THE TEXAS COMPANY — MONTEBELLO LABORATORY

RATE CALCULATIONS

RUN NO. 65-I
HOURS 184-208

HOUR	GAS ANALYSES 1400	2200	0600	AVERAGE
FRESH FEED				
CO 28.010	36.83	37.11	37.10	37.014
H_2 2.016	60.38	60.19	59.88	60.150
CO_2 44.010	2.04	2.37	2.43	2.280
N_2 28.016	0.18	0.26	0.50	0.313
CH_4 16.042	0.57	0.07	0.09	0.243
			M. W	12.71035
			H_2O 18.016	
			BALANCE	
WET GAS				
CO 28.010	7.74	8.41	7.72	7;957
H_2 2.016	39.71	37.11	35.69	37.503
CO_2 44.010	27.35	31.74	32.45	30.513
N_2 28.016	1.29	1.50	1.65	1.480
CH_4 16.042	11.92	9.16	9.90	10.327
C_2H_4 28.052	2.56	2.39	2.49	2.480
C_2H_6 30.068	1.84	1.82	1.87	1.843
C_3H_6 42.078	3.54	3.02	3.07	3.210
C_3H_8 44.094	0.36	0.27	0.21	0.280
C_4H_8 56.104	2.05	2.11	2.01	2.057
C_4H_{10} 58.120	0.55	0.78	1.18	0.837
C_5H_{10} 70.130	0.83	1.16	1.09	1.027
C_5H_{12} 72.146	0.13	0.23	0.28	0.213
C_6H_{12} 84.156	0.13	0.30	0.39	0.273
			M. W.	23.95306

GENERATOR BALANCE	M/HR	C	H	O
FRESH FEED				
CO 28.010	15.113	15.113		15.113
H_2 2.016	24.559		49.118	
CO_2 44.010	0.931	0.931		1.862
N_2 28.016	0.128			
CH_4 16.042	0.099	0.099	0.396	
		M. W		12.71035
		H_2O 18.016		
		BALANCE		
WET GAS				
CO 28.010				
H_2 2.016				
CO_2 44.010				
N_2 28.016				
CH_4 16.042				
C_2H_4 28.052				
C_2H_6 30.068				
C_3H_6 42.078				
C_3H_8 44.094				
C_4H_8 56.104				
C_4H_{10} 58.120				
C_5H_{10} 70.130				
C_5H_{12} 72.146				
C_6H_{12} 84.156				

	Mol %	M/Hr	C	H	O
O_2 32.000	0.23	10.535 0.030			21.130
CO_2 44.010	1.37	0.182	0.182		0.364
N_2 28.016	2.25	0.298			
CH_4 16.042	83.05	11.007	11.007	44.028	
C_2H_6 30.068	6.47	0.857	1.714	5.142	
C_3H_8 44.094	4.80	0.636	1.908	5.088	
C_4H_{10} 58.120	1.39	0.184	0.736	1.840	
C_5H_{12} 72.146	0.44	0.058	0.290	0.696	
MW	19.81700				
TOTAL			15.837	56.794	21.494

GAS FLOW RATES	$\sqrt{h}$	PRESSURE	TEMP.	M. W.	S. C. F. H.	M/HR
		413.8	58	2277671		
FRESH FEED 79.31	6.242	20.700	1.0019	1.5092	15495	40.830
		1.50	59	1208613		
WET GAS 158.44	6.242	4.025	1.0010	1.0994	4381	11.544
		411.7	74			
RECYCLE 79.31	8.492	20.649	0.9868	1.0994	15088	39.758
BLEED 5.02	8.517	20.649	1.0000	1.0994	971	2.559
		435.5	188	1460866		
NATURAL GAS 28.43	7.700	21.218	0.8958	1.2087	5029	13.252
		444.2	62			
OXYGEN 27.07	6.908	21.422	0.9981		3998	10.535
		27.1				
STEAM 215.7	5.917					

WEIGHT BALANCE	#/hr Measured	At Wt. Balance
WET GAS	26.71 276.51	319.90
OIL	53.90	56.86
WATER	134.78	142.19
TOTAL	491.90	
FRESH FEED	518.96	
WEIGHT BALANCE	94.79	
Forced Factor	105501	
WET GAS FACTOR	1156920	
INDICATED LOSS—S C F H	852	
	5233	

LIQUID PRODUCT RATES

HOUR	GAGE	GAL.	°F	FACTOR	GAL. AT 60	API° #/GAL.	#	# HR GAL HR
OIL	4'10½"	259.84	42	1.0089	262.15	52.4		
	1'2"	60.66	44	1.0079	61.14	6.406		
					+0.94		+6.00	53.90
					201.95		1293.69	8.415
WATER	7'6"	397.32	60	1.00000	397.32	10.8		
	7'2"	379.86	60	1.00000	379.86	8.282		
	7'3½"	386.41	60	1.00000	386.41			
	0'3"	13.28	44	1.00106	13.29			134.78
					390.58		3234.78	16.274

THE TEXAS COMPANY — MONTEBELLO LABORATORY

RATE CALCULATIONS

RUN NO. 65-J
HOURS 208-232

HOUR	GAS ANALYSES 1400	2200	0600	AVERAGE
FRESH FEED				
CO 28.010	37.36	37.62	37.26	37.413
H_2 2.016	59.97	59.88	60.10	59.984
CO_2 44.010	2.12	2.28	2.36	2.253
N_2 28.016	0.06	0.11	0.18	0.117
CH_4 15.042	0.49	0.11	0.10	0.233
			M. W	12.75036
			H_2O 18.016	
			BALANCE	
WET GAS				
CO 28.010	12.03	12.68	12.43	12.380
H_2 2.016	41.15	39.38	40.75	40.427
CO_2 44.010	24.71	27.17	26.73	26.203
N_2 28.016	1.33	1.23	1.55	1.370
CH_4 16.042	10.18	8.08	8.25	8.837
C_2H_4 28.052	2.22	2.12	1.98	2.107
C_2H_6 30.068	1.72	1.70	1.60	1.673
C_3H_6 42.078	2.83	2.87	2.27	2.657
C_3H_8 44.094	0.28	0.29	0.28	0.283
C_4H_8 56.104	1.77	2.14	1.78	1.897
C_4H_{10} 58.120	0.50	0.65	0.72	0.623
C_5H_{10} 70.130	0.81	1.15	1.06	1.007
C_5H_{12} 72.146	0.24	0.23	0.29	0.253
C_6H_{12} 84.156	0.23	0.31	0.31	0.283
			M. W.	22.50621

GENERATOR BALANCE	M/HR	C	H	O
FRESH FEED				
CO 28.010	15.055	15.055		15.055
H_2 2.016	24.137		48.274	
CO_2 44.010	0.907	0.907		1.814
N_2 28.016	0.047			
CH_4 16.042	0.094	0.094	0.376	
		M. W	9.360	4.519
		H_2O 18.016	9.199	4.600
		BALANCE		
WET GAS				
CO 28.010				
H_2 2.016				
CO_2 44.010				
N_2 28.016				
CH_4 16.042				
C_2H_4 28.052				
C_2H_6 30.068				
C_3H_6 42.078				
C_3H_8 44.094				
C_4H_8 56.104				
C_4H_{10} 58.120				
C_5H_{10} 70.130				
C_5H_{12} 72.146				
C_6H_{12} 84.156				

	Mol %	M/Hr	C	H	O
O_2 32.000	0.19	10.472 0.025			20.994
CO_2 44.010	1.49	0.197	0.197		0.394
N_2 28.016	0.21	0.028			
CH_4 16.042	84.70	11.211	11.211	44.844	
C_2H_6 30.068	6.45	0.854	1.708	5.124	
C_3H_8 44.094	4.95	0.655	1.965	5.240	
C_4H_{10} 58.120	1.47	0.195	0.780	1.950	
C_5H_{12} 72.146	0.54	0.071	0.355	0.852	
MW	19.728948				
TOTAL			16.216	58.010	21.388

GAS FLOW RATES	$\sqrt{h}$	PRESSURE	TEMP.	M. W.	S. C. F. H.	M/HR
		412.6	61	2270524		
FRESH FEED 79.31	6.188	20.671	0.9990	1.5068	15271	40.240
		1.50	62	1286311		
WET GAS 158.44	6.521	4.025	0.9981	1.1342	4708	12.406
		411.9	77			
RECYCLE 79.31	8.450	20.654	0.9840	1.1342	15448	40.706
BLEED 5.02	8.046	20.654	1.0000	1.1342	946	2.493
		432.7	187	1467386		
NATURAL GAS 28.43	7.692	21.152	0.8965	1.2114	5023	13.236
		441.6	63			
OXYGEN 27.07	6.892	21.361	0.9971		3974	10.472
		26.0				
STEAM 215.7	5.750					

WEIGHT BALANCE	#/hr Measured	At Wt. Balance
WET GAS	25.09 279.21	327.12
OIL	44.70	48.05
WATER	128.28	137.90
TOTAL	477.28	
FRESH FEED	513.07	
WEIGHT BALANCE	93.02	
Forced Factor	1074987	
WET GAS FACTOR	1171591	
INDICATED LOSS—S C F H	808	
	5735	

LIQUID PRODUCT RATES 21 hours basis

HOUR	GAGE	GAL.	°F	FACTOR	GAL. AT 60	API° #/GAL.	#	# HR GAL HR
OIL	4'7½"	246.74	49	1.0054	248.07	50.9		
	2'0½"	106.35	43	1.0084	107.24	6.459		
					+4.49		+29.00	44.70
					145.32		938.62	6.920
WATER	7'3-3/4	387.50	68	0.99920	387.19	10.6		
	1'9"	91.50	62	0.99982	91.48	8.293		
	1'7"	82.59	61	0.99992	82.58			
	1'0½"	54.14	50	1.00070	54.18			
					+0.72		+6.00	128.28
					324.83		2693.82	15.468

