MONTEBELLO SYNTHESIS UNIT
SUMMARY OF PRELIMINARY DATA

RUN NUMBER	12A	12B	12C	12D	12E
Start	8:00 2/21	8:00 2/22	8:00 2/23	8:00 2/24	8:00 2/25
End	8:00 2/22	8:00 2/23	8:00 2/24	8:00 2/25	8:00 2/26
Duration	24	24	24	24	24
GENERATOR DATA					
Pressure-psig	220	230	227	221	221
Gas Rate-scfh	2830	2880	2890	2930	2930
Oxygen Rate-scfh	2210	2260	2120	2120	2120
Product Rate-scfh	8880	9000	9000	8970	8970
Product Composition by Corrected Orsat- mol %					
CO	35.1	34.2	34.7	33.9	33.9
H2	58.9	59.2	59.0	60.0	60.0
CO2	2.3	2.6	2.0	2.0	2.0
N2	1.8	2.7	2.6	3.3	3.3
CH4	1.9	1.3	1.7	0.8	0.8
SYNTHESIS DATA					
Pressure-psig	200	200	200	200	200
Recycle Rate-scfh	13130	13480	12865	12660	13370
Fresh Feed Rate-scfh	8880	9000	9000	8970	8970
Wet Gas Rate-scfh	3370	3050	2940	2830	3650
Catalyst Temperature- F.	617	619	616	622	650
Catalyst Density-#/cu.ft.	71	52	46	42	85
Cat. Fluidized-#	495	505	411	268	220
Depth of Bed-ft.	16	22	21	15	9
Fresh Feed-cfh/# Cat.	18	18	22	33	41
Inlet Velocity-ft./sec.	2.0	2.0	2.0	2.0	2.0
Recycle Ratio	1.5	1.5	1.4	1.4	1.5
Contraction-%	60.5	66.1	67.5	68.5	57.0
Measured Oil-gph	3.3	3.3	2.4	3.7	3.0
Measured Water-ph	5.3	10.4	8.2	8.8	4.5
Steam Pressure-psig	1100	1100	1100	1100	1100
Steam Rate-#/hr.	376	452	435	435	
Wet Gas Composition by Mass Spectrometer- mol%					
CO	7.6	5.7	5.8	6.1	7.1
H2	49.1	46.0	45.3	45.7	46.8
CO2	28.1	30.2	27.3	27.6	25.6
N2	3.1	3.2	3.3	2.9	5.0
CH4	5.1	6.4	9.8	9.4	8.3
C2H4	1.9	2.2	2.3	2.2	2.0
C2H6	0.7	1.0	0.9	0.9	0.7
C3H6	1.6	2.0	1.9	1.9	1.6
C3H8	0.2	0.3	0.3	0.4	0.2
C4H8	1.5	1.8	1.9	1.8	1.5
C4H10	0.3	0.3	0.3	0.3	0.2
C5H10	0.8	1.0	1.0	0.9	0.8
CO Converted to:					
CO2	24.2	22.3	19.9	19.6	24.8
C1 & C2	5.7	9.0	10.2	12.2	14.2
C3 & Heavier	6.19	63.0	64.4	62.5	52.4
Unconverted	8.2	5.6	5.5	5.7	8.6
CO Conversion %	91.8	94.4	94.5	94.3	91.4
H2 Conversion %	68.5	73.6	75.0	76.0	68.4

