			3.81					2.48		3.81	

NET CHANGE ON REACTION	Carbon a/hr	Carbon %	Hydrogen a/hr	Hydrogen %	Oxygen a/hr	Ultimate Oil #/hr	Ultimate Oil #/gal	Ultimate Oil gal/hr	Unsats. %
CO	-10.27	-10.27	14.35		-10.27				
H2	-13.51				-27.02				
CO2	1.57	1.57	13.09		3.14				
N2									
CH4	.96	.96	8.01	3.84					
C2H4	.19	.38	3.17	.76					
C2H6	.20	.40	3.34	1.20					
C3H6	.23	.69	5.75	1.38		8.69	6.25	1.39	
C3H8	.04	.12	1.00	.32					
C4H8	.12	.48	4.00	.96		6.78	6.10	1.05	
C4H10	.03	.12	1.00	.30		1.74	4.86	.36	
C5H10	.06	.30	2.50	.60		4.20	5.40	.78	
C6H12	.02	.12	1.00	.24		1.68	5.50	.31	
OIL	5.13	42.79	10.26		(3.58)	71.82	6.50	11.05	
WATER			7.16		7.13				
TOTAL						94.51		14.94	
H2+CO									
H2/CO									

ULTIMATE YIELDS	% CO Fed	#/hr	H2/CO #/MCF	H2/CO g/M3	H2/CO Gal/hr	H2/CO Gal/MCF	H2/CO cc/M3
C1+C2	14.52	26.68	2.20	37.20			
C3+	58.04	97.58	8.03	135.79			
C4+	51.29	86.16	7.09	119.89			
Ult. Oil		94.51	7.78	131.56	14.94	1.23	173.80
C02	13.09	69.08	5.69	96.22			
H20		128.74	10.56	178.57			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas			
Oil			
Water			
Total			

EFFLUENT RATIOS	
H2/H20	4.77
C02/C0	1.33
(H2) (C02) / (H20) (C0)	6.34

CONTRACTION: 60.1

C0 Conversion: 85.7

H2 Conversion: 67.3

$H_2+CO = 70.4$

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

THE TEXAS COMPANY — MONTEBELLO LABORATORY

DATA SUMMARY SHEET

Synthesis Run Number 401 From May 8-48 Hr. 0800 to May 9-48 Hr. 0700

FLOWS	SCFH	%
Oxygen	2938	
Nat. Gas	4369	
Total	7307	40.2
Fresh Feed	12863	
F. F. by C	12478	
Avg. F. F.		
Wet Gas	5266	
Contraction		59.1
Recycle	18414	
Bleed	3107	
Total	21521	
Total Feed	34384	
Recycle/F.F.	1.62	
Inlet Vel.	1.18	
Steam Flow		

RUN CONDITIONS	
Generator Press.	295
O_2 Preheat, °F	467
Gas Preheat, °F	762
Reactor Press.	250
Steam Back Press.	
Temperatures, °F	
Heater Outlet	
Catalyst #1	656
#2	679
#3	700
#4	676
#5	
Average	
Product Separator	
Pre-Heat #3	772
" #4	767

DISTILLATIONS	A S T M	Hempel Dist.	°F	%	A.P.I.
Prod.	Gas 0.2				
A.P.I.	44.8		to 400	72.0	57.3
I.B.P.	116		400-550	17.0	35.9
5%			550+		
10%	160				
20	192				
30	214				
40	234				
50	252				
60	274				
70	294				
80	320				
90	350				
95	378				
E.P.	400				
Rec.	98.0				
Res.	1.0				
Loss.	1.0				

WATER	
Temp.	%
200	
203	
208	
Water A.P.I.	10.2

CATALYST DATA	
In Reactor at Start of Period	595.5
Fresh Catalyst Charged	—
Catalyst Recharged	—
Total	595.5
Catalyst Taken Out	28.5
In Reactor at End of Period	567.0
Reactor d-P, H_2O	
Pounds in Reactor	
Density, lbs./cu. ft.	
Bed Height, Feet	

CATALYST ANALYSIS	Particle Size				
	Screen			Sedimentation	
	Frac.	M	%	M	%
	On 40	420+	0.4	80+	
	100	419-150	51.0	80-40	
	150	149-105	17.3	40-20	
	200	104-74	12.7	20-10	
	250	73-62	1.6	10-0	
	325	61-44	6.7		
	<325	43-0	10.3		
	Density, lbs./cu. ft.			Chem. Anal.	
Aerated 118.6				% Fe	
Settled 124.8				% C	
Compacted 125.2				% Oil	
Sp. Grav. 3.5				Specific Surface	
				m^2/gm	

