

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 59-EE
HOURS 685-709
CATALYST Spent CM&S

FRESH FEED				WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H ₂ + CO FED											
	%	m/hr	#/hr	%	At Wt. Balance		m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE				YIELDS		BASIS BROWNSVILLE DESIGN		FEED RATE*			
					m/hr	#/hr						#/MCF	#/gal	gal/hr	gal/MCF			CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY, %	gal/hr		
CO	38.330	14.622	409.56	6.420	0.777	21.77	2.407	17.029	3.184	-13.945	-387.79												
H ₂	58.094	22.162	44.68	34.076	4.122	8.31	12.777	34.939	16.999	-18.040	-36.37							400 EP	73.0	7.192	98.0	7.048	
CO ₂	2.980	1.099	48.37	33.793	4.091	180.05	12.670	13.769	16.761	2.992	131.66	9.433						400-550	14.3	1.458	91.4	1.333	
N ₂	0.153	0.058	1.62	2.110	0.255	7.14	0.791	0.949	1.046									550 +	12.2	1.202	114.6	1.377	
CH ₄	0.543	0.207	3.32	11.287	1.366	21.91	4.232	4.439	5.598	1.159	18.59	1.332											
C ₂ H ₆					3.287	0.398	11.16	1.232	1.232	1.630	0.398	11.16	0.799						RECOVERY %	#/hr	gal/hr		
C ₃ H ₈					1.507	0.182	5.47	0.565	0.565	0.747	0.182	5.47	0.392						PROPYLENE,	45.0	7.02		
C ₄ +																			C ₃ POLY GASO.	87.5	6.14	1.027	
C ₂ H ₄					3.063	0.371	15.61	1.148	1.148	1.519	0.371	15.61	1.118	4.32	3.613	0.259			C ₃ POLY TAR	12.5	0.88	0.117	
C ₂ H ₂					0.347	0.042	1.85	0.130	0.130	0.172	0.042	1.85	0.133	4.24	0.436	0.031							
C ₂ H ₆					1.977	0.227	12.74	0.704	0.704	0.931	0.227	12.74	0.913	8.00	2.548	0.183			#/gal	#/hr	gal/hr	RVP	
C ₃ H ₈					0.663	0.080	4.65	0.249	0.249	0.329	0.080	4.65	0.333	4.88	0.957	0.069			C ₄ H ₆	5.00	0.39	0.078	68.0
C ₄ H ₁₀					0.953	0.115	8.06	0.357	0.357	0.472	0.115	8.06	0.577	5.45	1.479	0.106			C ₄ POLY GASO.	5.98	10.81	1.907	1.5
C ₄ H ₁₂					0.250	0.030	2.16	0.094	0.094	0.124	0.030	2.16	0.155	5.25	0.411	0.028			C ₄ H ₁₀	4.86	4.65	0.957	68.0
C ₄ H ₁₄					0.367	0.044	3.70	0.138	0.138	0.182	0.044	3.70	0.265	5.54	0.668	0.048			C ₄ FREE GASO.			10.633	5.8
C ₅ +																			C ₄ POLY TAR	7.53	1.54	0.205	
TOTAL		33.148	507.55		12.100	304.58	37.494	75.642	57.267														
H ₂ + CO	96.424	36.784	1395.930	SCFH	4.899		15.184	51.968	20.083	-31.985										gal/hr	gal/MCF	Bbl/Day	
H ₂ CO		1.52	Factor	716368	5.31		5.31	2.05	5.31	1.30										10 # RVP 400 EP GASOLINE	13.475	0.9653	5233
Weight Recovery, %	94.98	Catalyst Age, hrs.		Space Velocity, vhr	1084					RECOVERED OIL	0.451	63.28	4.533	9.952	0.706				GAS OIL	1.333	0.0955	518	
Pressure, psig	410	Inlet Velocity, Ft/sec	0.91	Catalyst, VOL., CP	12.88					TOTAL OIL		112.05	8.027	19.964	1.431				FUEL OIL	1.377	0.0986	535	
Temperature, °F	677	Bed Depth, Ft	19.51	Weight, #	1887					WATER SOLUBLE CHEMICALS	0.274	14.52	1.040	1.957	0.133				POLY TAR	0.322	0.0231	125	
Recycle Ratio	0.98	Bed Density, # CF	145	Effluent (H ₂)/CO ₂ Shift Ratio (H ₂ O)/CO	12.90					TOTAL LIQUID PRODUCTS C ₄ +		126.57	9.067	21.921	1.564				TOTAL	16.507	1.1825	6411	
FRESH FEED CONVERSION - %				TOTAL FEED CONVERSION - %			SELECTIVITY		NET WATER		6.948	125.17	8.967	15.027	1.077				W S CHEM.	1.957	0.1330	721	
Contraction	CO	H ₂	H ₂ +CO	CO	H ₂	CO+H ₂	C ₃ + C ₄ +	GROSS WATER		139.59	10.007	16.984	1.210						TOTAL	18.364	1.3155	7132	
63.28	94.69	81.40	86.68	81.30	51.63	61.36	78.23	HYDROCARBON TOTAL - C ₄ +		161.79	11.590												

Form ML-11

**Included in Reactor Effluent Total

g/NGM = 16.91 X #/MCF #9488 MCFH H₂ + CO, Bbl/Day = 5421.6 X gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 59-EE
HOURS 685-709

OPERATING CONDITIONS				PRODUCT TESTS				CATALYST DATA			
PRESSURES PSIG		RATES S.C.F.H.		OIL		WATER		INVENTORY DATA		PARTICLE SIZE	
Oxygen	434	Fresh Feed	14477	° API	51.5	10.9		In Reactor at Start of Period		Screen Analysis	Sedimentation
Natural Gas	431	Recycle	14229	Neut. No.	38.0	33.6		Fresh Catalyst Added	36	Mesh	Microns %
Generator Outlet	415	Combined Feed	28706	Sap. No.	47.0	35.2		Total		On 40	419+ 46.8
Reactor Inlet	410	Wet Gas - Measured	4200	Hydrox. No.				Catalyst Recovered	79.5	100	150 36.4
Condenser Inlet		Adjusted	4592	Bromine No.	93			In Reactor at End of Period		150	105 6.5
Product Accumulator	358	Loss	392	Pour °F.						200	74 5.7
				Chemicals, % by K ₂ CO ₃		11.0		REACTOR d-p. Inches H ₂ O		250	62 1.0
								No. Height		325	44 2.0
TEMPERATURES - °F.		Recycle/Fresh Feed	0.98					0 See Period A	50	<325	1.6
Oxygen	303	Inlet Velocity - ft./sec.	0.91					1	71	CATALYST	
Natural Gas	323	Fresh Feed Rate - S.C.F.H.	13959	HEMPEL DIST. %		° API		2	75	Bulk Density, Lbs./Cu.Ft.	
Generator	--	per Cu. Ft. Dense Bed	1084	205 °F.				3	73	Aerated	
Quench Accumulator	153	per Lb. Catalyst	7.48	400	72.0	54.6		4	275	Settled	
Reactor Inlet	385	per Sq. Ft.	21150	400-550	14.8	36.5		Total	544	Compacted	
Condenser Inlet	553	Heat Transfer Calculations		550+	13.2					Particle Density, gm. cc.	
Product Accumulator	95	Steam Rate = 404#/hr								CALCULATED FROM dp	
Catalyst No. Height		@ 705 psia & 507°F =		A. S. T. M. DIST. (ON						NH ₃ Value, ml./gm.	
1 See Per. A	656	1201 BTU		Naphtha °F.						Density, Lbs./Cu.Ft.	
2	680	Water in @ 73°F = 410°F		IBP	110					Inventory, Lbs.	
3	681	Net BTU/# Steam = 1160		10%	136					Bed Depth, Ft.	
4	672	1160x404 = 468640		50%	226					Vol., Cu. Ft.	
5	685	Ave. Bed Temp = 677		90%	352					Fe	
6	680	ΔT = 677 - 507 = 170°F		EP	394					H	
7	666	Tube Area = 35.3 sq ft		Rec.	96.5					K ₂ O, W + % basis Fe	
8	655	K = $\frac{468640}{(35.3)(170)} = 78.1$ BTU/°F/sq ft								X-Ray Analysis -	
9	643									Fe ₂ O ₃	
10	638									Fe ₃ O ₄	
11	613									Fe	