THE TEXAS COMPANY — MONTEBELLO LABORATORY

RATE CALCULATIONS

RUN NO. 65-K
HOURS 232-256

Forced

HOUR	GAS ANALYSES 1400	2200	0600	AVERAGE
FRESH FEED				
CO 28.010	37.11	38.12	37.32	37.517
H_2 2.016	60.39	58.93	60.12	59.813
CO_2 44.010	1.79	2.58	2.27	2.213
N_2 28.016	0.13	0.26	0.17	0.187
CH_4 16.042	0.59	0.11	0.12	0.270
			M. W	12.783986
			H_2O 18.016	
			BALANCE	
WET GAS				
CO 28.010	10.99	11.84	11.53	11.453
H_2 2.016	39.85	41.34	40.49	40.560
CO_2 44.010	26.81	26.99	27.47	27.090
N_2 28.016	1.26	1.27	1.43	1.320
CH_4 16.042	9.66	8.61	8.58	8.950
C_2H_4 28.052	2.02	2.07	1.88	1.990
C_2H_6 30.068	1.66	1.66	1.64	1.653
C_3H_6 42.078	2.58	2.55	2.42	2.517
C_3H_8 44.094	0.28	0.27	0.19	0.247
C_4H_8 56.104	2.04	1.64	1.80	1.827
C_4H_{10} 58.120	0.88	0.52	0.95	0.793
C_5H_{10} 70.130	1.16	0.84	0.95	0.983
C_5H_{12} 72.146	0.41	0.18	0.40	0.330
C_6H_{12} 84.156	0.40	0.22	0.27	0.297
			M. W.	22.634331

	M/HR	C	H	O
FRESH FEED	79.31	6.263		
WET GAS	158.44	6.496		
RECYCLE	79.31	8.392		
BLEED	5.02	8.046		
NATURAL GAS	28.43	7.713		
OXYGEN	27.07	6.883		
STEAM	215.7	5.696		
	99.98	99.45	100.76	
	15.240	15.240		15.240
	24.297		48.594	
	0.899	0.899		1.798
	0.076			
	0.110	0.110	0.440	
			8.858	4.268 / 4.429
		16.249	57.892	21.467

	Mol %	M/Hr	C	H	O
O_2 32.000	0.26	10.440 / 0.035			20.950
CO_2 44.010	1.34	0.178	0.178		0.356
N_2 28.016	0.38	0.051			
CH_4 16.042	84.43	11.225	11.225	44.900	
C_2H_4 30.068	6.69	0.890	1.780	5.340	
C_2H_6 44.094	4.98	0.662	1.986	5.296	
C_4H_{10} 58.120	1.44	0.191	0.764	1.910	
C_5H_{12} 72.146	0.48	0.064	0.320	0.768	
MW	19.71431				
TOTAL			16.253	58.214	21.306

	PRESSURE	TEMP.	M. W.	S. C. F. H.	M/HR
FRESH FEED	411.5	61	2264551		
WET GAS	1.65	63	1279030		
RECYCLE	410.9	75			
BLEED	434.0	187	1468476		
NATURAL GAS	440.9	64			
OXYGEN	21.345	0.9962		3962	10.440
STEAM	26.5				
	20.645	0.9990	1.5048	15416	40.622
	4.044	0.9971	1.1309	4693	12.366
	20.630	0.9859	1.1309	15309	40.340
	20.630	1.0000	1.1309	942	2.482
	21.183	0.8965	1.2118	5046	13.296

HOUR	GAGE	GAL.	°F	FACTOR	GAL. AT 60	API° #/GAL.	#	# HR GAL HR
OIL	7'3½"	385.32	48	1.0059	387.59	50.3		
	4'7⅞"	246.74	49	1.0054	248.07	6.480		
	1'4½"	70.49	45	1.0074	71.01			
	1'0½"	53.06	40	1.0099	53.59			
					+4.86		+31.50	43.69
					161.80		1048.46	6.742
WATER	7'7-1/8	402.23	65	0.99953	402.04	10.6		
	1'7"	82.59	61	0.99992	82.58	8.293		
	1'7½"	84.80	59	1.00009	84.81			
	0'9-3/4	42.31	44	1.00106	42.35			
					+0.78		+6.50	125.33
					362.70		3007.87	15.113

WEIGHT BALANCE	#/hr Measured	At Wt. Balance
WET GAS	25.24 / 279.90	334.20
OIL	43.69	47.85
WATER	125.33	137.26
TOTAL	474.16	519.31
FRESH FEED	519.31	
WEIGHT BALANCE	91.31	
Forced Factor	1095221	
WET GAS FACTOR	1193997	
INDICATED LOSS—S C F H	1180	
	5873	

THE TEXAS COMPANY — MONTEBELLO LABORATORY

RATE CALCULATIONS

RUN NO. 65-L
HOURS 256-280

Forced

HOUR	GAS ANALYSES 1400	2200	0600	AVERAGE
FRESH FEED				
CO 28.010	37.35	36.93	36.82	37.033
H_2 2.016	60.45	60.53	60.69	60.557
CO_2 44.010	1.73	2.13	2.11	2.010
N_2 28.016	0.17	0.24	0.14	0.133
CH_4 16.042	0.30	0.11	0.24	0.217
			M. W	12.56445
			H_2O 18.016	
			BALANCE	
WET GAS				
CO 28.010	10.26	11.50	11.80	11.187
H_2 2.016	40.40	42.11	43.62	42.044
CO_2 44.010	27.49	26.60	25.75	26.613
N_2 28.016	1.24	1.47	1.07	1.260
CH_4 16.042	8.98	8.34	8.52	8.613
C_2H_4 28.052	2.15	1.97	1.95	2.023
C_2H_6 30.068	1.74	1.58	1.57	1.630
C_3H_6 42.078	2.67	1.97	2.24	2.293
C_3H_8 44.094	0.21	0.16	0.21	0.193
C_4H_8 56.104	2.13	1.77	1.46	1.787
C_4H_{10} 58.120	0.81	0.82	0.53	0.720
C_5H_{10} 70.130	1.25	1.06	0.80	1.037
C_5H_{12} 72.146	0.26	0.34	0.22	0.273
C_6H_{12} 84.156	0.41	0.31	0.26	0.327
			M. W.	22.156156

	M/HR	C	H	O
FRESH FEED	79.31	6.246		
WET GAS	158.44	5.883		
RECYCLE	79.31	7.992		
BLEED	5.02	8.096		
NATURAL GAS	28.43	7.700		
OXYGEN	27.07	6.900		
STEAM	215.7	5.521		
	99.98	99.45	100.76	
	15.112	15.112		15.112
	24.710		49.420	
	0.820	0.820		1.640
	0.075			
	0.089	0.089	0.356	

	Mol %	M/Hr	C	H	O
O_2 32.000	0.22	10.451 / 0.029			20.960
CO_2 44.010	1.29	0.170	0.170		0.340
N_2 28.016	0.62	0.082			
CH_4 16.042	83.77	11.039	11.039	44.156	
C_2H_6 30.068	6.78	0.893	1.786	5.358	
C_3H_8 44.094	5.19	0.684	2.052	5.472	
C_4H_{10} 58.120	1.55	0.204	0.816	2.040	
C_5H_{12} 72.146	0.58	0.077	0.385	0.924	
MW	19.896607				
TOTAL					21.300

	PRESSURE	TEMP.	M. W.	S. C. F. H.	M/HR
FRESH FEED	410.3	61	2304119		
WET GAS	1.50	65	1306634		
RECYCLE	410.1	79			
BLEED	432.3	188	1455021		
NATURAL GAS	438.8	63			
OXYGEN	21.296	0.9971		3966	10.451
STEAM	28.1				
	20.616	0.9990	1.5179	15486	40.806
	4.025	0.9952	1.1431	4268	11.246
	20.611	0.9822	1.1431	14668	38.651
	20.611	1.0000	1.1431	958	2.524
	21.142	0.8958	1.2062	5001	13.178

HOUR	GAGE	GAL.	°F	FACTOR	GAL. AT 60	API° #/GAL.	#	# HR GAL HR
OIL	3'11½"	211.83	51	1.0044	212.76	49.9		
	1'4½"	70.49	45	1.0074	71.01	6.494		
					+1.69		+11.00	38.81
					143.44		931.50	5.977
WATER	7'2½"	382.05	67	0.99932	381.79	10.7		
	1'7½"	84.80	59	1.00009	84.81	8.287		
	2'0"	105.19	62	0.99982	105.17			
	1'2"	60.66	58	1.00018	60.67			
					+0.72		+6.00	118.16
					342.20		2835.81	14.258

WEIGHT BALANCE	#/hr Measured	At Wt. Balance
WET GAS	24.70 / 249.17	325.91
OIL	38.81	46.18
WATER	118.16	140.61
TOTAL	430.84	
FRESH FEED	512.70	
WEIGHT BALANCE	84.03	
Forced Factor	11900	
WET GAS FACTOR	1307982	
INDICATED LOSS—S C F H	1825	
	6093	

THE TEXAS COMPANY — MONTEBELLO LABORATORY

RATE CALCULATIONS

RUN NO. 65-M

HOURS 280-304

	GAS ANALYSES				GENERATOR BALANCE										WEIGHT BALANCE		
HOUR	1400	2200	0600	AVERAGE	M/HR	C	H	O		Mol %	M/Hr	C	H	O		#/hr Measured	At Wt. Balance
FRESH FEED									O_2 32.000	0.26	10.543 0.034			21.154	WET GAS	24.62 236.65	321.75
CO 28.010	36.97	37.12	37.21	37.100	15.042	15.042		15.042	CO_2 44.010	1.62	0.214	0.214		0.428	OIL	40.94	50.42
H_2 2.016	60.47	60.33	59.97	60.257	24.431		48.863		N_2 28.016	1.70	0.224				WATER	115.28	141.96
CO_2 44.010	2.02	2.15	2.43	2.200	0.892	0.892		1.784	CH_4 16.042	83.55	11.026	11.026	44.104		TOTAL	417.49	
N_2 28.016	0.22	0.33	0.32	0.290	0.118				C_2H_6 30.068	6.17	0.814	1.628	4.884		FRESH FEED	514.13	
CH_4 16.042	0.32	0.07	0.07	0.153	0.062	0.062	0.248		C_3H_8 44.094	4.72	0.623	1.869	4.984		WEIGHT BALANCE	81.20	
			M. W	12.680502					C_4H_{10} 58.120	1.48	0.195	0.780	1.950		Forced Factor	1231478	
			H_2O 18.016				8.558	4.279	C_6H_{12} 72.146	0.50	0.066	0.330	0.792		WET GAS FACTOR	1359602	
						15.996	57.668	21.105	MW	19.832863					INDICATED LOSS—SCFH	2084	
			BALANCE			100.94	101.68	97.80	TOTAL			15.847	56.714	21.582		6152	