RUN NUMBER 12 A

MONTEBELLO SYNTHESIS UNIT
CALCULATION OF YIELDS

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS m/hr	WET GAS #/hr	CHANGE mols	C	H	O	POLY Y'LD	#/hr	gal/hr
CO	35.1	8.217	230.1	7.63	0.678	19.0	-7.539	-7.539	-7.539	-7.539			
H2	58.9	13.788	27.5	49.06	4.353	8.7	-9.435		-18.870				
CO2	2.3	0.539	23.7	28.05	2.497	109.9	1.958	1.958		3.970			
N2	1.8	0.421	11.8	3.10	0.276	7.7	-0.145						
CH4	1.9	0.445	7.1	5.11	0.455	7.3	0.010	0.010	0.040				
C2H4				1.87	0.166	4.7	0.166	0.332	0.664				
C2H6				0.72	0.064	1.9	0.064	0.128	0.384				
C3H6				1.65	0.147	6.2	0.147	0.441	0.882		0.90	5.6	0.90
C3H8				0.22	0.020	0.9	0.020	0.060	0.160				
C4H8				1.51	0.134	7.5	0.134	0.536	1.072		0.95	7.1	1.17
C4H10				0.29	0.030	1.7	0.030	0.120	0.300			1.7	0.35
C5H10				0.79	0.070	4.9	0.070	0.350	0.700			4.9	0.91
OIL								3.577*	7.154			50.1	7.70
WATER									7.514*	3.569*			
						65.9				3.757 from H2			
ToTal	23.41	300.2		8.89	180.4	14.52						69.4	11.03

22.005 20.13 3.326 3.663

Contraction: 14.52 / 23.41 = 62.0 %
Conversion of CO: 7.539 / 8.217 = 91.8 %
Conversion of H2: 9.435 / 13.788 = 68.5 %

Weight Balance:

Wet Gas	180.4	
Oil; 3.3 gph	21.5	
Water; 5.3 gph	44.2	
	246.1	82.1 %

8.321 #/MCF H2+CO
1.322 gal/MCF

CO Converted to:

	mols/hr	%	%
CO2	1.985	24.2	26.4
C1 & C2	0.470	5.7	6.2
C3 & Heavier	5.084	61.9	67.4
Unconverted	0.678	8.2	

H2+CO = 8.340
= 2.95 × N.G.

	#/R	#/MMSCF	#/M³
H2O	65.9%	7.91	126.6
CO2	86.2	10.34	165.4
C3+	71.3	8.55	136.8
C1+C2	6.8	0.82	13.1

Oil Yield: 7.70 / 2.83 - 2.72 gal. "recovered" oil per MCF natural gas fed to generator
11.03 / 2.83 - 3.89 gal. ultimate oil per MCF natural gas fed to generator
92.5 bbl. ultimate oil per MMCF natural gas fed to generator

RUN NUMBER 12 B

MONTEBELLO SYNTHESIS UNIT
CALCULATION OF YIELDS

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS m/hr	WET GAS #/hr	CHANGE mols	C	H	O	POLY Y'LD	#/hr	gal/hr
CO	34.2	8.112	227.5	5.66	0.455	12.7	-7.657	-7.657		-7.657			
H2	59.2	14.073	28.2	46.02	3.707	7.4	-10.366		-20.732				
CO2	2.6	0.616	27.2	30.15	2.426	108.0	1.810	1.810		3.620			
N2	2.7	0.641	17.9	3.21	0.258	7.2	-0.383						
CH4	1.3	0.308	4.9	6.43	0.517	8.3	0.209	0.209	0.836				
C2H4				2.24	0.180	5.0	0.180	0.360	0.720				
C2H6				0.98	0.079	2.4	0.079	0.158	0.474				
C3H6				2.02	0.162	6.8	0.162	0.486	0.972		0.90	6.11	0.98
C3H8				0.28	0.023	1.0	0.023	0.069	0.184				
C4H8				1.75	0.141	7.9	0.141	0.564	1.128		0.95	7.51	1.23
C4H10				0.28	0.023	1.3	0.023	0.092	0.230			1.3	0.27
C5H10				0.98	0.079	5.5	0.079	0.395	0.790			5.5	1.02
OIL								3.514*	7.028			49.15	7.57
WATER									8.370*	4.037*			
							4.111			4.185 from H2			
TOTAL	23.75	305.7		8.05	173.5	15.70						69.57	11.07

22.185 21.6 22.2

Contraction: 15.70 / 23.75 = 66.1 %
Conversion of CO: 7.657 / 8.112 = 94.4 %
Conversion of H2: 10.366 / 14.073 = 73.6 %

Weight Balance:

Wet Gas	173.5
Oil; 3.3 gph	21.5
Water; 10.4 gph	86.7
	281.7

92.1 %

8.27 #/m 1.32 gal/m

CO Converted to:

	mols/hr	%	%
CO2	1.810	22.3	23.6
C1 & C2	0.727	9.0	9.5
C3 & Heavier	5.120	63.1	66.9
Unconverted	0.455		