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 59-FF
HOURS 709-733
CATALYST Spent GM&S

FRESH FEED				WET GAS				RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H ₂ + CO FED									
	%	m/hr	#/hr	%	At Wt. Balance	#/hr	m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE				YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*						
												#/MCF	#/gal	gal/hr	gal/MCF		CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY, %	gal/hr		
CO _{28.010}	37.966	14.552	407.61	6.160	0.740	20.73	2.319	16.871	3.059	-13.812	-386.98											
H ₂ _{2.016}	58.970	22.603	45.57	34.934	4.183	8.43	13.114	35.717	17.297	-18.420	-37.14						400 EP	77.8	7.176	98.0	7.032	
CO ₂ _{44.010}	2.380	0.912	40.14	33.440	4.016	176.75	12.589	13.501	16.805	3.104	136.61	9.888					400-550	14.4	1.328	91.4	1.214	
N ₂ _{29.016}	0.117	0.045	1.26	1.880	0.226	6.33	0.708	0.753	0.934								550 +	7.8	0.719	114.6	0.924	
CH ₄ _{16.042}	0.567	0.217	3.48	10.920	1.300	20.85	4.073	1.517	4.373	1.083	17.37	1.232										
C ₂ H ₆ _{26.052}				3.333	0.400	11.22	1.255	0.400	1.655	0.400	11.22	0.796										
C ₃ H ₈ _{30.068}				1.553	0.187	5.62	0.585	0.187	0.772	0.187	5.62	0.399					PROPYLENE	45.4	6.93			
C ₄ +C ₅											34.21	2.427					C ₃ POLY GASO.	87.5	6.06	1.013		
C ₆ H ₁₂ _{42.078}				3.023	0.363	15.27	1.138	0.363	1.501	0.363	15.27	1.083	4.32	3.535	0.251		C ₃ POLY TAR	12.5	0.87	0.116		
C ₇ H ₁₆ _{44.094}				0.290	0.035	1.54	0.109	0.035	0.144	0.035	1.54	0.109	4.24	0.363	0.026							
C ₈ H ₁₈ _{56.104}				2.047	0.246	13.90	0.771	0.246	1.017	0.246	13.90	0.979	5.00	2.760	0.196							
C ₉ H ₁₀ _{58.120}				0.930	0.100	5.81	0.312	0.100	0.412	0.100	5.81	0.412	4.86	1.195	0.085		C ₄ H ₆	5.00	--	--	68.0	
C ₁₀ H ₁₀ _{70.130}				1.120	0.135	9.47	0.422	0.135	0.557	0.135	9.47	0.672	5.46	1.738	0.123		C ₄ POLY GASO.	5.98	12.08	2.019	1.5	
C ₁₁ H ₁₂ _{72.140}				0.253	0.030	2.16	0.095	0.030	0.125	0.030	2.16	0.153	5.28	0.411	0.029		C ₄ H ₁₀	4.86	5.29	1.089	68.0	
C ₁₂ H ₁₂ _{84.156}				0.417	0.050	4.21	0.157	0.050	0.207	0.050	4.21	0.299	5.54	0.760	0.054		C ₄ -FREE GASO.				10.954	
C ₁₃ -C ₁₆																	C ₄ POLY TAR	7.53	1.72	0.228		
TOTAL		38.329	498.06		12.011	302.19	37.647	75.976	57.085													
H ₂ +CO	96.936	37.155	1410031	SCFH	4.923		15.433	52.588	20.366	-32.232												
H ₂ /CO		1.55	Factor	709204	5.65		5.66	2.12	5.65	1.33							10 # RVP 400 EP GASOLINE	14.062	0.9973	5407		
Weight Recovery, %	94.96	Catalyst Age, hrs.		Space Velocity, vhr	1081		RECOVERED OIL	0.424	59.50	4.220	9.223	0.654					GAS OIL	1.214	0.0861	467		
Pressure, psig	408	Inlet Velocity, Ft/sec	0.92	Catalyst, Vol. CF	13.04		TOTAL OIL	111.76	7.927	19.985	1.418						FUEL OIL	0.824	0.0584	317		
Temperature, °F	678	Bed Depth, Ft	19.75	Weight, #	1877		WATER SOLUBLE CHEMICALS	0.291	15.45	1.096	1.980	0.140					POLY TAR	0.344	0.0244	132		
Recycle Ratio	0.98	Bed Density, #/CF	144	Effluent (H ₂)/CO ₂ Shift Ratio (H ₂ O)/CO	13.99		TOTAL LIQUID PRODUCTS C ₄ +	127.21	9.023	21.965	1.558						TOTAL	16.444	1.1662	6323		
FRESH FEED CONVERSION - %				TOTAL FEED CONVERSION - %				SELECTIVITY	NET WATER	6.712	120.92	8.576	14.516	1.029			W. S. CHEM.	1.980	0.1404	761		
Contraction	CO	H ₂	H ₂ +CO	CO	H ₂	CO+H ₂	C ₃ +C ₄ +	GROSS WATER	136.37	9.672	16.496	11.69					TOTAL	18.424	1.3066	7084		
68.66	94.91	81.49	86.75	81.87	51.57	61.29	78.91	HYDROCARBON TOTAL - C ₄ +	161.42	11.450												

Form ML-11

**Included in Reactor Effluent Total

g/NCM = 16.91 X #/MCF

*9488 MCF H₂ + CO, Bbl/Day = 5421.6 X gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 59-FF
HOURS 709-733