WET GAS					GAS FLOW RATES										LIQUID PRODUCT RATES						
CO 28.010	10.32	11.35	10.60	10.757		$\sqrt{h}$	PRESSURE	TEMP.	M. W.	S. C. F. H.	M/HR	HOUR	GAGE	GAL.	°F	FACTOR	GAL. AT 60	API° #/GAL.	#	# HR GAL HR
H_2 2.016	42.34	41.98	41.37	41.897	FRESH FEED		408.3	57	2283032			OIL	6'8½"	355.86	43	1.0084	358.85	50.0		
CO_2 44.010	26.70	27.05	28.25	27.333	79.31	6.225	20.567	1.0029	1.5110	15387	40.545		3'11½"	211.83	51	1.0044	212.76	6.490		
N_2 28.016	1.26	1.54	1.40	1.400	WET GAS		1.50	60	1311259								+5.32		+34.50	40.94
CH_4 16.042	9.49	8.28	8.50	8.757	158.44	5.571	4.025	1.0000	1.1451	4068	10.719						151.41		982.65	6.309
C_2H_6 28.052	2.02	1.88	2.14	2.013	RECYCLE		407.9	74												
C_2H_6 33.068	1.67	1.59	1.67	1.643	79.31	8.500	20.557	0.9868	1.1451	15660	41.265									
C_3H_6 42.078	2.37	2.35	2.62	2.447	BLEED															
C_3H_8 44.094	0.23	0.24	0.29	0.253	5.02	8.063	20.557	1.0000	1.1451	953	2.511	WATER	7'2⅛"	382.05	63	0.99973	381.95	10.7		
C_4H_8 56.104	1.58	1.65	1.57	1.600	NATURAL GAS		431.3	187	1459698				2'0"	105.19	62	0.99982	105.17	8.287		
C_4H_{10} 58.120	0.67	0.74	0.45	0.620	28.43	7.700	21.119	0.8965	1.2082	5008	13.196		2'5-¾	132.34	56	1.00033	132.38			
C_5H_{10} 70.130	0.89	0.85	0.79	0.843	OXYGEN		439.5	56					1'5⅛"	75.97	54	1.00047	76.01			
C_5H_{12} 72.146	0.20	0.24	0.13	0.190	27.07	6.908	21.312	1.0039		4001	10.543						+0.72		+6.00	115.28
C_6H_{12} 84.156	0.26	0.26	0.22	0.247	STEAM		27.4										333.87		2766.78	13.911
			M. W.	22.078012	215.7	5.450														

THE TEXAS COMPANY — MONTEBELLO LABORATORY

RATE CALCULATIONS

RUN NO. 65-N

HOURS 304-326

Forced

	GAS ANALYSES				GENERATOR BALANCE										WEIGHT BALANCE		
HOUR	1400	2200	0200	AVERAGE	M/HR	C	H	O		Mol %	M/Hr	C	H	O		#/hr Measured	At Wt. Balance
FRESH FEED									O_2 32.000	0.23	10.522 0.030			21.104	WET GAS	226.13 24.77	308.40
CO 28.010	37.13	37.01	36.88	37.007	15.106	15.106		15.106	CO_2 44.010	1.24	0.162	0.162		0.324	OIL	42.42	52.14
H_2 2.016	60.53	60.46	60.55	60.513	24.700		49.400		N_2 28.016	1.85	0.242				WATER	125.33	154.05
CO_2 44.010	1.89	2.28	2.26	2.143	0.875	0.875		1.750	CH_4 16.042	82.28	10.747	10.747	42.988		TOTAL	418.65	514.59
N_2 28.016	0.23	0.16	0.21	0.200	0.082				C_2H_6 30.068	6.70	0.875	1.750	5.250		FRESH FEED	514.59	
CH_4 16.042	0.22	0.09	0.10	0.137	0.056	0.056	0.224		C_3H_8 44.094	5.27	0.688	2.064	5.504		WEIGHT BALANCE	81.36	
			M. W	12.60675					C_4H_{10} 58.120	1.72	0.225	0.900	2.250		Forced Factor	1229165	
			H_2O 18.016				8.314	4.157	C_6H_{12} 72.146	0.71	0.093	0.465	1.116		WET GAS FACTOR	1363817	
						16.037	57.938	21.013	MW	20.187188					INDICATED LOSS—SCFH	1405	
			BALANCE			99.68	101.45	9.806	TOTAL			16.088	57.108	21.428		5924	

WET GAS					GAS FLOW RATES										LIQUID PRODUCT RATES Basis 21 hours						
CO 28.010	9.96	10.57	9.47	10.000		$\sqrt{h}$	PRESSURE	TEMP.	M. W.	S. C. F. H.	M/HR	HOUR	GAGE	GAL.	°F	FACTOR	GAL. AT 60	API° #/GAL.	#	# HR GAL HR
H_2 2.016	42.33	41.68	41.91	41.973	FRESH FEED		408.4	57	2296388			OIL	7'5"	392.96	52	1.0039	394.49	51.0		
CO_2 44.010	27.35	27.89	28.39	27.877	79.31	6.248	20.569	1.0029	1.5154	15491	40.819		6'8½"	355.86	43	1.0084	358.85	6.455		
N_2 28.016	1.47	1.52	1.42	1.470	WET GAS		1.50	59	1302916				3'4"	179.09	40	1.0099	180.86			
CH_4 16.042	8.93	8.15	8.90	8.660	158.44	5.300	4.025	1.0010	1.1415	3862	10.177		1'6½"	80.37	50	1.0049	80.76			
C_2H_6 28.052	1.99	1.83	2.21	2.010	RECYCLE		406.9	78									+2.25		+14.50	42.42
C_2H_6 33.068	1.63	1.64	1.70	1.657	79.31	8.010	20.533	0.9831	1.1415	14638	38.572						137.99		890.73	6.571
C_3H_6 42.078	2.28	2.38	2.72	2.460	BLEED															
C_3H_8 44.094	0.20	0.23	0.26	0.230	5.02	8.095	20.533	1.0000	1.1415	952	2.509	WATER	7'2½"	382.05	62	0.99982	381.98	10.7		
C_4H_8 56.104	1.67	1.70	1.50	1.623	NATURAL GAS		432.2	190	1434077				2'0"	105.19	62	0.99982	105.17	8.287		
C_4H_{10} 58.120	0.74	0.86	0.42	0.673	28.43	7.700	21.140	0.8944	1.1975	4957	13.062		1'6-¾	81.48	55	1.0039	81.51			
C_5H_{10} 70.130	0.91	0.89	0.71	0.837	OXYGEN		440.0	59					0'9⅛"	41.26	42	1.00116	41.31			
C_5H_{12} 72.146	0.26	0.31	0.20	0.257	27.07	6.910	21.324	1.0010		3993	10.522						+0.60		+5.00	125.33
C_6H_{12} 84.156	0.28	0.35	0.19	0.273	STEAM		25.7										317.61		2632.03	15.124
			M. W.	22.219367	215.7	5.548														

RUN NO. 66-0 (A-E)
HOURS 0-94
CATALYST Brownsville Trtd Mill Scale @ 660° F.

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED: CONDENSATE				YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*				
	%	m/hr	#/hr	%	At Wt. Balance m/hr	At Wt. Balance #/hr	m/hr	m/hr	m/hr	m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF		CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY, %	gal/hr
CO 28.010	36.086	15.575	436.26	8.805	1.253	35.10	3.605	19.180	4.858	-14.322	-401.16									
H_2 2.016	60.971	26.317	53.06	41.033	5.843	11.78	16.802	43.119	22.645	-20.474	-41.28					400 EP	80.34	9.204	98.0	9.020
CO_2 44.010	2.168	0.936	41.19	29.503	4.201	184.89	12.081	13.017	16.282	3.265	143.70	9.039				400-550	9.62	1.102	91.4	1.007
N_2 28.016	0.668	0.288	8.07	1.715	0.244	6.84	0.702	0.990	0.946							550 +	10.04	1.150	114.6	1.318
CH_4 16.042	0.107	0.046	0.74	9.083	1.294	20.76	3.719	3.765	5.013	1.248	20.02	1.259								
C_2H_4 28.052				2.236	0.318	8.92	0.916	0.916	1.234	0.318	8.92	0.561					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.399	0.199	5.98	0.573	0.573	0.722	0.199	5.98	0.376				PROPYLENE	43.0	7.49		
C_1+C_2											34.92	2.196				C_3 POLY GASO.	87.5	6.55	1.095	
C_3H_6 42.078				2.905	0.414	17.42	1.189	1.189	1.603	0.414	17.42	1.096	4.32	4.032	0.254	C_3 POLY TAR	12.5	0.94	0.125	
C_3H_8 44.094				0.313	0.046	2.03	0.128	0.128	0.174	0.046	2.03	0.128	4.24	0.479	0.030					
C_4H_8 56.104				1.598	0.228	12.79	0.654	0.654	0.882	0.228	12.79	0.805	5.00	2.558	0.161		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.494	0.070	4.07	0.202	0.202	0.272	0.070	4.07	0.256	4.86	0.837	0.053	C_4H_8	5.00	1.34	0.268	68.0
C_5H_{10} 70.130				0.609	0.087	6.10	0.249	0.249	0.336	0.087	6.10	0.384	5.45	1.119	0.070	C_4 POLY GASO.	5.98	10.02	1.675	1.5
C_5H_{12} 72.146				0.137	0.020	1.44	0.056	0.056	0.076	0.020	1.44	0.091	5.25	0.274	0.017	C_4H_{10}	4.86	4.07	0.837	68.0
C_6H_{12} 84.156				0.170	0.024	2.02	0.070	0.070	0.094	0.024	2.02	0.127	5.54	0.365	0.023	C_4-FREE GASO.			11.873	5.8
C_3-C_6											45.87	2.887		9.664	0.608	C_4 POLY TAR	7.53	1.43	0.190	
TOTAL		43.162	53.932		14.241	320.14	40.946	84.108	63.058											
H_2+CO	97.057	41.892	15898	SCFH	7.096		20.407	62.299	27.503	-34.796							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.69	Factor	629009	4.66		4.66	2.25	4.66	1.43						10 # RVP 400 EP GASOLINE	14.653	0.9217	4997	

									m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF		gal/hr	gal/MCF	Bbl/Day
Weight Recovery, %		Catalyst Age, hrs.	47	Space Velocity, vhv	1271			RECOVERED OIL	0.517**	72.50	4.560		11.456	0.721	GAS OIL	1.007	0.0633	343
Pressure, psig	404	Inlet Velocity, Ft/sec		Catalyst				TOTAL OIL		118.37	7.447		21.120	1.329	FUEL OIL	1.318	0.0829	449
Temperature, °F	662	Bed Depth, Ft	18.95	Weight, #	1931			WATER SOLUBLE CHEMICALS	0.408**	21.65	1.362	2.967	2.717	0.171	POLY TAR	0.315	0.0198	107
Recycle Ratio	0.95	Bed Density, #/CF	154	Effluent Shift Ratio $\frac{(H_2)(CO_2)}{(H_2O)(CO)}$	= 10.9			TOTAL LIQUID PRODUCTS C_3+		140.02	8.809		23.837	1.500	TOTAL	17.293	1.0877	5896
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY	NET WATER	6.946**	125.14	7.871				W. S. CHEM.	2.717	0.1709	927
Contraction	CO	H_2	H_2+CO	CO	H_2	CO+H_2	C_3+/C_1+	GROSS WATER		146.79	9.233				TOTAL	20.010	1.2586	6823
67.01	91.96	77.80	83.06	74.67	47.48	55.85	80.04	HYDROCARBON TOTAL—C_1+		174.94	11.004							

Form ML—11

**Included in Reactor Effluent Total

g/NCM = 16.91×#/MCF

*9488 MCFH H_2 + CO, Bbl/Day = 5421.6×gal/MCF

RUN NO. 66-1 (F-J)
HOURS 94-207
CATALYST Brownsville Trtd Mill Scale @ 660° F.