8.408

	#/l	g/m	g/m³
H2O	74.00	8.801	140.8
CO2	79.64	9.472	151.6
C3+	71.65	8.521	136.3
C1+C2	10.8	1.284	20.5

Oil Yield: 7.57 / 2.88 = 2.63 gal."recovered" oil per MCF natural gas fed to generator
11.07 / 2.88 = 3.84 gal. ultimate oil per MCF natural gas fed to generator
= 91.4 bbl. ultimate oil per MMCF natural gas fed to generator

RUN NUMBER 12 C

MONTEBELLO SYNTHESIS UNIT
CALCULATION OF YIELDS

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS m/hr	WET GAS #/hr	CHANGE mols	C	H	O	POLY Y'LD	#/hr	gal/hr
CO	34.7	8.241	230.7	5.81	0.451	12.6	-7.790	-7.790		-7.790			
H2	59.0	14.013	28.0	45.28	3.505	7.0	-10.508		-21.016				
CO2	2.0	0;475	20.9	27.30	2.116	93.1	1.641	1.641		3.282			
N2	2.6	0.617	17.3	3.27	0.254	7.1	-0.363						
CH4	1.7	0.404	6.5	9.83	0.762	12.2	0.358	0.358	1.432				
C2H4				2.26	0.175	4.9	0.175	0.350	0.700				
C2H6				0.87	0.068	2.0	0.068	0.136	0.408				
C3H6				1.89	0.147	6.0	0.147	0.441	0.882		0.90	5.7	0.86
C3H8				0.29	0.023	1.0	0.023	0.069	0.184				
C4H8				1.89	0.147	8.1	0.147	0.588	1.176		0.95	7.7	1.27
C4H10				0.29	0.023	1.3	0.023	0.092	0.230			1.3	0.27
C5H10				1.02	0.079	5.5	0.079	0.395	0.790			5.5	1.02
OIL								3.720*	7.440			52.1	8.01
WATER									7.774*	4.508*			
										3.887			
TOTAL		23.75	303.4		7.75	160.8	16.00					72.2	11.41

22.254 20.75 3.395 4.198

8.572 #/M

Contraction: 16.00 / 23.75 = 67.4 %
Conversion of CO: 7.79 / 8.24 = 94.5 %
Conversion of H2: 10.508/14.013 = 75.0 %

Weight balance:

Wet Gas		160.8	1.352 8
Oil: 2.4 gph		15.6	
Water: 8.2 gph		68.5	
		244.9	81.0 %

#/hr #/M

H2O	75.6	8.963	143.4
CO2	72.2	8.560	137.0
C3+	76.0	9.011	144.2
C4+	12.6	1.494	23.9

8.434

Co Converted to:

	mols/hr	%	%
CO2	1.641	19.9	21.1
C1 & C2	0.844	10.2	10.8
C3 & Heavier	5.305	64.4	68.1
Unconverted	0.451	5.5	

Oil Yield: 8.01 / 2.89 = 2.77 gal."recovered"oil per MCF natural gas fed to generator
11.41 / 2.89 = 3.96 gal. ultimate oil per MCF natural gas fed to generator
= 94.1 bbl. ultimate oil per MMCF natural gas fed to generator

RUN NUMBER 12 D

MONTEBELLO SYNTHESIS UNIT
CALCULATION OF YIELDS

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS m/hr	WET GAS #/hr	CHANGE mols	C	H	O	POLY Y'LD	#/hr	gal/hr
CO	33.9	8.023	224.4	6.09	0.455	12.7	-7.568	-7.568		-7.568			
H2	60.0	14.200	28.4	45.70	3.420	6.8	-10.780		-21.560				
CO2	2.0	0.474	20.8	27.55	2.047	90.1	1.573	1.573		3.146			
N2	3.3	0.781	21.9	2.90	0.217	6.1	-0.564						
CH4	0.8	0.190	3.0	9.36	0.700	11.2	0.510	0.510	2.040				
C2H4				2.18	0.163	4.6	0.163	0.326	0.652				
C2H6				0.94	0.070	2.1	0.070	0.140	0.420				
C3H6				1.88	0.141	5.9	0.141	0.423	0.846		0.90	5.3	0.85
C3H8				0.36	0.027	1.2	0.027	0.081	0.216				
C4H8				1.81	0.135	7.6	0.135	0.540	1.080		0.95	7.2	1.07
C4H10				0.29	0.022	1.3	0.022	0.088	0.220			1.3	0.27
C5H10				0.94	0.070	4.9	0.070	0.350	0.700			4.9	0.91
OIL								3.537*	7.074			49.52	7.64
WATER									8.312*	4.422*		79.6	
										4.156 from H2			
TOTAL		23.668	298.5		7.467	154.4	16.201			8.578		68.22	10.74