OPERATING CONDITIONS				PRODUCT TESTS				CATALYST DATA								
PRESSURES PSIG		RATES S.C.F.H		OIL		WATER		INVENTORY DATA				PARTICLE SIZE				
Oxygen	429	Fresh Feed	14546	* API	51.3	11.0	In Reactor at Start of Period				Screen Analysis					
Natural Gas	426	Recycle	14287	Neut. No.	37.0	33.8	Fresh Catalyst Added				36	Mesh	Microns	%	Microns	%
Generator Outlet	412	Combined Feed	28833	Sap. No.	47.9	35.4	Total				On 40	419+	39.0	80+		
Reactor Inlet	408	Wet Gas - Measured	4180	Hydrox. No.			Catalyst Recovered				76.5	100	150	39.8	40-80	
Condenser Inlet		Adjusted	4558	Bromine No.	95		In Reactor at End of Period				150	105	8.7	20-40		
Product Accumulator	356	Loss	378	Pour °F.			REACTOR d-p, Inches H ₂ O				250	62	1.2	0-20		
				Chemicals, % by K ₂ CO ₃		12.0	No. Height				325	44	2.4			
TEMPERATURES - °F.		Recycle/Fresh Feed	0.98				0	See Period A	49	<325	2.2					
Oxygen	316	Inlet Velocity - ft./sec.	0.92				1	71	CATALYST							
Natural Gas	320	Fresh Feed Rate - S.C.F.H.	14100	HEMPEL, DIST. %		°API	2	74	Bulk Density, Lbs./Cu.Ft.							
Generator		per Cu.Ft. Dense Bed	1081	205 °F.			3	73	Aerated							
Quench Accumulator	130	per Lb. Catalyst	7.51	400	76.8	55.8	4	280	Settled							
Reactor Inlet	373	per Sq. Ft.	21364	400-550	14.4	35.6	Total	547	Compacted							
Condenser Inlet	565			550+	8.8				Particle Density, gm./cc.							
Product Accumulator	96	Heat Transfer Calculations					CALCULATED FROM dp				NH ₃ Value, ml./gm.					
Catalyst No.	Height	Steam Rate=409#/hr		A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.				144	N ₂ Surface, m ² /gm.				
1	See Par. A	@ 705 psia & 507°F		Naphtha °F.			Inventory, Lbs.				1877					
2	678	1201 BTU		IBP	108		Bed Depth, Ft.				19.75	CHEMICAL ANALYSIS				
3	683	Water in @ 720°F=400°F		10%	136		Vol., Cu. Ft.				13.04	Fe				
4	673	Net BTU/# Steam=1161		50%	222							C				
5	685	1161x409=474849		90%	352							O				
6	680	Ave. BedTemp=678		EP	392							H				
7	666	dT=678-507=171°F		Rec.	96.0							K ₂ O, W+, % basis Fe				
8	655	Tube Area=35.7 sq ft										X-Ray Analysis-				
9	643	K _a = $\frac{474,849}{(35.7)(171)}$ = 77.8 BTU/°F/sq ft										Fe ₂ O ₃				
10	638											Fe ₂ O ₃				
11	613											Fe				

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 59-88
HOURS 733-757
CATALYST Spent CM&S

FRESH FEED				WET GAS				RECYCLE	COMBINED FEED	EFFLUENT		NET CHANGE		YIELD BASIS H ₂ + CO FED									
	%	m/hr	#/hr	%	At Wt. Balance		m/hr	m/hr	m/hr	m/hr	m/hr	m/hr	CONDENSATE				YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*						
					m/hr	#/hr							#/MCF	#/gal	gal/hr	gal/MCF		CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY, %	gal/hr		
CO	38.327	14.928	418.12	5.453	0.675	18.91	2.108	17.036	2.783	-14.253	-399.21												
H ₂	58.946	22.959	46.29	35.806	4.430	8.93	13.837	36.796	18.267	-18.529	-37.36							400 EP	78.6	7.458	98.0	7.309	
CO ₂	1.743	0.679	29.88	32.920	4.073	179.25	12.722	13.401	16.795	3.394	149.37	10.389						400-550	13.6	1.290	91.4	1.179	
N ₂	0.377	0.147	4.12	2.010	0.249	6.98	0.777	0.924	1.026									550 +	7.8	0.740	114.6	0.848	
CH ₄	0.607	0.236	3.79	11.603	1.436	23.04	4.484	4.720	5.920	1.200	19.23	1.339											
C ₂ H ₆				3.167	0.392	11.00	1.224	1.224	1.616	0.392	11.00	0.765							RECOVERY	#/hr	gal/hr		
C ₃ H ₈				1.590	0.197	5.92	0.614	0.614	0.211	0.197	5.92	0.412							PROPYLENE	44.8	7.60		
C ₄ +C ₅																			C ₃ POLY GAS.	87.5	6.65	1.112	
C ₂ H ₄				3.257	0.403	16.96	1.259	1.259	1.662	0.403	16.96	1.180	4.32	3.926	0.273				C ₃ POLY TAR	12.5	0.95	0.126	
C ₂ H ₂				0.360	0.045	1.98	0.139	0.139	0.184	0.045	1.98	0.138	4.24	0.467	0.032								
C ₂ H ₆				1.877	0.232	13.02	0.725	0.725	0.957	0.232	13.02	0.906	8.00	2.604	0.181					#/gal	#/hr	gal/hr	RVP
C ₃ H ₈				0.567	0.070	4.07	0.219	0.219	0.289	0.070	4.07	0.283	4.86	0.837	0.058				C ₂ H ₆	5.00	0.99	0.198	68.0
C ₄ H ₁₀				0.877	0.109	7.64	0.339	0.339	0.448	0.109	7.64	0.531	5.48	1.402	0.098				C ₄ POLY GAS.	5.98	10.53	1.760	1.5
C ₅ H ₁₂				0.220	0.027	1.95	0.085	0.085	0.112	0.027	1.95	0.136	5.25	0.371	0.026				C ₅ H ₁₀	4.86	4.07	0.837	68.0
C ₆ H ₁₄				0.283	0.036	3.03	0.113	0.113	0.149	0.036	3.03	0.211	5.54	0.547	0.038				C ₄ FREE GAS.			10.741	5.8
C ₇ +C ₈													49.65	3.385	10.154	0.706			C ₄ POLY TAR	7.53	1.50	0.199	
TOTAL		38.949	502.20		12.374	302.68	38.645	77.594	58.563														
H ₂ +CO	97.273	37.887	1437792	SCFH	5.105		15.945	53.832	21.050	-32.782										gal/hr	gal/MCF	Bbl/Day	
H ₂ /CO		1.54	Factor	695510	6.56		6.56	2.16	6.56	1.30									10 # RVP 400 EP GASOLINE	13.536	0.9414	5104	
Weight Recovery, %	94.57	Catalyst Age, hrs.		Space Velocity, vhr	1103		RECOVERED OIL	0.436	61.18	4.255	9.488	0.660							GAS OIL	1.179	0.0820	445	
Pressure, psig	418	Inlet Velocity, Ft/sec	0.92	Catalyst, Vol. CF	13.04		TOTAL OIL		109.83	7.640	19.642	1.366							FUEL OIL	0.848	0.0590	320	
Temperature, °F	679	Bed Depth, Ft	19.75	Weight, #	1812		WATER SOLUBLE CHEMICALS	0.294	15.58	1.084	1.953	0.136							POLY TAR	0.325	0.0226	123	
Recycle Ratio	0.99	Bed Density, #/CF	139	Effluent (H ₂)(CO ₂) Shift Ratio (H ₂ O)(CO) =	17.60		TOTAL LIQUID PRODUCTS C ₄ +		125.41	8.724	21.595	1.502							TOTAL	15.888	1.1050	5992	
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %				SELECTIVITY		NET WATER		6.814		122.76		8.538		14.737		1.025		W. S. CHEM. 1.953 0.1358 736	
Contraction	CO	H ₂	H ₂ +CO	CO	H ₂	CO+H ₂	C ₃ +C ₄ +	GROSS WATER	138.34	9.622	16.690	1.161	TOTAL		17.841		1.2408		6728				
68.23	95.48	80.70	86.53	83.66	50.36	60.90	77.61	HYDROCARBON TOTAL—C ₄ +	161.58	11.240													