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED: CONDENSATE				YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*				
	%	m/hr	#/hr	%	At Wt. Balance m/hr	At Wt. Balance #/hr	m/hr	m/hr	m/hr	m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF		CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY, %	gal/hr
CO 28.010	37.165	15.400	431.35	9.025	1.342	37.59	3.631	19.031	4.973	-14.058	-393.76									
H_2 2.016	59.995	24.859	50.12	40.444	6.015	12.13	16.273	41.132	22.288	-18.844	-37.99					400 EP	81.46	7.138	98.0	6.995
CO_2 44.010	2.191	0.908	39.96	29.700	4.417	194.39	11.950	12.858	16.367	3.509	154.43	10.108				400-550	8.68	0.761	91.4	0.696
N_2 28.016	0.572	0.237	6.64	1.859	0.276	7.73	0.748	0.985	1.024							550 +	9.86	0.864	114.6	0.990
CH_4 16.042	0.077	0.032	0.51	8.536	1.270	20.37	3.435	3.467	4.705	1.238	19.86	1.300								
C_2H_4 28.052				2.225	0.331	9.29	0.895	0.895	1.226	0.331	9.29	0.608					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.641	0.244	7.34	0.660	0.660	0.904	0.244	7.34	0.480				PROPYLENE	39.3	7.56		
C_1+C_2											36.49	2.388				C_3 POLY GASO.	87.5	6.61	1.105	
C_3H_6 42.078				3.075	0.457	19.23	1.237	1.237	1.694	0.457	19.23	1.259	4.32	4.451	0.291	C_3 POLY TAR	12.5	0.95	0.126	
C_3H_8 44.094				0.336	0.050	2.20	0.135	0.135	0.185	0.050	2.20	0.144	4.24	0.519	0.034					
C_4H_8 56.104				1.705	0.254	14.25	0.686	0.686	0.940	0.254	14.25	0.933	5.00	2.850	0.187		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.502	0.075	4.36	0.202	0.202	0.277	0.075	4.36	0.285	4.86	0.897	0.059	C_4H_8	5.00	0.60	0.120	68.0
C_5H_{10} 70.130				0.631	0.094	6.59	0.254	0.254	0.348	0.094	6.59	0.431	5.45	1.209	0.079	C_4 POLY GASO.	5.98	11.94	1.997	1.5
C_5H_{12} 72.146				0.147	0.022	1.59	0.059	0.059	0.081	0.022	1.59	0.104	5.25	0.303	0.020	C_4H_{10}	4.86	4.36	0.897	68.0
C_6H_{12} 84.156				0.174	0.026	2.19	0.070	0.070	0.096	0.026	2.19	0.143	5.54	0.395	0.026	C_4-FREE GASO.			10.007	5.8
C_3-C_6											50.41	3.299		10.624	0.696	C_4 POLY TAR	7.53	1.71	0.227	
TOTAL		41.436	528.58		14.873	339.25	40.236	81.672	62.166											
H_2+CO	97.160	40.259	15278	SCFH	7.357		19.904	60.163	27.261	-32.902							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.61	Factor	654535	4.48		4.48	2.16	4.48	1.34						10 # RVP 400 EP GASOLINE	13.021	0.8523	4621	

									m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF		gal/hr	gal/MCF	Bbl/Day
Weight Recovery, %		Catalyst Age, hrs.	150	Space Velocity, vhv	1241			RECOVERED OIL	0.394**	55.21	3.614		8.763	0.574	GAS OIL	0.696	0.0456	247
Pressure, psig	403	Inlet Velocity, Ft/sec		Catalyst				TOTAL OIL		105.62	6.913		19.387	1.270	FUEL OIL	0.990	0.0648	351
Temperature, °F	662	Bed Depth, Ft	18.66	Weight, #	1909			WATER SOLUBLE CHEMICALS	0.408**	21.63	1.416	7.943	2.723	0.178	POLY TAR	0.353	0.0231	125
Recycle Ratio	0.97	Bed Density, #/CF	155	Effluent Shift Ratio $\frac{(H_2)(CO_2)}{(H_2O)(CO)}$	= 11.7			TOTAL LIQUID PRODUCTS C_3+		127.25	8.329		22.110	1.448	TOTAL	15.060	0.9858	5344
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY	NET WATER	6.255**	112.69	7.376		13.528	0.885	W. S. CHEM.	2.723	0.1782	966
Contraction	CO	H_2	H_2+CO	CO	H_2	CO+H_2	C_3+/C_1+	GROSS WATER		134.32	8.792		16.251	1.063	TOTAL	17.783	1.1640	6310
64.11	91.29	75.80	81.73	73.87	45.81	54.69	77.71	HYDROCARBON TOTAL—C_1+		163.74	10.717							

Form ML—11

**Included in Reactor Effluent Total

g/NCM = 16.91×#/MCF

*9488 MCFH H_2 + CO, Bbl/Day = 5421.6×gal/MCF

RUN NO. 66-2 (K-0)
HOURS 207-296
CATALYST Brownsville Trtd
Mill Scale @ 660° F.

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED							
					At Wt. Balance							CONDENSATE							
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	m/hr	m/hr	m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*				
CO 28.010	36.778	14.575	408.25	8.823	1.309	36.67	3.589	18.164	4.898	-13.266	-371.58						CORRECTED HEMPEL. %	gal/hr	TREATING RECOVERY.%	gal/hr
H_2 2.016	60.197	23.855	48.09	41.463	6.151	12.40	16.865	40.720	23.016	-17.704	-35.69					400 EP	82.48	6.446	98.0	6.317
CO_2 44.010	2.325	0.921	40.53	28.801	4.273	188.05	11.715	12.636	15.988	3.352	147.52	10.115				400-550	8.48	0.663	91.4	0.606
N_2 28.016	0.602	0.239	6.70	1.630	0.242	6.78	0.663	0.902	0.905							550 +	9.04	0.706	114.6	0.809
CH_4 16.042	0.098	0.039	0.63	8.949	1.328	21.30	3.640	3.679	4.968	1.289	20.67	1.417								
C_2H_4 28.052				2.328	0.345	9.68	0.947	0.947	1.292	0.345	9.68	0.664					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.832	0.272	8.18	0.745	0.745	1.017	0.272	8.18	0.561				PROPYLENE	37.6	6.58		
C_1+C_2											38.53	2.642				C_3 POLY GASO.	87.5	5.76	0.963	
C_3H_6 42.078				2.805	0.416	17.50	1.141	1.141	1.557	0.416	17.50	1.200	4.32	4.051	0.278	C_3 POLY TAR	12.5	0.82	0.109	
C_3H_8 44.094				0.320	0.047	2.07	0.130	0.130	0.177	0.047	2.07	0.142	4.24	0.488	0.033					
C_4H_8 56.104				1.587	0.235	13.18	0.646	0.646	0.881	0.235	13.18	0.904	5.00	2.636	0.181		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.491	0.073	4.24	0.200	0.200	0.273	0.073	4.24	0.291	4.86	0.872	0.060	C_4H_8	5.00	0.36	0.072	68.0
C_5H_{10} 70.130				0.635	0.094	6.59	0.258	0.258	0.352	0.094	6.59	0.452	5.45	1.209	0.083	C_4 POLY GASO.	5.98	11.22	1.876	1.5
C_5H_{12} 72.146				0.147	0.022	1.59	0.060	0.060	0.082	0.022	1.59	0.109	5.25	0.303	0.021	C_4H_{10}	4.86	4.24	0.872	68.0
C_6H_{12} 84.156				0.189	0.028	2.36	0.077	0.077	0.105	0.028	2.36	0.162	5.54	0.426	0.029	C_4-FREE GASO.			9.218	5.8
C_3-C_6											47.53	3.260		9.985	0.685	C_4 POLY TAR	7.53	1.60	0.212	
TOTAL		39.629	504.20		14.835	330.59	40.676	80.305	61.993											
H_2+CO	96.975	38.430	14584 SCFH		7.460		20.454	58.884	27.914	-30.970							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.64	Factor 685682		4.70		4.70	2.24	4.70	1.33						10 # RVP 400 EP GASOLINE	12.038	0.8254	4475	
Weight Recovery, %		Catalyst Age, hrs. 252		Space Velocity, vhv 1179			RECOVERED OIL	0.353**	49.45	3.391		7.815	0.536	GAS OIL	0.606	0.0416	226	
Pressure, psig 403		Inlet Velocity, Ft/sec		Catalyst			TOTAL OIL		96.98	6.651		17.800	1.221	FUEL OIL	0.809	0.0555	301	
Temperature, °F 661		Bed Depth, Ft 18.74		Weight, # 1837			WATER SOLUBLE CHEMICALS	0.399**	21.15	1.450	7.857	2.692	0.185	POLY TAR	0.321	0.0220	119	
Recycle Ratio 1.03		Bed Density, #/CF 149		Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ = 13.1			TOTAL LIQUID PRODUCTS C_5+		118.13	8.101		20.492	1.406	TOTAL	13.774	0.9445	5121	
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY	NET WATER	5.730**	103.24	7.079		12.394	0.850	W. S. CHEM.	2.692	0.1846	1001	
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+	GROSS WATER		124.39	8.529		15.086	1.035	TOTAL	16.466	1.1291	6122	
62.57	91.02	74.22	80.59	73.03	43.48	52.59	75.41	HYDROCARBON TOTAL—C_1+		156.66	10.742									

Form ML—11

**Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF

*9488 MCFH H_2 + CO, Bbl/Day = 5421.6 × gal/MCF

RUN NO. 66-3 (P-T)
HOURS 296-416
CATALYST Brownsville Trtd
Mill Scale @ 660° F.

