

RUN NUMBER 7 A

MONTEBELLO SYNTHESIS UNIT
CALCULATION OF YIELDS

	FRESH FEED		WET GAS		CHANGE	C	H	O	POLY YIELD	MW	#/hr	#/gal	gal/hr
	%	m/hr	%	m/hr	mols								
CO	34.1	6.095	11.57	0.916	5.179	-5.179		-5.179					
CO2	2.0	0.358	23.50	1.861	1.503	1.503		3.006					
H2	58.6	10.478	46.86	3.708	6.770		-13.540						
N2	1.9	0.340	0.52	0.041									
CH4	3.4	0.609	10.65	0.844	0.235	0.235	0.940						
C2H4			1.84	0.146	0.146	0.292	0.584						
C2H6			0.70	0.055	0.055	0.110	0.330						
C3H6			1.84	0.146	0.146	0.438	0.876	0.90 x 42	5.52	6.25	0.884		
C3H8			0.32	0.025	0.025	0.075	0.200						
C4H8			1.37	0.108	0.108	0.432	0.864	0.95 x 56	5.75	6.1	0.942		
C4H10			0.17	0.013	0.013	0.052	0.130	58	0.75	4.86	0.155		
C5H10			0.66	0.052	0.052	0.260	0.520	70	3.64	5.4	0.674		
OIL						1.782*	3.564	14	24.95	6.5	3.838		
WATER							5.532*	2.173*					
								vs. 2.766 from H2					
TOTAL		<u>17.88</u>		<u>7.915</u>						<u>40.61</u>		<u>6.493</u>	

Contraction: $17.88 - 7.915 / 17.88 = 55.8\%$
 Conversion of H2: $6.770 / 10.478 = 64.6\%$
 Conversion of CO: $5.179 / 6.095 = 84.9\%$

CO Converted to:

	mols/hr	%	%
CO2	1.503	24.6	29.0
C1 & C2	0.637	10.5	12.4
C3 & Heavier	3.039	49.8	58.6
Unconverted	0.916	15.1	
	<u>6.095</u>		

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Oil Yields: $3.34 / 2.19 = 1.75$ gal. "recovered" oil per MCF natural gas fed to generator
 $6.49 / 2.19 = 2.96$ gal. ultimate oil per MCF natural gas fed to generator
 $= 70.5$ bbl. ultimate oil per MMCF natural gas fed to generator

RUN NUMBER 7 B

MONTEBELLO SYNTHESIS UNIT
CALCULATION OF YIELDS

	FRESH FEED		WET GAS		CHANGE	C	H	O	POLY YIELD	MW	#/hr	#/gal.gal/hr
	%	m/hr	%	m/hr	mols							
CO	34.1	6.095	6.05	0.342	-5.753	-5.753		-5.753				
H2	58.6	10.478	35.16	1.985	-8.493		-16.986					
CO2	2.0	0.358	20.90	1.182	0.824	0.824		1.648				
N2	1.9	0.340	2.34	0.132								
CH4	3.4	0.609	25.90	1.463	0.854	0.854	3.416					
C2H4			2.49	0.141	0.141	0.282	0.564					
C2H6			1.78	0.101	0.101	0.202	0.606					
C3H6			2.34	0.132	0.132	0.396	0.792	0.90 x 42	4.99	6.25	0.799	
C3H8			0.55	0.031	0.031	0.093	0.248					
C4H8			1.50	0.85	0.085	0.340	0.680	0.95 x 56	4.52	6.1	0.742	
C4H10			0.28	0.016	0.016	0.640	0.160	58	0.93	4.86	0.191	
C5H10			0.71	0.040	0.040	0.200	0.400	70	2.80	5.4	0.519	
OIL						2.498*	4.996	14	35.0	6.5	5.38	
WATER							5.124*					
							vs	2.562* 84				
								4.105 60				
TOTAL		<u>17.88</u>		<u>5.65</u>						<u>38.24</u>		<u>7.63</u>

Contraction: $17.88 - 5.65 / 17.88 = 68.5\%$
 Conversion of CO: $5.753 / 6.095 = 94.5\%$
 Conversion of H2: $8.493 / 10.478 = 81.0\%$