Form ML-11

** Included in Reactor Effluent Total

g/NCM = 16.91 X #/MCF

99488 MCFH₂ + CO, Bbl/Day = 5421.6 X gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 59-88
HOURS 733-757

OPERATING CONDITIONS				PRODUCT TESTS				CATALYST DATA							
PRESSURES PSIG		RATES S.C.F.H.		OIL		WATER		INVENTORY DATA				PARTICLE SIZE			
Oxygen	441	Fresh Feed	14781	° API	51.2	10.8	In Reactor at Start of Period				Screen Analysis				
Natural Gas	438	Recycle	14666	Neut. No.	37.0	32.3	Fresh Catalyst Added	35			Mesh	Microns	%	Microns	%
Generator Outlet	423	Combined Feed	29.447	Sap. No.	47.6	34.6	Total				On 40	419+	36.1	80+	
Reactor Inlet	418	Wet Gas—Measured	4273	Hydrox. No.			Catalyst Recovered	87.8			100	150	40.6	40-80	
Condenser Inlet		Adjusted	4696	Bromine No.	95		In Reactor at End of Period				150	105	9.9	20-40	
Product Accumulator	367	Loss	423	Pour °F.							200	74	6.8	10-20	
				Chemicals, % by K ₂ CO ₃		11.7	REACTOR d-p, Inches H ₂ O				250	62	0.6	0-20	
							No. Height				325	44	2.4		
TEMPERATURES — °F.		Recycle/Fresh Feed	0.99				0 See Period A	48	<325	3.6					
Oxygen	343	Inlet Velocity—ft./sec.	0.92				1	70	CATALYST						
Natural Gas	309	Fresh Feed Rate—S.C.F.H.	14378	HEMPEL DIST. %		° API	2	70	Bulk Density, Lbs./Cu.Ft.						
Generator		per Cu. Ft. Dense Bed	1103	205 °F.			3	70	Aerated						
Quench Accumulator	137	per Lb. Catalyst	7.93	400	77.6	56.0	4	270	Settled						
Reactor Inlet	368	per Sq. Ft.	21785	400-550	13.6	35.8	Total	528	Compacted						
Condenser Inlet	563			550+	8.8				Particle Density, gm./cc.						
Product Accumulator	96	Heat Transfer Calculations							CALCULATED FROM dp						
Catalyst No.	Height	Steam Rate=416#/hr		A. S. T. M. DIST. ON					Density, Lbs./Cu.Ft.						
1 See Per. A	652	@ 705 psia & 506°F		Naphtha °F.					Inventory, Lbs.						
2	680	1201 BTU		IBP	100				Bed Depth, Ft.						
3	681	Water in @ 72°F=40		10%	130				Vol., Cu. Ft.						
4	671	Net BTU/# steam=1161		50%	220				Fe						
5	687	1161x416=482976		90%	350				C						
6	684	Ave. Bed Temp=679°F		EP	388				O						
7	670	dT=679-506=173°F		Rec.	96.0				H						
8	658	Tube Area=35.7 sq ft							K ₂ O. W+. % basis Fe						
9	646	K= 482976 / (35.7)(173) = 78.2 BTU/OP/sq ft							X-Ray Analysis—						
10	640								Fe ₂ C ₃						
11	617								Fe ₃ O ₄						
									Fe						

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 59-HH
HOURS 757-781
CATALYST Spent CM&S

Table with columns: FRESH FEED, WET GAS, RECYCLE, COMBINED FEED, EFFLUENT, NET CHANGE, YIELD BASIS H2 + CO FED. Rows include CO, H2, CO2, N2, CH4, C2H6, C3H8, C4H10, C5H12, C6H14, C7H16, C8H18, C9H20, C10H22, C11H24, C12H26, C13H28, C14H30, C15H32, C16H34, C17H36, C18H38, C19H40, C20H42, C21H44, C22H46, C23H48, C24H50, C25H52, C26H54, C27H56, C28H58, C29H60, C30H62, C31H64, C32H66, C33H68, C34H70, C35H72, C36H74, C37H76, C38H78, C39H80, C40H82, C41H84, C42H86, C43H88, C44H90, C45H92, C46H94, C47H96, C48H98, C49H100, C50H102.

Form ML-11

** Included in Reactor Effluent Total

g/NCM = 16.91 X #/MCF

9488 MCFH H2 + CO, Bbl/Day = 3421.6 X gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 59-HH
HOURS 757-781

Table with columns: OPERATING CONDITIONS, PRODUCT TESTS, CATALYST DATA. Rows include PRESSURES PSIG, TEMPERATURES -°F, and various catalyst and product analysis data.

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 59-II
HOURS 781-796
CATALYST Spent CM&S