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED							
					At Wt. Balance							CONDENSATE							
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	m/hr	m/hr	m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*				
CO 28.010	36.921	13.906	389.51	9.352	1.364	38.21	3.772	17.678	5.136	-12.542	-351.30						CORRECTED HEMPEL. %	gal/hr	TREATING RECOVERY.%	gal/hr
H_2 2.016	59.712	22.490	45.34	41.133	5.996	12.09	16.591	39.081	22.587	-16.494	-33.25					400 EP	80.98	5.500	98.0	5.390
CO_2 44.010	2.315	0.872	38.38	28.565	4.164	183.26	11.521	12.393	15.685	3.292	144.88	10.489				400-550	8.70	0.591	91.4	0.540
N_2 28.016	0.932	0.351	9.83	2.246	0.327	9.16	0.906	1.257	1.233							550 +	10.32	0.701	114.6	0.803
CH_4 16.042	0.120	0.045	0.72	8.477	1.236	19.83	3.419	3.464	4.655	1.191	19.11	1.384								
C_2H_4 28.052				2.255	0.329	9.23	0.910	0.910	1.239	0.329	9.23	0.668					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.739	0.254	7.64	0.701	0.701	0.955	0.254	7.64	0.553				PROPYLENE	36.3	6.32		
C_1+C_2											35.98	2.605				C_3 POLY GASO.	87.5	5.53	0.925	
C_3H_6 42.078				2.837	0.414	17.42	1.144	1.144	1.558	0.414	17.42	1.261	4.32	4.032	0.292	C_3 POLY TAR	12.5	0.79	0.105	
C_3H_8 44.094				0.302	0.044	1.94	0.122	0.122	0.166	0.044	1.94	0.140	4.24	0.458	0.033					
C_4H_8 56.104				1.638	0.239	13.41	0.661	0.661	0.900	0.239	13.41	0.971	5.00	2.682	0.194		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.484	0.071	4.13	0.195	0.195	0.266	0.071	4.13	0.299	4.86	0.850	0.062	C_4H_8	5.00	0.15	0.030	68.0
C_5H_{10} 70.130				0.643	0.094	6.59	0.259	0.259	0.353	0.094	6.59	0.477	5.45	1.209	0.088	C_4 POLY GASO.	5.98	11.60	1.940	1.5
C_5H_{12} 72.146				0.154	0.022	1.59	0.062	0.062	0.084	0.022	1.59	0.115	5.25	0.303	0.022	C_4H_{10}	4.86	4.13	0.850	68.0
C_6H_{12} 84.156				0.175	0.026	2.19	0.071	0.071	0.097	0.026	2.19	0.159	5.54	0.395	0.029	C_4-FREE GASO.			8.222	5.8
C_3-C_6											47.27	3.422		9.929	0.720	C_4 POLY TAR	7.53	1.66	0.220	
TOTAL		37.664	483.78		14.580	326.69	40.334	77.998	60.797											
H_2+CO	96.633	36.396	13812 SCFH		7.360		20.363	56.759	27.723	-29.036							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.62	Factor 724008		4.40		4.40	2.21	4.40	1.32						10 # RVP 400 EP GASOLINE	11.042	0.7994	4334	
Weight Recovery, %		Catalyst Age, hrs. 356		Space Velocity, vhv 1124			RECOVERED OIL	0.307**	43.10	3.120		6.792	0.492	GAS OIL	0.540	0.0391	212	
Pressure, psig 401		Inlet Velocity, Ft/sec		Catalyst			TOTAL OIL		90.37	6.542		16.721	1.212	FUEL OIL	0.803	0.0581	315	
Temperature, °F 661		Bed Depth, Ft 18.61		Weight, # 1698			WATER SOLUBLE CHEMICALS	0.386**	20.46	1.482	7.913	2.586	0.187	POLY TAR	0.325	0.0235	127	
Recycle Ratio 1.07		Bed Density, #/CF 138		Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ = 13.3			TOTAL LIQUID PRODUCTS C_5+		110.83	8.024		19.307	1.399	TOTAL	12.710	0.9201	4988	
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY	NET WATER	5.190**	93.50	6.769		11.224	0.813	W. S. CHEM.	2.586	0.1872	1015	
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+	GROSS WATER		113.96	8.251		13.810	1.000	TOTAL	15.296	1.1073	6003	
61.29	90.19	73.34	79.78	70.95	42.20	51.16	75.49	HYDROCARBON TOTAL—C_1+		146.81	10.629									

Form ML—11

**Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF

*9488 MCFH H_2 + CO, Bbl/Day = 5421.6 × gal/MCF

13.82%

RUN NO. 66-4 (U-X)
HOURS 416-500
CATALYST Brownsville Trtd Mill Scale @ 660° F.

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED							
	%	m/hr	#/hr	%	At Wt. Balance m/hr	At Wt. Balance #/hr	m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE #/MCF	CONDENSATE #/gal	CONDENSATE gal/hr	CONDENSATE gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY,%	gal/hr
CO 28.010	36.320	14.578	408.33	11.784	2.124	59.49	4.966	19.544	7.090	-12.454	-348.84									
H_2 2.016	60.450	24.264	48.92	46.748	8.425	16.98	19.701	43.965	28.126	-15.839	-31.94									
CO_2 44.010	2.255	0.905	39.83	24.836	4.476	196.99	10.466	11.371	14.942	3.571	157.16	10.662				400 EP	81.35	4.916	98.0	4.816
N_2 28.016	0.835	0.335	9.39	1.910	0.344	9.64	0.805	1.140	1.149							400-550	7.83	0.473	91.4	0.432
CH_4 16.042	0.140	0.056	0.90	6.954	1.253	20.10	2.930	2.986	4.183	1.197	19.20	1.303				550 +	10.82	0.654	114.6	0.749
C_2H_4 28.052				1.744	0.314	8.81	0.735	0.735	1.049	0.314	8.81	0.598					RECOVERY %	#/hr	gal/hr	
C_3H_6 30.068				1.261	0.227	6.83	0.531	0.531	0.758	0.227	6.83	0.463				PROPYLENE	31.5	5.01		
C_1+C_2											34.84	2.364				C_3 POLY GASO.	87.5	4.38	0.732	
C_3H_6 42.078				2.096	0.378	15.91	0.883	0.883	1.261	0.378	15.91	1.079	4.32	3.683	0.250	C_3 POLY TAR	12.5	0.63	0.084	
C_3H_8 44.094				0.227	0.041	1.81	0.096	0.096	0.137	0.041	1.81	0.123	4.24	0.427	0.029					
C_4H_8 56.104				1.201	0.216	12.12	0.506	0.506	0.722	0.216	12.12	0.823	5.00	2.424	0.164		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.378	0.068	3.95	0.159	0.159	0.227	0.068	3.95	0.268	4.86	0.813	0.055	C_4H_8	5.00	0.0	0.0	68.0
C_5H_{10} 70.130				0.541	0.097	6.80	0.228	0.228	0.325	0.097	6.80	0.461	5.45	1.248	0.085	C_4 POLY GASO.	5.98	10.61	1.773	1.5
C_5H_{12} 72.146				0.149	0.027	1.95	0.063	0.063	0.090	0.027	1.95	0.132	5.25	0.371	0.023	C_4H_{10}	4.86	3.95	0.813	68.0
C_6H_{12} 84.156				0.171	0.031	2.61	0.072	0.072	0.103	0.031	2.61	0.177	5.54	0.471	0.032	C_4-FREE GASO.			7.640	5.8
C_5-C_6											45.15	3.063		9.437	0.640	C_5 POLY TAR	7.53	1.51	0.201	
TOTAL		40.138	507.37		18.021	363.99	42.141	82.279	65.469											
H_2+CO	96.770	38.942	14740 SCFH		10.549		24.667	63.509	35.216	-28.293							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.66	Factor 678426		3.97		3.97	2.25	3.97	1.27						10 # RVP 400 EP GASOLINE	10.226	0.6938	3762	
Weight Recovery, %		Catalyst Age, hrs. 458		Space Velocity, vhv 1369		RECOVERED OIL	0.277**	38.89	2.638		6.043	0.410	GAS OIL	0.432	0.0293	159				
Pressure, psig 398		Inlet Velocity, Ft/sec		Catalyst		TOTAL OIL		84.04	5.701		15.480	1.050	FUEL OIL	0.749	0.0508	275				
Temperature, °F 662		Bed Depth, Ft 16.31		Weight, # 1433		WATER SOLUBLE CHEMICALS	0.368**	19.53	1.325	7.889	2.746	0.168	POLY TAR	0.285	0.0193	105				
Recycle Ratio 1.05		Bed Density, #/CF 133		Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ = 12.6		TOTAL LIQUID PRODUCTS C_5+		103.57	7.026		17.956	1.218	TOTAL	11.692	0.7932	4301				
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %		SELECTIVITY	NET WATER	4.717**	84.98	6.444		10.202	0.692	W.S CHEM.	2.476	0.1680	911				
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+	GROSS WATER		104.51	7.090		12.678	0.960	TOTAL	14.168	0.9612	5212		
55.10	85.43	65.28	72.84	63.72	36.03	44.55	74.83	HYDROCARBON TOTAL—C_1+		138.41	9.390									

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF

*9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

RUN NO. 66-5 (Y-CC)
HOURS 500-619
CATALYST Brownsville Trtd Mill Scale @ 660° F.