CO Converted to:

	mols/hr	%	%
CO2	0.824	13.5	14.3
C1 & C2	1.338	21.9	23.2
C3 & Heavier	3.591	59.0	62.5
Unconverted	0.342	5.6	
	<u>6.095</u>		

Oil Yields: $5.38 / 2.19 = 2.46$ gal. "recovered" oil per MCF Natural Gas fed to generator
 $7.63 / 2.19 = 3.48$ gal. ultimate oil per MCF Natural Gas fed to generator
 $= 82.9$ bbl. ultimate oil per MMCF Natural Gas fed to generator

$\frac{.245}{6.095} = 4.0$

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MONTEBELLO SYNTHESIS UNIT
CALCULATION OF YIELDS

	FRESH FEED		WET GAS		CHANGE	C	H	O	POLY	MW	#/hr	#/gal	gal/hr
	%	m/hr	%	m/hr	mols				YIELD				
CO	35.3	5.905	13.78	0.712	-5.193	-5.193		-5.193					
H ₂	58.7	9.820	53.37	2.795 ⁹⁹	-7.061		-14.122						
CO ₂	2.5	0.419	19.73	1.021	0.602	0.602		1.204					
N ₂	2.3	0.385	2.42	0.125									
CH ₄	1.2	0.201	6.70	0.346	0.145	0.145	0.580						
C ₂ H ₄			1.12	0.058	0.058	0.116	0.232						
C ₂ H ₆			0.46	0.024	0.024	0.048	0.144						
C ₃ H ₆			0.84	0.043	0.043	0.129	0.258	0.90 x 42		1.625	6.25	0.260	
C ₃ H ₈			0.19	0.010	0.010	0.030	0.080						
C ₄ H ₈			0.84	0.043	0.043	0.172	0.344	0.95 x 56		2.185	6.1	0.375	
C ₄ H ₁₀			0.19	0.010	0.010	0.040	0.100	58		0.580	4.86	0.119	
C ₅ H ₁₀			0.37	0.019	0.019	0.095	0.190	70		1.330	5.4	0.246	
OIL						3.816*	7.632	14		53.40	6.5	8.21	
WATER							4.562*						
										3.989*			
										vs. 2.281 from H ₂			
TOTAL		<u>16.73</u>		<u>5.17</u>							<u>59.12</u>		<u>9.21</u>

Contraction: $16.73 - 5.17 / 16.73 = 69.1\%$
 Conversion of CO: $5.193 / 5.905 = 87.9\%$
 Conversion of H₂: $7.061 / 9.820 = 71.9\%$

Co Converted to:

	mols/hr	%	%
CO ₂	0.602	10.2	11.5
C ₁ & C ₂	0.309	5.2	6.0
C ₃ & Heavier	4.282	72.5	82.5
Unconverted	<u>0.342</u>	12.1	
	<u>5.905</u>		

Oil Yields: $8.21 / 2.06 = 3.98$ gal. "recovered" oil per MCF natural gas fed to generator
 $9.21 / 2.06 = 4.46$ gal. ultimate oil per MCF natural gas fed to generator
 106.1 bbl. ultimate oil per MMCF natural gas fed to generator

MONTEBELLO SYNTHESIS UNIT
CALCULATION OF YIELDS

	FRESH FEED			WET GAS			CHANGE			POLY	#/hr	gal/hr
	%	m/hr	#/hr	%	m/hr	#/hr	mols	C	H			
CO	34.0	8.432	236.1	3.9	0.350	13.3	-8.082	-8.082				
H2	59.9	14.856	20.7	46.4	4.154	8.3	-10.702		-21.404			
CO2	1.9	0.471	20.7	21.9	1.957	96.4	1.486	1.486			2.972	
N2	1.9	0.471	13.2	3.5	0.315	8.8	-0.156					
CH4	2.3	0.570	9.1	14.6	1.307	20.9	0.737	0.737	2.972			
C2H4				2.5	0.224	6.3	0.224	0.448	0.896			
C2H6				1.0	0.084	2.5	0.084	0.168	0.504			
C3H6				2.5	0.224	9.4	0.224	0.672	1.344	0.90	8.5	1.35
C3H8				0.3	0.028	1.2	0.028	0.074	0.224			
C4H8				2.4	0.216	12.1	0.216	0.864	1.728	0.95	11.5	1.88
C4H10				1								
C5H10				1.0	0.091	6.4	0.091	0.455	0.910		6.4	1.18
OIL								3.178*	6.356		44.5	7.12
WATER									6.494*	5.110*		
TOTAL		24.80	308.8		8.95	185.6-15.850			3.247		92.1	11.53