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H ₂ + CO FED										
	%	m/hr	#/hr	%	At Wt. Balance	#/hr				m/hr	m/hr	m/hr	#/hr	CONDENSATE			YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*					
					m/hr	#/hr						#/MCF	#/gal	gal/hr	gal/MCF		CORRECTED HEMPEL %	gal/hr	TREATING RECOVERY %	gal/hr		
CO _{2.8.010}	38.583	14.752	413.20	6.000	0.749	20.98	2.318	17.070	3.067	-14.003	-392.22											
H ₂ _{2.016}	57.140	21.848	44.05	35.176	4.392	8.85	13.593	35.441	17.985	-17.456	35.20						400 EP	79.0	7.601	98.0	7.449	
CO _{2.4.010}	2.690	1.029	45.29	33.157	4.137	182.07	12.812	13.841	16.949	3.108	136.78	9.848					400-550	13.2	1.270	91.4	1.161	
N _{2.016}	0.710	0.271	7.59	1.500	0.187	5.24	0.580	0.851	0.787								550 +	7.8	0.750	114.6	0.860	
CH ₄ _{16.016}	0.877	0.335	5.37	12.267	1.532	24.58	4.740	5.075	6.272	1.197	19.21	1.383										
C ₂ H ₆ _{28.052}				3.120	0.390	10.94	1.206	1.206	1.596	0.390	10.94	0.788						RECOVERY %	#/hr	gal/hr		
C ₃ H ₈ _{30.068}				1.447	0.181	5.44	0.559	0.559	0.740	0.181	5.44	0.392					PROPYLENE	43.4	6.83			
C ₄ +C ₆																	C ₄ POLY GASO.	87.5	5.98	1.000		
C ₂ H ₄ _{42.073}				2.997	0.374	15.74	1.158	1.158	1.532	0.374	15.74	1.133	4.32	3.644	0.262		C ₃ POLY TAR	12.5	0.85	0.113		
C ₃ H ₆ _{44.094}				0.293	0.037	1.63	0.113	0.113	0.150	0.037	1.63	0.117	4.24	0.384	0.028							
C ₄ H ₁₀ _{56.104}				1.947	0.243	13.63	0.752	0.752	0.995	0.243	13.63	0.981	5.00	2.726	0.196			#/gal	#/hr	gal/hr	RVP	
C ₅ H ₁₂ _{59.120}				0.573	0.072	4.18	0.221	0.221	0.293	0.072	4.18	0.301	4.86	0.860	0.062		C ₄ H ₆	5.00	1.04	0.208	68.0	
C ₆ H ₁₄ _{72.140}				1.047	0.131	9.19	0.405	0.405	0.536	0.131	9.19	0.662	5.45	1.686	0.121		C ₄ POLY GASO.	5.98	11.02	1.842	1.5	
C ₇ H ₁₆ _{84.156}				0.143	0.018	1.30	0.055	0.055	0.073	0.018	1.30	0.094	5.25	0.248	0.018		C ₄ H ₁₀	4.86	4.13	0.860	68.0	
C ₈ +C ₁₀				0.333	0.042	3.53	0.129	0.129	0.171	0.042	3.53	0.254	5.84	0.637	0.046		C ₄ FREE GASO.			11.020	5.8	
TOTAL		38.235	515.50		12.466	307.30	38.641	76.876	59.104													
H ₂ +CO	95.723	36.600	13889407	SCFH	5.141		15.911	52.511	21.052	-31.459								gal/hr	gal/MCF	Bbl/Day		
H ₂ /CO		1.48	Factor	719973	5.86		5.86	2.08	5.86	1.25								10 # RVP 400 EP GASOLINE	13.930	1.0029	5437	
Weight Recovery, %	96.42	Catalyst Age, hrs.			Space Velocity, vhr			1072	RECOVERED OIL			0.445	62.38	4.491	9.621	0.693	GAS OIL	1.161	0.0836	453		
Pressure, psig	415	Inlet Velocity, Ft/sec			0.92	Catalyst, Vol CF			12.96	TOTAL OIL			111.58	8.033	19.806	1.426	FUEL OIL	0.860	0.0619	336		
Temperature, °F	678	Bed Depth, Ft			19.63	Weight, #			1788	WATER SOLUBLE CHEMICALS			0.288	15.29	1.101	1.937	0.139	POLY TAR	0.321	0.0231	125	
Recycle Ratio	1.01	Bed Density, #/CF			138	Effluent (H ₂)(CO) Shift Ratio (H ₂ O)(CO)			13.72	TOTAL LIQUID PRODUCTS C ₃ +			126.97	9.134	21.743	1.565	TOTAL	16.272	1.1715	6351		
FRESH FEED CONVERSION - %				TOTAL FEED CONVERSION - %				SELECTIVITY				NET WATER		7.245	130.53	9.398	15.670	1.128	W. S. CHEM.	1.937	0.1395	756
Contraction	CO	H ₂	H ₂ +CO	CO	H ₂	CO+H ₂	C ₃ +C ₄	GROSS WATER			145.92	10.499	17.607	1.287	TOTAL	18.209	1.3110	7107				
67.35	94.92	79.90	85.95	82.03	49.25	59.91	78.09	HYDROCARBON TOTAL -C ₃ +			162.46	11.697										

Form ML-11

**Included in Reactor Effluent Total

g/NCM = 16.91 X #/MCF

*9488 MCFH H₂ + CO, Bbl/Day = 5421.6 X gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 59-II
HOURS 781-796

OPERATING CONDITIONS			PRODUCT TESTS				CATALYST DATA							
PRESSURES PSIG		RATES S.C.F.H	OIL		WATER	INVENTORY DATA		PARTICLE SIZE						
Oxygen	439	Fresh Feed	14510	°API	50.5	10.8	In Reactor at Start of Period		Screen Analysis	Sedimentation				
Natural Gas	435	Recycle	14664	Neut. No.	38.0	34.1	Fresh Catalyst Added		41	Mesh	Microns	%	Microns	%
Generator Outlet	420	Combined Feed	29174	Sap. No.	47.1	35.2	Total			On 40	419+		80+	
Reactor Inlet	415	Wet Gas—Measured	4454	Hydrox. No.			Catalyst Recovered		52.8	100	150		40—80	
Condenser Inlet		Adjusted	4738	Bromine No.	92		In Reactor at End of Period			150	105		20—40	
Product Accumulator	366	Loss	284	Pour °F.						200	74		10—20	
				Chemicals, % by K ₂ CO ₃		11.0	REACTOR d-p, Inches H ₂ O			250	62		0—20	
							No. Height			325	44			
TEMPERATURES—°F.		Recycle/Fresh Feed	1.01				0 See Period A		47					
Oxygen	328	Inlet Velocity—ft./sec.	0.92				1		69	CATALYST				
Natural Gas	312	Fresh Feed Rate—S.C.F.H. @ 600	13889	HEMPEL, DIST. %		°API	2		70	Bulk Density, Lbs./Cu.Ft.				
Generator		per Cu. Ft. Dense Bed	1072	205 °F.			3		70	Aerated				
Quench Accumulator	143	per Lb. Catalyst	7.77	400	78.0	55.5	4		265	Settled				
Reactor Inlet	368	per Sq. Ft.	21044	400-550	13.2	33.6	Total		521	Compacted				
Condenser Inlet	549			550+	8.8					Particle Density, gm./cc.				
Product Accumulator	99	Heat Transfer Calculations					CALCULATED FROM dp			NH ₃ Value, ml./gm.				
Catalyst No.	Height	Steam Rate=405#/hr		A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.		138	N ₂ Surface, m ² /gm.				
1 See Per. A	651	705 psia & 507°F		Naphtha °F.			Inventory, Lbs.		1788					
2	680	1201 BTU		IBP	102		Bed Depth, Ft.		19.63	CHEMICAL ANALYSIS				
3	680	Water in @ 86°F=54°F		10%	138		Vol., Cu. Ft.		12.96	Fe				
4	670	Net BTU/# Steam=1147		50%	232					C				
5	685	1147x405=464535		90%	362					O				
6	682	Ave. Bed Temp=678°F		EP	398					H				
7	668	dT=678-507=171°F		Rec.	95.5					K ₂ O, W+, % basis Fe				
8	657	Tube Area=35.4 sq ft								X-Ray Analysis—				
9	645	464535 K=(171)(35.4) = 76.7 BTU/°F/sq ft								Fe ₂ O ₃				
10	641									Fe ₃ O ₄				
11	616									Fe				