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

14.18%

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED							
	%	m/hr	#/hr	%	At Wt. Balance m/hr	At Wt. Balance #/hr	m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE #/MCF	CONDENSATE #/gal	CONDENSATE gal/hr	CONDENSATE gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY,%	gal/hr
CO 28.010	36.320	14.370	402.50	14.801	2.552	71.48	12.255	26.625	14.807	-11.818	-331.02									
H_2 2.016	60.323	23.866	48.11	46.671	8.047	16.22	38.642	62.508	46.689	-15.819	-31.89									
CO_2 44.010	2.230	0.882	38.82	22.824	3.935	173.18	18.897	19.779	22.832	3.053	134.36	9.259				400 EP	76.44	5.537	98.0	5.426
N_2 28.016	0.738	0.292	8.18	1.742	0.300	8.40	1.442	1.734	1.742							400-550	12.06	0.874	91.4	0.799
CH_4 16.042	0.389	0.154	2.47	6.356	1.096	17.58	5.263	5.417	6.359	0.942	15.11	1.041				550 +	11.50	0.833	114.6	0.955
C_2H_4 28.052				1.766	0.304	8.53	1.462	1.462	1.766	0.304	8.53	0.588					RECOVERY %	#/hr	gal/hr	
C_3H_6 30.068				0.989	0.171	5.14	0.819	0.819	0.990	0.171	5.14	0.354				PROPYLENE	32.4	4.73		
C_1+C_2											28.78	1.983				C_3 POLY GASO.	87.5	4.14	0.692	
C_3H_6 42.078				2.013	0.347	14.60	1.667	1.667	2.014	0.347	14.60	1.006	4.32	3.380	0.233	C_3 POLY TAR	12.5	0.59	0.078	
C_3H_8 44.094				0.203	0.035	1.54	0.168	0.168	0.203	0.035	1.54	0.106	4.24	0.363	0.025					
C_4H_8 56.104				1.326	0.229	12.85	1.098	1.098	1.327	0.229	12.85	0.886	5.00	2.570	0.177		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.401	0.069	4.01	0.332	0.332	0.401	0.069	4.01	0.276	4.86	0.825	0.057	C_4H_8	5.00	0.21	0.042	68.0
C_5H_{10} 70.130				0.586	0.101	7.08	0.485	0.485	0.586	0.101	7.08	0.488	5.45	1.299	0.090	C_4 POLY GASO.	5.98	11.06	1.849	1.5
C_5H_{12} 72.146				0.137	0.024	1.73	0.113	0.113	0.137	0.024	1.73	0.119	5.25	0.330	0.023	C_4H_{10}	4.86	4.01	0.825	68.0
C_6H_{12} 84.156				0.185	0.032	2.69	0.153	0.153	0.185	0.032	2.69	0.185	5.54	0.486	0.033	C_4-FREE GASO.			8.233	5.8
C_5-C_6											44.50	3.066		9.253	0.638	C_5 POLY TAR	7.53	1.58	0.210	
TOTAL		39.564	500.08		17.242	345.03	82.796	122.360	105.696											
H_2+CO	96.643	38.236	14511 SCFH		10.599		50.897	89.133	61.496	-27.637							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.66	Factor 689132		3.15		3.15	2.35	3.15	1.34						10 # RVP 400 EP GASOLINE	10.949	0.7545	4091	
Weight Recovery, %		Catalyst Age, hrs. 560		Space Velocity, vhv 2668		RECOVERED OIL	0.334**	46.88	3.231		7.244	0.499	GAS OIL	0.799	0.0551	299				
Pressure, psig 404		Inlet Velocity, Ft/sec		Catalyst		TOTAL OIL		91.38	6.297		16.497	1.137	FUEL OIL	0.955	0.0658	357				
Temperature, °F 663		Bed Depth, Ft 8.24		Weight, # 596		WATER SOLUBLE CHEMICALS	0.390**	20.67	1.424	8.005	2.582	0.178	POLY TAR	0.288	0.0198	107				
Recycle Ratio 2.09		Bed Density, #/CF 109.		Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ = 14.6		TOTAL LIQUID PRODUCTS C_5+		112.05	7.721		19.079	1.315	TOTAL	12.991	0.8952	4854				
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %		SELECTIVITY	NET WATER	4.934**	88.89	6.126		10.671	0.735	W.S CHEM.	2.582	0.1779	965				
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+	GROSS WATER		109.56	7.550		13.253	0.913	TOTAL	15.573	1.0731	5819		
56.42	82.24	66.28	72.28	44.39	25.31	31.01	79.56	HYDROCARBON TOTAL—C_1+		140.83	9.705									

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF

*9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

RUN NO. 66-A
HOURS 0-9
CATALYST Brownsville Treated Mill Scale Reduced at 660°F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

FRESH FEED				WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED								
					At Wt. Balance							CONDENSATE								
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	m/hr	m/hr	m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*				
CO 28.010	36.129	14.989	419.86	7.445	0.978	27.39	3.014	18.003	3.992	-14.011	-392.47						CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY, %	gal/hr
H_2 2.016	60.855	25.255	50.91	40.855	5.368	10.82	16.540	41.795	21.908	-19.887	-40.09					400 EP	79.1	9.857	98.0	9.660
CO_2 44.010	2.410	1.000	44.01	31.375	4.123	181.42	12.702	13.702	16.825	3.123	137.41	8.997				400-550	11.6	1.445	91.4	1.321
N_2 28.016	0.535	0.222	6.22	1.840	0.242	6.78	0.745	0.967	0.987							550 +	9.3	1.159	114.6	1.328
CH_4 16.042	0.080	0.033	0.53	8.770	1.152	18.48	3.551	3.584	4.703	1.119	17.95	1.175								
C_2H_4 28.052				2.260	0.297	8.33	0.915	0.915	1.212	0.297	8.33	0.545					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.180	0.155	4.66	0.478	0.478	0.633	0.155	4.66	0.305				PROPYLENE	44.9	7.01		
C_1+C_2											30.94	2.025				C_3 POLY GASO.	87.5	6.13	1.025	
C_3H_6 42.078				2.820	0.371	15.61	1.142	1.142	1.513	0.371	15.61	1.022	4.32	3.613	0.237	C_3 POLY TAR	12.5	0.88	0.117	
C_3H_8 44.094				0.290	0.038	1.68	0.117	0.117	0.155	0.038	1.68	0.110	4.24	0.396	0.026					
C_4H_8 56.104				1.545	0.203	11.39	0.625	0.625	0.828	0.203	11.39	0.746	5.00	2.278	0.149		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.595	0.078	4.53	0.241	0.241	0.319	0.078	4.53	0.297	4.86	0.932	0.061	C_4H_8	5.00	0.99	0.198	68.0
C_5H_{10} 70.130				0.635	0.083	5.82	0.257	0.257	0.340	0.083	5.82	0.381	5.45	1.068	0.070	C_4 POLY GASO.	5.98	9.10	1.522	1.5
C_5H_{12} 72.146				0.180	0.024	1.73	0.073	0.073	0.097	0.024	1.73	0.113	5.25	0.330	0.022	C_4H_{10}	4.86	4.53	0.932	68.0
C_6H_{12} 84.156				0.210	0.028	2.36	0.085	0.085	0.113	0.028	2.36	0.155	5.54	0.426	0.028	C_4 FREE GASO.			12.509	5.8
C_3-C_4											43.12	2.824		9.043	0.593	C_4 POLY TAR	7.53	1.30	0.173	
TOTAL		41.499	521.53		13.140	301.00	40.485	81.984	61.492											
H_2+CO	96.975	40.244	15273 SCFH	6.346			19.554	59.798	25.900	-33.898							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.68	Factor 654750	5.49			5.49	2.32	5.49	1.42						10 # RVP 400 EP GASOLINE	15.161	0.9927	5382	

Weight Recovery, %	92.95	Catalyst Age, hrs.		Space Velocity, vhv	1209	RECOVERED OIL **	0.563	78.97	5.171		12.461	0.816	GAS OIL	1.321	0.0865	469				
Pressure, psig	402	Inlet Velocity, Ft/sec	1.00	Catalyst	Vol CF 12.63	TOTAL OIL		122.09	7.995		21.504	1.409	FUEL OIL	1.328	0.0870	472				
Temperature, °F	661	Bed Depth, Ft	19.13	Weight, #	1970	WATER SOLUBLE CHEMICALS **	0.284	15.09	0.988		1.876	0.123	POLY TAR	0.290	0.0190	103				
Recycle Ratio	0.98	Bed Density, #/CF	156	Effluent $\frac{(H_2)(CO_2)}{(H_2O)(CO)}$ = Shift Ratio		TOTAL LIQUID PRODUCTS C_3+		137.18	8.983		23.380	1.532	TOTAL	18.100	1.1852	6426				
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY	MET WATER **	7.020	126.47	8.281		15.182	0.994	W. S. CHEM.	1.876	0.1228	666		
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+	GROSS WATER		141.56	9.269		17.058	1.117	TOTAL	19.976	1.3080	7092		
68.34	93.48	78.74	84.23	77.83	47.58	56.69	81.60	HYDROCARBON TOTAL—C_1+		168.12	11.008									

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-A
HOURS 0-9

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA					
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE			
Oxygen	431	Fresh Feed	15749	°API	54.4	10.5	In Reactor at Start of Period		Screen Analysis			Sedimentation
Natural Gas	454	Recycle	15364	Neut. No.	45.4		Fresh Catalyst Added		Mesh	Microns	%	Microns %
Generator Outlet	406	Combined Feed	31113	Sap. No.	57.1		Total		On 40	419+	0.8	80+
Reactor Inlet	402	Wet Gas—Measured	4377	Hydrox. No.			Catalyst Recovered	12	100	150	63.8	40—80
Condenser Inlet		Adjusted	4986	Bromine No.	98		In Reactor at End of Period		150	105	21.0	20—40
Product Accumulator	375	Loss	609	Pour °F.					200	74	9.6	10—20
				Chemicals, % by K_2CO_3		11.0	REACTOR d-p, Inches H_2O		250	62	4.0	0—20
							No. Height		325	44	0.4	
TEMPERATURES—°F.		Recycle/Fresh Feed	0.98				0 0-21-3/8		<325		0.4	
Oxygen	478	Inlet Velocity—ft./sec.	1.00				1 21-3/8-52-3/4	74	CATALYST			
Natural Gas	763	Fresh Feed Rate—S.C.F.H.	15273	HEMPEL, DIST. %		°API	2 52-3/4-84	73	Bulk Density, Lbs./Cu.Ft.			
Generator	2497	per Cu. Ft. Dense Bed	1209	205 °F.			3 84-115-3/8	90	Aerated			146
Quench Accumulator	137	per Lb. Catalyst	7.75	400	78.1	53.0	4 115-3/8-353-1/8	307	Settled			148
Reactor Inlet	196	per sq ft	23141	400-550	11.6	34.0	Total	544	Compacted			180
Condenser Inlet	562			550+	10.3				Particle Density, gm./cc.			4.98
Product Accumulator	54						CALCULATED FROM dp		NH_3 Value, ml./gm.			
Catalyst No. Height				A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	156	N_2 Surface, m^2/gm.			
1 0'8"	---			Naphtha °F.			Inventory, Lbs.	1970				
2 0'9"	661			IBP	100		Bed Depth, Ft.	19.13	CHEMICAL ANALYSIS			
3 1'9"	648			10%	121		Vol cu ft	12.63	Fe			
4 4'5"	661			50%	213				C			
5 7'10"	663			90%	370				O			
6 12'3"	668			EP	397				H			
7 17'5"	662			Rec	97.0				K_2O, W+. % basis Fe			
8 20'0"	648								X-Ray Analysis—			
9 22'7"	641								$Fe_{20}C_9$			
10 25'2"	638								Fe_3O_4			
11 26'11"	615								Fe			