Contraction: $15.85/24.80 = 64.0\%$
 Conversion of CO: $8.082/8.432 = 95.8\%$
 Conversion of H2: $10.702/14.856 = 72.0\%$

CO Converted to:

	mols/hr	%	%
CO2	1.486	17.6	18.4
C1 & C2	1.353	16.0	16.8
C3 & Heavier	5.243	62.2	64.8
Unconverted	0.350	4.2	

WEIGHT BALANCE

Measured Oil	4.8 gal/hr	31.2 #/hr
Measured Water	11.5 gal/hr	95.9 #/hr
Wet gas		185.6 #/hr
		<u>312.7</u>
	or	101.2 %

Oil Yield: $7.12/3.0 = 2.37$ gal. "recovered" oil per MCF natural gas fed to generator
 $11.53/3.0 = 3.84$ gal. ultimate oil per MCF natural gas fed to generator
 $= 91.5$ bbl. ultimate oil per MCF natural gas fed to generator

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RUN NUMBER 9 B

MONTEBELLO SYNTHESIS UNIT
CALCULATION OF YIELDS

	FRESH FEED			WET GAS			CHANGE			POLY Y'LD	#/hr	gal/hr
	%	m/hr	#/hr	%	m/hr	#/hr	mols	C	H			
CO	34.2	8.300	232.4	3.0	0.224	6.3	-8.076	-8.076		-8.076		
H2	58.2	14.104	28.2	41.5	3.125	6.2	-10.979		-21.958			
CO2	1.7	0.413	18.2	24.2	1.820	80.2	1.407	1.407		2.814		
N2	2.5	0.607	17.0	2.5	0.189	5.1	-0.418					
CH4	3.4	0.826	13.2	16.1	1.211	19.4	0.385	0.385	1.540			
C2H4				2.9	0.218	6.1	0.218	0.436	0.872			
C2H6				1.6	0.124	3.7	0.124	0.248	0.744			
C3H6				3.4	0.254	10.7	0.254	0.762	1.524	0.90	0.60	1.54
C3H8				0.5	0.035	1.5	0.035	0.105	0.280			
C4H8				2.6	0.195	10.9	0.195	0.780	1.560	0.95	10.38	1.70
C4H10				0.4	0.030	1.7	0.030	0.120	0.300		1.74	0.36
C5H10				1.3	0.095	6.6	0.095	0.475	0.950		6.65	1.23
OIL								3.358	6.716		47.0	7.24
WATER									7.572*	5.262*		
TOTAL		24.25	309.0		7.52	158.3	16.73			3.786	75.37	12.07

Contraction: $16.73/24.25 = 69.0\%$
 Conversion of CO: $8.076/8.300 = 97.3\%$
 Conversion of H2: $10.979/14.104 = 77.9\%$

CO Converted to:

	mols/hr	%	%
CO2	1.407	17.0	17.4
C1 & C2	1.069	12.9	13.2
C3 & heavier	5.600	67.4	69.4
Unconverted	0.224	2.7	

WEIGHT BALANCE:

Measured Oil	8.5 gal/hr	55.3 #/hr
Measured water	20.0 gal/hr	146.0 #/hr
Wet Gas		158.3 #/hr
		379.6
	or	122.9 %

Oil Yield: $7.24/2.95 = 2.46$ gal. "recovered" oil per MCF natural gas fed to generator
 $12.07/2.95 = 4.09$ gal. ultimate oil per MCF natural gas fed to generator
 $= 97.4$ bbl. ultimate oil per MMCF natural gas fed to generator

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