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 59-JJ
HOURS 796-806
CATALYST Spent CM&S

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H ₂ + CO FED								
	%	m/hr	#/hr	%	At Wt. Balance	#/hr				m/hr	m/hr	m/hr	#/hr	CONDENSATE			YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*			
					m/hr	#/hr					#/MCF	#/gal	gal/hr	gal/MCF	HEMPEL %	gal/hr		TREATING RECOVERY %	gal/hr	
CO _{2.8.010}	37.150	14.373	402.57	5.225	0.574	16.08	2.010	16.383	2.584	-13.799	-386.49									
H ₂ _{2.016}	59.210	22.907	46.18	31.745	3.491	7.04	12.211	35.118	15.702	-19.416	39.14				400 EP	76.7	8.092	98.0	7.930	
CO _{2.4.010}	2.530	0.979	43.09	33.875	3.725	163.96	13.030	14.009	16.755	2.746	120.878	5.44			400-550	14.0	1.477	91.4	1.350	
N ₂ _{2.9.016}	0.220	0.085	2.38	1.800	0.198	5.55	0.692	0.777	0.890						550 +	9.3	0.981	114.6	1.124	
CH ₄ _{10.2.016}	0.890	0.344	5.52	15.965	1.755	29.15	6.141	6.485	7.896	1.411	22.63	1.600								
C ₂ H ₆ _{2.8.052}				2.755	0.303	8.50	1.060	1.060	1.363	0.303	8.50	0.601				RECOVERY %	#/hr	gal/hr		
C ₂ H ₄ _{3.0.059}				1.700	0.187	5.62	0.654	0.654	0.841	0.187	5.62	0.397			PROPYLENE	50.7	6.21			
C ₃ +C ₄											36.75	2.598			C ₃ POLY GASO.	87.5	5.43	0.908		
C ₃ H ₈ _{4.2.079}				2.650	0.291	12.24	1.019	1.019	1.310	0.291	12.24	0.865	4.32	2.833	0.200	C ₃ POLY TAR	12.5	0.73	0.104	
C ₄ H ₁₀ _{4.4.094}				0.285	0.031	1.37	0.110	0.110	0.141	0.031	1.37	0.097	4.24	0.323	0.023					
C ₄ H ₈ _{5.6.104}				1.680	0.195	10.38	0.846	0.846	0.831	0.165	10.38	0.734	5.00	2.076	0.147		#/gal	#/hr	gal/hr	RVP
C ₄ H ₆ _{5.8.120}				0.910	0.100	5.81	0.350	0.350	0.450	0.100	5.81	0.411	4.86	1.195	0.084	C ₄ H ₆	5.00	--	--	68.0
C ₅ H ₁₂ _{7.0.130}				0.870	0.096	6.73	0.335	0.335	0.431	0.096	6.73	0.476	5.45	1.235	0.087	C ₅ POLY GASO.	5.98	9.08	1.519	1.5
C ₅ H ₁₀ _{7.2.140}				0.250	0.027	1.95	0.096	0.096	0.123	0.027	1.95	0.138	5.25	0.371	0.026	C ₅ H ₁₀	4.86	(5.91)	(1.195)	68.0
C ₅ H ₈ _{8.4.156}				0.290	0.032	2.69	0.112	0.112	0.144	0.032	2.69	0.190	5.54	0.486	0.034	C ₅ FREE GASO.		4.93	1.014	10.930
C ₆ +C ₇											41.17	2.911	9.519	0.601	C ₆ POLY TAR	7.53	1.30	0.173		
TOTAL		33.686	499.74		10.995	276.07	38.466	77.154	57.982											
H ₂ +CO	96.360	37.280	141475752 SCFH	4.065			14.221	51.501	18.286	-33.215						gal/hr	gal/MCF	Bbl/Day		
H ₂ CO		1.59	Factor 706839	6.08			6.08	2.14	6.08	1.41					10 # RVP 480 EP GASOLINE	13.463	0.9516	5159		
Weight Recovery, %	97.61	Catalyst Age, hrs.		Space Velocity, v/hv		1118	RECOVERED OIL		0.488	68.44	4.838	10.550	0.746	GAS OIL	1.350	0.0954	517			
Pressure, psig	420	Inlet Velocity, Ft/sec		0.92	Catalyst, Vol. CF		22.65	TOTAL OIL		109.61	7.749	19.069	1.347	FUEL OIL	1.124	0.0794	430			
Temperature, °F	683	Bed Depth, Ft		19.16	Weight, #		1733	WATER SOLUBLE CHEMICALS		0.299	15.29	1.123	2.004	POLY TAR	0.277	0.0196	106			
Recycle Ratio	0.99	Bed Density, #/CF		137	Effluent (H ₂)(CO) Shift Ratio (H ₂ O)(CO)		13.16	TOTAL LIQUID PRODUCTS C ₄ +		125.50	8.872	21.073	1.489	TOTAL	16.214	1.1460	6212			
FRESH FEED CONVERSION - %				TOTAL FEED CONVERSION - %				SELECTIVITY		NET WATER		7.724	139.34	9.849	16.728	1.182	W. S. CHEM.	2.004	0.1417	768
Contraction	CO	H ₂	H ₂ +CO	CO	H ₂	CO+H ₂	C ₃ +C ₄	GROSS WATER		155.23	10.972	18.732	1.324	TOTAL	18.218	1.2377	6980			
71.59	96.01	84.78	99.10	84.23	55.29	64.49	77.35	HYDROCARBON TOTAL - C ₄ +		162.25	11.470									

Form ML-11

*Included in Reactor Effluent Total

g/NCM = 16.91X#/MCF

*9488 MCFH₂ + CO, Bbl/Day = 5421.6 X gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 59-JJ
HOURS 796-806