RUN NO. 66-B
HOURS 9-22
CATALYST Brownsville Treated MS Red. @ 660F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

FRESH FEED				WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED								
	%	m/hr	#/hr	%	At Wt. Balance m/hr	At Wt. Balance #/hr	m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE #/MCF	CONDENSATE #/gal	CONDENSATE gal/hr	CONDENSATE gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY, %	gal/hr
CO 28.010	35.085	15.689	439.46	8.650	1.268	35.52	3.619	19.308	4.887	-14.421	-403.94									
H_2 2.016	61.980	27.716	55.88	43.075	6.313	12.73	18.021	45.737	24.334	-21.403	-43.15					400 EP	80.2	9.941	98.0	9.742
CO_2 44.010	2.060	0.921	40.53	28.625	4.195	184.63	11.976	12.897	16.171	3.274	144.10	8.748				400-550	7.7	0.954	91.4	0.872
N_2 28.016	0.720	0.322	9.02	1.785	0.262	7.34	0.747	1.069	1.331							550 +	12.1	1.500	114.6	1.719
CH_4 16.042	0.155	0.069	1.11	8.805	1.290	20.69	3.684	3.753	5.043	1.221	19.58	1.189								
C_2H_4 28.052				2.150	0.315	8.84	0.899	0.899	1.214	0.315	8.84	0.537					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.230	0.180	5.41	0.515	0.515	0.695	0.180	5.41	0.328				PROPYLENE	43.3	6.98		
C_1+C_2											33.85	2.054				C_3 POLY GASO.	87.5	6.11	1.022	
C_3H_6 42.078				2.615	0.383	16.12	1.094	1.094	1.477	0.383	16.12	0.979	4.32	3.731	0.227	C_3 POLY TAR	12.5	0.87	0.116	
C_3H_8 44.094				0.290	0.042	1.85	0.121	0.121	0.163	0.042	1.85	0.112	4.24	0.436	0.026					
C_4H_8 56.104				1.510	0.221	12.40	0.632	0.632	0.853	0.221	12.40	0.753	5.00	2.480	0.151		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.435	0.064	3.72	0.182	0.182	0.246	0.064	3.72	0.226	4.86	0.765	0.046	C_4H_8	5.00	2.16	0.432	68.0
C_5H_{10} 70.130				0.550	0.081	5.68	0.230	0.230	0.311	0.081	5.68	0.345	5.48	1.042	0.063	C_4 POLY 6850	5.98	12.22	2.043	1.5
C_5H_{12} 72.146				0.155	0.023	1.66	0.065	0.065	0.088	0.023	1.66	0.101	5.25	0.316	0.019	C_4H_{10}	4.86	3.72	0.765	68.0
C_6H_{12} 84.156				0.125	0.018	1.51	0.052	0.052	0.070	0.018	1.51	0.092	5.54	0.273	0.017	C_4-FREE GASO.			12.395	5.8
C_3-C_6											42.94	2.608		9.043	0.549	C_4 POLY TAR	7.53	1.74	0.231	
TOTAL		44.717	546.00		14.655	318.10	41.837	86.554	64.751											
H_2+CO	97.065	43.405	16472 SCFH		7.581		21.640	65.045	29.221	-35.824							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.77	Factor 607090		4.98		4.98	2.37	4.97	1.48						10 # RVP 400 EP GASOLINE	15.635	0.9492	5146	

Weight Recovery, %	94.63	Catalyst Age, hrs.		Space Velocity, vhv	1366	RECOVERED OIL **	0.562	78.79	4.783		12.395	0.752	GAS OIL	0.872	0.0529	287	
Pressure, psig	405	Inlet Velocity, Ft/sec	1.04	Catalyst Vol CF	12.06	TOTAL OIL		121.73	7.391		21.438	1.301	FUEL OIL	1.719	0.1044	566	
Temperature, °F	661	Bed Depth, Ft	18.27	Weight, #	1881	WATER SOLUBLE CHEMICALS **	0.298	15.81	0.960		1.978	0.120	POLY TAR	0.347	0.0211	114	
Recycle Ratio	0.94	Bed Density, #/CF	156	Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =		TOTAL LIQUID PRODUCTS C_3+		137.54	8.351		23.416	1.421	TOTAL	18.573	1.1276	6113	
						NET WATER **	7.399	133.30	8.093		16.002	0.971	W. S. CHEM.	1.978	0.1201	651	
						GROSS WATER		149.11	9.053		17.980	1.091	TOTAL	20.551	1.2477	6764	
						TOTAL—C_1+		171.37	10.404								

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+
67.23	91.92	77.22	82.53	74.69	46.80	55.08	80.26

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF

*9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66B
HOURS 9-22

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA				
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE		
Oxygen	435	Fresh Feed	16970	°API	53.3	10.6	In Reactor at Start of Period		Screen Analysis		Sedimentation
Natural Gas	430	Recycle	15877	Neut. No.	43.2	35.7	Fresh Catalyst Added		Mesh / Microns	%	Microns / %
Generator Outlet	410	Combined Feed	32847	Sap. No.	56.2	38.6	Total		On 40 / 419+		80+
Reactor Inlet	405	Wet Gas—Measured	5049	Hydrox. No.			Catalyst Recovered	5	100 / 150		40—80
Condenser Inlet		Adjusted	5562	Bromine No.	99		In Reactor at End of Period		150 / 105		20—40
Product Accumulator	376	Loss	513	Pour °F.					200 / 74		10—20
				Chemicals, % by K_2CO_3		11.0	REACTOR d-p, Inches H_2O		250 / 62		0—20
							No. Height		325 / 44		
TEMPERATURES—°F.		Recycle/Fresh Feed	0.94				0 See Per. A		<325		
Oxygen	498	Inlet Velocity—ft./sec.	1.04				1	74	CATALYST		
Natural Gas	787	Fresh Feed Rate—S.C.F.H.	16472	HEMPEL. DIST. %		°API	2	76	Bulk Density, Lbs./Cu.Ft.		
Generator	2498	per Cu. Ft. Dense Bed	1366	205 °F.			3	83	Aerated		
Quench Accumulator	135	per Lb. Catalyst	8.76	400	79.2	54.0	4	285	Settled		
Reactor Inlet	185	per sq ft	24958	400-550	7.7	35.7	Total	518	Compacted		
Condenser Inlet	571			550+	13.1				Particle Density, gm./cc.		
Product Accumulator	57						CALCULATED FROM dp		NH_3 Value, ml./gm.		
Catalyst No. Height				A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	156	N_2 Surface, m^2/gm.		
1 See Per. A	--			Naphtha °F.			Inventory, Lbs.	1881			
2	661			IBP	101		Bed Depth, Ft.	18.27	CHEMICAL ANALYSIS		
3	647			10%	121		Vol. Cu. Ft.	12.06	Fe		
4	662			50%	211				C		
5	664			90%	358				O		
6	669			EP	400				H		
7	663			Rec	97.5				K_2O. W+. % basis Fe		
8	649								X-Ray Analysis—		
9	644								$Fe_{20}C_9$		
10	639								Fe_3O_4		
11	619								Fe		

RUN NO. 66-C
HOURS 1-22-46
CATALYST Brownsville Treated MS Red. @ 550F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED			
	%	m/hr	#/hr	%	At Wt. Balance m/hr	At Wt. Balance #/hr	m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE #/MCF	CONDENSATE #/gal	CONDENSATE gal/hr	CONDENSATE gal/MCF
CO 28.010	36.607	15.923	446.03	9.250	1.326	37.14	3.769	19.692	5.095	-14.597	408.89				
H_2 2.016	60.516	26.323	53.07	40.377	5.786	11.66	16.454	42.777	22.240	-20.537	41.41				
CO_2 44.010	2.070	0.900	39.61	29.514	4.229	186.14	12.027	12.927	16.256	3.329	146.53	9.140			
N_2 28.016	0.670	0.291	8.15	1.640	0.235	6.58	0.668	0.959	0.903						
CH_4 16.042	0.137	0.060	0.96	9.153	1.312	21.05	3.730	3.790	5.042	1.252	20.09	1.253			
C_2H_4 28.052				2.247	0.322	9.03	0.916	0.916	1.238	0.322	9.03	0.563			
C_2H_6 30.068				1.440	0.206	6.19	0.587	0.587	0.793	0.206	6.19	0.386			
C_1+C_2											35.31	2.202			
C_3H_6 42.078				2.973	0.426	17.93	1.212	1.212	1.638	0.426	17.93	1.118	4.32	4.150	0.259
C_3H_8 44.094				0.320	0.046	2.03	0.130	0.130	0.176	0.046	2.03	0.127	4.24	0.479	0.030
C_4H_8 56.104				1.683	0.241	13.52	0.686	0.686	0.927	0.241	13.52	0.943	5.00	2.704	0.169
C_4H_{10} 58.120				0.470	0.067	3.89	0.192	0.192	0.259	0.067	3.89	0.243	4.86	0.800	0.050
C_5H_{10} 70.130				0.663	0.095	6.66	0.270	0.270	0.365	0.095	6.66	0.415	5.45	1.222	0.076
C_5H_{12} 72.146				0.103	0.015	1.08	0.042	0.042	0.057	0.015	1.08	0.067	5.25	0.206	0.013
C_6H_{12} 84.156				0.167	0.024	2.02	0.068	0.068	0.092	0.024	2.02	0.126	5.54	0.365	0.023
C_3-C_6											47.13	2.939		9.926	0.620
TOTAL		43.497	547.82		14.330	324.92	40.751	84.248	63.380						
H_2+CO	97.123	42.246	16032 SCFH		7.112		20.223	62.469	27.335	-35.134					
H_2/CO		1.65	Factor 623752		4.36		4.37	2.17	4.37	1.41					