22,223 20.67

Contraction: 16.201 / 23.668 = 68.5 %
Conversion of CO: 7.568 / 8.023 = 94.3 %
Conversion of H2: 10.780 / 14.200 = 76.0 %

Weight Balance:

Wet Gas	154.4	
Oil; 3.7 gph	24.1	
Water; 8.8 gph	73.4	
	251.9	84.4 %

8.10 #/m 1.275 gal/m

CO CONVERTED TO:

	mols/hr	%	%
CO2	1.573	19.6	20.8
C1 & C2	0.976	12.2	12.9
C3 & Heavier	5.019	62.5	66.3
Unconverted	0.455	5.7	

8.423

	#/h	#/m	s/m³
H2O	77.20	91.66	146.6
CO2	69.30	82.28	131.6
C3+	70.42	83.61	133.8
C+R	14.90	17.69	28.3

Oil Yield: 7.64 / 2.93 = 2.60 gal."recovered"oil per MCF natural gas fed to generator
10.74 / 2.93 = 3.80 gal. ultimate oil per MCF natural gas fed to generator
= 90.5 bbl. ultimate oil per MMCF natural gas fed to generator

RUN NUMBER 12 E

MONTEBELLO SYNTHESIS UNIT
CALCULATION OF YIELDS

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS m/hr	WET GAS #/hr	CHANGE mols	C	H	O	POLY Y'LD	#/hr	gal/hr
CO	33.9	8.023	224.4	7.14	0.687	19.2	-7.336	-7.336		-7.336			
H2	60.0	14.200	28.4	46.80	4.502	9.0	-9.698		-19.396				
CO2	2.0	0.474	20.8	25.60	2.464	108.4	1.990	1.990		3.980			
N2	3.3	0.781	21.9	4.99	0.480	13.4	-0.301						
CH4	0.8	0.190	3.0	8.33	0.801	12.8	0.611	0.611	2.444				
C2H4				2.01	0.193	5.4	0.193	0.386	0.772				
C2H6				0.74	0.071	2.1	0.071	0.142	0.426				
C3H6				1.64	0.158	6.7	0.158	0.474	0.948		0.90	6.1	0.97
C3H8				0.22	0.021	0.9	0.021	0.063	0.168				
C4H8				1.49	0.143	8.0	0.143	0.572	1.144		0.95	7.6	1.24
C4H10				0.22	0.021	1.2	0.021	0.084	0.210			1.2	0.25
C5H10				0.82	0.079	5.5	0.079	0.395	0.790			5.5	1.02
OIL								2.619*	5.238			36.6	5.87
WATER									7.256*	3.366*			
										3.628 from H2			
TOTAL	23.668	298.5		9.62	192.6	13.848						57.0	9.35

Contraction: 13.848 / 23.668 = 57.0%

Conversion of CO: 7.336/ 8.023 = 91.4%

Conversion of H2: 9.698/14.200 = 68.4%

CO Converted to:	mols/hr	%	%
CO2	1.990	24.8	27.3
C1 & C2	1.139	14.2	15.4
C3 & Heavier	4.207	52.4	57.3
Unconverted	0.687		

Weight Balance

Wet Gas	192.6
Oil; 5.6 gph	36.6
Water; 7.3 gph	60.6
	289.8 #/hr

Oil Yield: 5.87 / 2.93 = 2.01 gal."recovered"oil per MCF natural gas fed to generator

9.35 / 2.93 = 3.18 gal. ultimate oil per MCF natural gas fed to generator

= 75.9 bbl. ultimate oil per MMCF natural gas fed to generator