OPERATING CONDITIONS				PRODUCT TESTS				CATALYST DATA			
PRESSURES PSIG		RATES S.C.F.H.		OIL		WATER		INVENTORY DATA		PARTICLE SIZE	
Oxygen	441	Fresh Feed	14682	° API	50.1	10.7	In Reactor at Start of Period		Screen Analysis		Sedimentation
Natural Gas	438	Recycle	14598	Neut. No.	36.4	30.3	Fresh Catalyst Added	--	Mesh	Microns	%
Generator Outlet	425	Combined Feed	29280	Sap. No.	44.4	33.0	Total		On 40	419+	43.3
Reactor Inlet	420	Wet Gas—Measured	3992	Hydrox. No.			Catalyst Recovered	29	100	150	34.8
Condenser Inlet		Adjusted	4173	Bromine No.	92		In Reactor at End of Period		150	105	8.5
Product Accumulator	375	Loss	181	Pour °F.					200	74	5.7
				Chemicals, % by K ₂ CO ₃		10.7	REACTOR d-p, Inches H ₂ O		250	62	2.6
							No. Height		325	44	1.4
TEMPERATURES—°F.		Recycle/Fresh Feed	0.99				0 See Period A	47	<325		3.7
Oxygen	331	Inlet Velocity—ft./sec.	0.92				1	68	CATALYST		
Natural Gas	283	Fresh Feed Rate—S.C.F.H. H ₂ +CO	14148	HEMPEL, DIST. %		° API	2	71	Bulk Density, Lbs./Cu.Ft.		
Generator	2428	per Cu. Ft. Dense Bed	1118	205 °F.			3	69	Aerated		
Quench Accumulator	136	per Lb. Catalyst	8.16	400	77.0	56.1	4	250	Settled		
Reactor Inlet	340	per Sq. Ft.	21436	400-550	14.4	36.2	Total	505	Compacted		
Condenser Inlet	535			550+		8.6			Particle Density, gm. cc.		
Product Accumulator	95	Heat Transfer Calculations					CALCULATED FROM dp		NH ₃ Value, ml./gm.		
Catalyst No.	Height	Steam Rate=437#/hr		A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	137	N ₂ Surface, m ² /gm.		
1	See Per. A	657	@ 705 psia & 506°F=	Naphtha °F.			Inventory, Lbs.	1733			
2	685	1201 BTU		IBP		106	Bed Depth, Ft.	19.16	CHEMICAL ANALYSIS		
3	683	Water in @ 71°F=39		10%		140	Vol., Cu. Ft.	12.65	Fe		
4	671	Net BTU/# Steam=1182		50%		232			C		
5	692	1162x437=507794		90%		360			O		
6	688	Ave. Bed Temp=583°F		EP		406			H		
7	676	Tube Area=34.8 sq ft		Rec.		95.0			K ₂ O, W+, % basis Fe		
8	658	dT=683-506=177							X-Ray Analysis—		
9	650	K= $\frac{507794}{(177)(34.8)}$ = 82.4 BTU/°F/sq ft							Fe ₂ O ₃		
10	645								Fe ₃ O ₄		
11	616								Fe		

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO 59-KK
HOURS 806-830
CATALYST Spent CM&S

Table with columns: FRESH FEED, WET GAS, RECYCLE, COMBINED FEED, EFFLUENT, NET CHANGE, YIELD BASIS H2 + CO FED. Includes rows for CO, H2, CO2, N2, CH4, C2H6, C3H8, C4H10, C5H12, C6H14, C7H16, C8H18, C9H20, C10H22, C11H24, C12H26, C13H28, C14H30, C15H32, C16H34, C17H36, C18H38, C19H40, C20H42, C21H44, C22H46, C23H48, C24H50, C25H52, C26H54, C27H56, C28H58, C29H60, C30H62, C31H64, C32H66, C33H68, C34H70, C35H72, C36H74, C37H76, C38H78, C39H80, C40H82, C41H84, C42H86, C43H88, C44H90, C45H92, C46H94, C47H96, C48H98, C49H100, C50H102, C51H104, C52H106, C53H108, C54H110, C55H112, C56H114, C57H116, C58H118, C59H120, C60H122, C61H124, C62H126, C63H128, C64H130, C65H132, C66H134, C67H136, C68H138, C69H140, C70H142, C71H144, C72H146, C73H148, C74H150, C75H152, C76H154, C77H156, C78H158, C79H160, C80H162, C81H164, C82H166, C83H168, C84H170, C85H172, C86H174, C87H176, C88H178, C89H180, C90H182, C91H184, C92H186, C93H188, C94H190, C95H192, C96H194, C97H196, C98H198, C99H200, C100H202.

Form ML-11

**Included in Reactor Effluent Total

g/NCM = 16.91 X g/MCF

9488 MCFH2 + CO, Bbl/Day = 5421.6 X gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO 59-KK
HOURS 806-830

Table with columns: OPERATING CONDITIONS, PRODUCT TESTS, CATALYST DATA. Includes rows for PRESSURES PSIG, RATES S.C.F.H., TEMPERATURES -F., and various catalyst and product data points.

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 59-LL
HOURS 830-843
CATALYST Spent CM&S

FRESH FEED				WET GAS				RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H ₂ + CO FED																										
	%	m/hr	#/hr	%	At Wt. Balance		m/hr	m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE				YIELDS BASIS	BROWNSVILLE DESIGN	FEED RATE*																				
					m/hr	#/hr							#/MCF	#/gal	gal/hr	gal/MCF				CORRECTED REFR. %	gal/hr	TREATING RECOVERY, %	gal/hr																
CO _{28.010}	37.370	14.346	401.86	5.485	0.678	18.99	2.182	16.498	2.830	-13.668	-382.87																												
H ₂ _{2.016}	58.845	22.592	45.55	35.720	4.414	8.90	14.016	36.608	18.430	-18.178	-36.65					400 EP	76.6	6.931	98.0	6792																			
CO _{44.010}	2.405	0.923	40.62	33.105	4.091	180.03	12.990	13.913	17.091	3.168	139.41	9.945				400-550	15.6	1.412	91.4	1.291																			
N ₂ _{28.016}	0.280	0.107	3.00	1.210	0.150	4.20	0.475	0.582	0.625							550 +	7.8	0.706	114.6	0.809																			
CH ₄ _{16.042}	1.100	0.422	6.77	13.010	1.608	25.80	5.105	5.527	6.713	1.186	19.03	1.358																											
C ₂ H ₆ _{28.052}				2.835	0.350	9.82	1.112	1.112	1.462	0.350	9.82	0.701					RECOVERY %	#/hr	gal/hr																				
C ₃ H ₈ _{30.068}				1.530	0.189	5.68	0.600	0.600	0.789	0.189	5.68	0.405				PROPYLENE	44.2	6.75																					
C ₄ +C ₂											34.53	2.464				C ₄ POLY GASO.	87.5	5.91	0.988																				
C ₂ H ₄ _{42.078}				2.940	0.363	15.27	1.154	1.154	1.517	0.363	15.27	1.089	4.32	3.535	0.252	C ₂ POLY TAR	12.5	0.84	0.112																				
C ₂ H ₂ _{44.094}				0.380	0.047	2.07	0.149	0.149	0.196	0.047	2.07	0.148	4.24	0.488	0.035																								
C ₂ H ₂ _{56.104}				1.945	0.240	13.46	0.763	0.763	1.003	0.240	13.46	0.960	5.00	2.692	0.192		#/gal	#/hr	gal/hr	RVP																			
C ₂ H ₂ _{58.110}				0.630	0.078	4.53	0.247	0.247	0.325	0.078	4.53	0.323	4.86	0.932	0.066	C ₂ H ₂	5.00	0.30	0.060	68.0																			
C ₂ H ₂ _{70.130}				0.820	0.101	7.08	0.322	0.322	0.423	0.101	7.08	0.505	5.48	1.299	0.093	C ₂ POLY GASO.	5.98	11.52	1.926	1.5																			
C ₂ H ₂ _{72.146}				0.175	0.022	1.59	0.069	0.069	0.091	0.022	1.59	0.113	5.28	0.303	0.022	C ₂ H ₂	4.86	4.53	0.932	68.0																			
C ₂ H ₂ _{84.154}				0.215	0.027	2.27	0.084	0.084	0.111	0.027	2.27	0.162	5.54	0.410	0.029	C ₂ -FREE GASO.				9.792	5.8																		
C ₂ -C ₄											46.27	3.300		9.659	0.689	C ₄ POLY TAR	7.53	1.64	0.218																				
TOTAL		38.390	497.80		12.358	299.69	39.238	77.628	59.232																														
H ₂ +CO	96.215	36.938	14017563	SCFH	5.092		16.168	53.106	21.260	-31.946							gal/hr	gal/MCF	Bbl/Day																				
H ₂ CO		1.57	Factor	713390	6.51		6.51	2.22	6.51	1.33						10 # RVP 400 EP GASOLINE	12.7100	0.967	4916																				
Weight Recovery, %	97.31	Catalyst Age, hrs.		Space Velocity, vhr	1121		RECOVERED OIL	**	0.419	58.71	4.188		9.049	0.646	GAS OIL	1.2910	0.921	499																					
Pressure, psig	420	Inlet Velocity, Ft./sec	0.92	Catalyst, Vol CF	12.51		TOTAL OIL		104.98	7.488		18.708	1.335	FUEL OIL	0.8090	0.577	313																						
Temperature, °F	676	Bed Depth, Ft	18.95	Weight, #	1689		WATER SOLUBLE CHEMICALS	**	0.267	14.19	1.012	1.801	0.128	POLY TAR	0.3300	0.235	127																						
Recycle Ratio	1.02	Bed Density, #/CF	135	Effluent Shift Ratio (H ₂)(CO) ₂	= 16.01		TOTAL LIQUID PRODUCTS C ₂ +		119.17	8.500	20.509	1.463	TOTAL	15.1401	0.800	5855																							
FRESH FEED CONVERSION - %				TOTAL FEED CONVERSION - %				SELECTIVITY				NET WATER				**																							
Contraction	CO	H ₂	H ₂ +CO	CO	H ₂	CO+H ₂	C ₂ +C ₄	GROSS WATER				HYDROCARBON TOTAL - C ₁ +																											
67.81	95.27	80.46	86.21	82.85	49.66	59.97	77.53	139.40				9.944				16.832				1.200				TOTAL				16.9411				2.085				6552			