NATURAL GAS	%
CO_2	1.30
CH_4	85.35
C_2H_6	9.74
C_3H_8	3.60
C_4H_{10}	
N_2	
O_2	

PRODUCT INSPECTION					
	Oil	Water	Product	Pour °F	SUS @ °F
Neut. No.	41.5	34.3			
Sap. No.	43.5	33.1			
Hydrox. No.	49.9				
Bromine No.	72.2				
% Fe					
% Alc		6.0			

GENERATOR ELEMENTAL BALANCE

	IN Mol %	SCFH m/hr	C	H	O	OUT Mol %	SCFH m/hr	C	H	O
O_2	248.00	7.75			15.50	CO_2 1.68	.67	.67		1.28
CO_2		.15	.15		.30	CO 35.43	12.02	12.02		12.02
CH_4		9.84	9.84	39.36		CH_4 3.62	1.23	1.23	4.92	
C_2H_6		1.18	2.36	6.72		H_2 58.06	20.04		40.08	
C_3H_8		.42	1.26	3.36		N_2 —				
C_4H_{10}						H_2O			5.00	2.50
N_2						Total	33.93	13.89	50.00	15.80
Total		19.28	13.49	49.44	15.80					

	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	35.4	12.01	336.28	13.08	1.68	47.04			6.64	18.65	20.97	8.32	10.97
H2	59.1	20.06	40.12	46.27	6.43	12.86			25.44	45.50	51.17	31.87	42.01
CO2	1.9	.64	28.16	18.13	2.52	110.88			9.97	10.61	11.93	12.49	16.46
N2	—	—	—	.89	.12	3.36			.49	.49	.55	.61	.80
CH4	3.6	1.22	19.52	15.44	2.14	34.24			8.49	9.71	10.92	10.63	14.01
C2H4				1.42	.20	5.60			.78	.78	.88	.98	1.29
C2H6				1.71	.24	7.20			.94	.94	1.06	1.18	1.56
C3H6				1.80	.25	10.50			.99	.99	1.11	1.24	1.63
C3H8				.41	.06	2.64			.23	.23	.36	.29	.38
C4H8				.94	.13	7.28			.52	.52	.58	.65	.86
C4H10				.24	.03	1.74			.13	.13	.15	.16	.21
C5H10				.50	.07	4.90			.27	.27	.30	.34	.45
C6H12				.68	.03	2.52			.10	.10	.11	.13	.17
OIL						(56.98)						.41	.54
WATER												6.57	8.66
TOTAL		33.94	424.08		13.89	250.76			54.98	88.92	99.99	75.87	100.00
H2+CO		32.07			8.11								
H2/CO		1.67			3.83					2.44		3.83	

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	-10.33	-10.33	13.99			-10.33				
H2	-13.63			-27.26						
CO2	1.68	1.68	15.65			3.76				
N2										
CH4	.92	.92	7.66	3.68						
C2H4	.20	.40	3.33	.80						
C2H6	.24	.96	7.99	1.44						
C3H6	.25	.75	6.24	1.50			9.45	6.25	1.51	
C3H8	.06	.18	1.50	.48						
C4H8	.13	.52	4.33	1.04			6.52	6.10	1.13	
C4H10	.03	.12	1.00	.30			1.74	4.86	.36	
C5H10	.07	.35	2.91	.70			4.90	5.40	.91	
C6H12	.03	.18	1.50	.36			2.52	5.50	.46	
OIL		4.07	33.89	8.14		(4.41)	56.88	6.50	8.77	
WATER				8.82		6.57				
TOTAL	20.03		99.99				82.51		13.14	
H2+CO										
H2/CO										

ULTIMATE YIELDS	% C0 Fed	#/hr	H2 / C0 #/MCF	H2 / C0 g/M3	Gal/hr	H2 / C0 Gal/MCF	H2 / C0 cc/M3
C1+C2	18.88	27.52	2.27	38.39			
C3+	51.37	86.56	7.12	120.40			
C4+	63.63	73.42	6.04	102.14			
Ult. Oil		82.51	6.79	114.82	13.14	1.08	152.60
C02	15.65	82.72	6.81	115.16			
H20		118.26	9.73	164.53			

WEIGHT BALANCE	#/hr	%	#/hr
Wet Gas			
Oil			
Water			
Total			

EFFLUENT RATIOS	
H2/H20	4.65
C02/C0	1.50
(H2) (C02) / (H20) (C0)	7.28

CONTRACTION: 59.0

C0 Conversion: 86.0

H2 Conversion: 67.9

Wet CO = 70.6

Yield Calculations assume "oil" is CH_2, and is found by difference on Carbon, and H20 by difference on Hydrogen. "Oil" figures therefore include hydrocarbon fraction of oxygenated compounds. Standard cubic feet measured at 60 F and 14.7 psig. Cubic Meters measured at 0 C. and 14.7 psig. g/M3 = 16.91 × #/MCF. cc/M3 = 141.3 × gal/MCF.