Form ML-11

**Included in Reactor Effluent Total

R/NCM = 16.91 X #/MCF

99488 MCFH H₂ + CO, Bbl/Day = 5421.6 X gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 59-LL
HOURS 830-843

OPERATING CONDITIONS				PRODUCT TESTS				CATALYST DATA			
PRESSURES PSIG		RATES S.C.F.H.		OIL		WATER		INVENTORY DATA		PARTICLE SIZE	
Oxygen	441	Fresh Feed	14569	° API	50.3	10.8	In Reactor at Start of Period		Screen Analysis	Sedimentation	
Natural Gas	438	Recycle	14891	Neut. No.	38.6	34.4	Fresh Catalyst Added	35	Mesh	Microns	%
Generator Outlet	425	Combined Feed	29460	Sap. No.	46.5	35.2	Total		On 40	419+	80+
Reactor Inlet	420	Wet Gas - Measured	4480	Hydrox. No.			Catalyst Recovered	39	100	150	40-80
Condenser Inlet		Adjusted	4690	Bromine No.	94		In Reactor at End of Period		150	105	20-40
Product Accumulator	376	Loss	210	Pour °F.			REACTOR 4-p, Inches H ₂ O		250	62	0-20
				Chemicals, % by K ₂ CO ₃	10.7		No. Height		325	44	
TEMPERATURES - °F.		Recycle/Fresh Feed	1.02				0 See Per.iod A	47	<325		
Oxygen	350	Inlet Velocity - ft./sec.	0.92				1	68	CATALYST		
Natural Gas	309	Fresh Feed Rate - S.C.F.H.	14018	HEMPEL, DIST. %	°API		2	69	Bulk Density, Lbs./Cu.Ft.		
Generator	--	per Cu.Ft. Dense Bed	1121	205 °F.			3	68	Aerated		
Quench Accumulator	136	per Lb. Catalyst	8.30	400	75.6	56.1	4	240	Settled		
Reactor Inlet	354	per Sq. Ft.	21239	400-550	15.6	36.2	Total	492	Compacted		
Condenser Inlet	533			550+	8.8				Particle Density, gm./cc.		
Product Accumulator	101	Heat Transfer Calculations					CALCULATED FROM dp		NH ₃ Value, ml./gm.		
Catalyst No.	Height	Steam Rate = 420#/hr		A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	135	N ₂ Surface, m ² /gm.		
1	See Per. A	@ 705 psia & 506°F		Naphtha °F.			Inventory, Lbs.	1689			
2	676	1201 BTU		IBP	104		Bed Depth, Ft.	18.95	CHEMICAL ANALYSIS		
3	679	Water in @ 91°F = 59°F		10%	136		Vol., Cu. Ft.	12.51	Fe		
4	667	Net BTU/# Steam = 1142		50%	228				C		
5	683	1142x420 = 479640		90%	348				O		
6	680	Ave. Bed Temp = 676°F		EP	394				H		
7	669	dT = 676-506 = 170°F		Rec.	96.0				K ₂ O, W., % basis Fe		
8	652	Tube Area = 34.4 sq ft							X-Ray Analysis -		
9	643	K = $\frac{479640}{(34.4)(170)} = 82.0$ BTU/°F/sq ft							Fe ₂ O ₃		
10	641								Fe ₂ O ₃		
11	615								Fe		

THE TEXAS COMPANY — MONTEBELLO LABORATORY

RATE CALCULATIONS

RUN NO. 59-A
HOURS 0-14

Table with columns: GAS ANALYSES, GENERATOR BALANCE, WEIGHT BALANCE. Includes rows for FRESH FEED, CO, H2, CO2, N2, CH4, C2H6, C3H8, C4H10, C5H12, C6H14, C7H16, C8H18, C9H20, C10H22, C11H24, C12H26, C13H28, C14H30, C15H32, C16H34, C17H36, C18H38, C19H40, C20H42, M.W., H2O, and BALANCE. Includes sub-tables for WET GAS, GAS FLOW RATES, and LIQUID PRODUCT RATES.

THE TEXAS COMPANY — MONTEBELLO LABORATORY

RATE CALCULATIONS

RUN NO. 59-B
HOURS 14-38

Table with columns: GAS ANALYSES, GENERATOR BALANCE, WEIGHT BALANCE. Includes rows for FRESH FEED, CO, H2, CO2, N2, CH4, C2H6, C3H8, C4H10, C5H12, C6H14, C7H16, C8H18, C9H20, C10H22, C11H24, C12H26, C13H28, C14H30, C15H32, C16H34, C17H36, C18H38, C19H40, C20H42, M.W., H2O, and BALANCE. Includes sub-tables for WET GAS, GAS FLOW RATES, and LIQUID PRODUCT RATES.