Weight Recovery, %	95.36	Catalyst Age, hrs.		Space Velocity, vhv	1268	RECOVERED OIL **
Pressure, psig	405	Inlet Velocity, Ft/sec	1.02	Catalyst	Vol CF 12.64	TOTAL OIL
Temperature, °F	661	Bed Depth, Ft	19.15	Weight, #	19.34	WATER SOLUBLE CHEMICALS **
Recycle Ratio	0.94	Bed Density, #/CF	153	Effluent Shift Ratio	$\frac{(H_2)(CO_2)}{(H_2O)(CO)}$ =	TOTAL LIQUID PRODUCTS C_3+
						NET WATER **
						GROSS WATER
						HYDROCARBON TOTAL—C_1+

	RECOVERED OIL **	WATER SOLUBLE CHEMICALS **	TOTAL LIQUID PRODUCTS C_3+	NET WATER **	GROSS WATER	HYDROCARBON TOTAL—C_1+
	0.524	73.46	4.582		11.605	0.724
		120.59	7.521		21.531	1.344
	0.267	14.17	0.884		1.804	0.113
		134.76	8.405	7.508	23.335	1.457
		135.27	8.437		16.239	1.013
		149.44	9.321		18.043	1.126
		170.07	10.608			

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+
67.06	91.67	78.02	83.17	74.13	48.01	56.24	79.24

YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*				
	CORRECTED HEMPEL. %	gal/hr	TREATING RECOVERY.%	gal/hr
400 EP	80.3	9.319	98.0	9.133
400-550	10.8	1.253	91.4	1.145
550 +	8.9	1.033	114.6	1.184
	RECOVERY %	#/hr	gal/hr	
PROPYLENE	43.1	7.73		
C_3 POLY GASO.	87.5	6.76	1.130	
C_3 POLY TAR	12.5	0.97	0.129	
	#/gal	#/hr	gal/hr	RVP
C_4H_8	5.00	1.64	0.328	68.0
C_4 POLY GASO.	5.98	10.40	1.738	1.5
C_4H_{10}	4.86	3.89	0.800	68.0
C_4-FREE GASO.			12.056	5.8
C_4 POLY TAR	7.53	1.48	0.197	
	gal/hr	gal/MCF	Bbl/Day	
10 # RVP 400 EP GASOLINE	14.922	0.9308	5046	
GAS OIL	1.145	0.0714	387	
FUEL OIL	1.184	0.0739	401	
POLY TAR	0.326	0.0203	110	
TOTAL	17.577	1.0964	5944	
W. S. CHEM.	1.804	0.1125	610	
TOTAL	19.381	1.2089	6554	

Form ML—11

** INCLUDED in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-C
HOURS 22-46

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA						
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE				
Oxygen	438	Fresh Feed	16507	° API	54.6	10.8	In Reactor at Start of Period		Screen Analysis			Sedimentation	
Natural Gas	430	Recycle	15465	Neut. No.	39.9	32.2	Fresh Catalyst Added		Mesh	Microns	%	Microns	%
Generator Outlet	410	Combined Feed	31972	Sap. No.	53.3	37.1	Total		On 40	419+	1.0	80+	
Reactor Inlet	405	Wet Gas—Measured	5013	Hydrox. No.			Catalyst Recovered	12	100	150	68.4	40—80	
Condenser Inlet		Adjusted	5438	Bromine No.	99		In Reactor at End of Period		150	105	19.2	20—40	
Product Accumulator	376	Loss	425	Pour °F.	below -30				200	74	7.8	10—20	
				Chemicals, % by K_2CO_3		10.0	REACTOR d-p, Inches H_2O		250	62	2.6	0—20	
							No. Height		325	44	0.6		
TEMPERATURES—°F.		Recycle/Fresh Feed	0.94				0 See Per. A	--	<325		0.4		
Oxygen	498	Inlet Velocity—ft./sec.	1.02				1	74	CATALYST				
Natural Gas	797	Fresh Feed Rate—S.C.F.H.	16032	HEMPEL, DIST. %		°API	2	77	Bulk Density, Lbs./Cu.Ft.				
Generator	2500	per Cu. Ft. Dense Bed	1268	205 °F.			3	81	Aerated			140	
Quench Accumulator	147	per Lb. Catalyst	8.29	400	79.3	56.1	4	302	Settled			141	
Reactor Inlet	211	per sq ft	24291	400-550	10.8	34.8	Total	534	Compacted			174	
Condenser Inlet	579	Heat Transfer Calculations		550+	9.9				Particle Density, gm./cc.			3.66	
Product Accumulator	65	Steam Rate=376 #/hr @ 706					CALCULATED FROM dp		NH_3 Value, ml./gm.				
Catalyst No. Height		psia & 505°F=1201 BTU/#		A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	153	N_2 Surface, m^2/gm.				
1 See Per. A	--	Water in @ 58°F=26 BTU/#		Naphtha °F.			Inventory, Lbs.	1934					
2	658	Net Heat Trans/# steam		IBP	100		Bed Depth, Ft.	19.15	CHEMICAL ANALYSIS				
3	648	=1175 BTU		10%	130		Vol Cu. Ft.	12.64	Fe				
4	660	(1175)(376)=441800 BTU/hr		50%	222				C				
5	665	Ave. Bed Temp=661		90%	362				O				
6	670	dT=661-505=156°F		EP	398				H				
7	663	Tube Area=34.6 sq ft		Rec	96.0				K_2O, W+. % basis Fe				
8	650	$K=\frac{441800}{(34.6)(156)}=$							X-Ray Analysis—				
9	644	81.9 BTU/°F/sq ft							$Fe_{20}C_9$				
10	641								Fe_3O_4				
11	622								Fe				

RUN NO. 66-D
HOURS 46-70
CATALYST Brownsville Treated MS Red @ 660F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

FRESH FEED				WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED								
	%	m/hr	#/hr	%	At Wt. Balance m/hr	#/hr	m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE #/MCF	#/gal	gal/hr	gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*				
CO 28.010	36.367	15.810	442.84	9.070	1.342	37.59	3.740	19.550	5.082	-14.468	-405.25						CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY,%	gal/hr
H_2 2.016	60.673	26.376	53.17	41.224	6.098	12.29	16.998	43.374	23.096	-20.278	-40.88					400 EP	82.6	8.864	98.0	8.687
CO_2 44.010	2.163	0.940	41.37	28.470	4.210	185.29	11.739	12.679	15.949	3.270	143.92	8.989				400-550	9.2	0.987	91.4	0.902
N_2 28.016	0.687	0.299	8.38	1.540	0.228	6.39	0.635	0.934	0.863							550 +	8.2	0.880	114.6	1.008
CH_4 16.042	0.110	0.048	0.77	9.570	1.416	22.72	3.946	3.994	5.362	1.368	21.95	1.371								
C_2H_4 28.052				2.303	0.341	9.57	0.950	0.950	1.291	0.341	9.57	0.598					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.547	0.229	6.89	0.638	0.638	0.867	0.229	6.89	0.430				PROPYLENE	41.6	7.60		
C_1+C_2											38.41	2.399				C_3 POLY GASO.	87.5	6.65	1.112	
C_3H_6 42.078				2.934	0.434	18.26	1.210	1.210	1.644	0.434	18.26	1.141	4.32	4.227	0.264	C_3 POLY TAR	12.5	0.95	0.126	
C_3H_8 44.094				0.303	0.045	1.98	0.125	0.125	0.170	0.045	1.98	0.124	4.24	0.467	0.029					
C_4H_8 56.104				1.573	0.233	13.07	0.649	0.649	0.882	0.233	13.07	0.816	5.00	2.614	0.163		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.540	0.080	4.65	0.223	0.223	0.303	0.080	4.65	0.290	4.86	0.957	0.060	C_4H_8	5.00	0.75	0.150	68.0
C_5H_{10} 70.130				0.603	0.089	6.24	0.248	0.248	0.337	0.089	6.24	0.390	5.48	1.145	0.072	C_4 POLY GASO.	5.98	10.78	1.803	1.5
C_5H_{12} 72.146				0.140	0.021	1.52	0.058	0.058	0.079	0.021	1.52	0.095	5.25	0.290	0.018	C_4H_{10}	4.86	4.65	0.957	68.0
C_6H_{12} 84.156				0.183	0.027	2.27	0.075	0.075	0.102	0.027	2.27	0.142	5.54	0.410	0.026	C_4-FREE GASO.			11.644	5.8
C_3-C_6											47.99	2.998		10.110	0.632	C_4 POLY TAR	7.53	1.54	0.205	
TOTAL		43.473	546.53		14.793	328.73	41.233	84.706	64.201											
H_2+CO	97.040	42.186	16010 SCFH		7.440		20.738	62.924	28.178	-34.746							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.67	Factor 624609		4.54		4.54	2.22	4.54	1.40						10 # RVP 400 EP GASOLINE	14.554	0.9091	4929	
									RECOVERED OIL **	0.483	67.78	4.234		10.731	0.670	GAS OIL	0.902	0.0563	305	
									TOTAL OIL		115.77	7.232		20.841	1.302	FUEL OIL	1.008	0.0630	342	
									WATER SOLUBLE CHEMICALS **	0.326	17.31	1.081		2.172	0.136	POLY TAR	0.331	0.0207	112	
									TOTAL LIQUID PRODUCTS C_5+		133.08	8.313		23.013	1.438	TOTAL	16.795	1.0491	5688	
									NET WATER **	7.366	132.71	8.289		15.931	0.995	W.S. CHEM.	2.172	0.1357	736	
									GROSS WATER		150.02	9.370		18.103	1.131	TOTAL	18.967	1.1848	6424	
									HYDROCARBON TOTAL—C_1+		171.49	10.711								

Weight Recovery, % 95.41 | Catalyst Age, hrs. | Space Velocity, vhv 1248

Pressure, psig 405 | Inlet Velocity, Ft/sec 1.02 | Catalyst Vol CF 12.83

Temperature, °F 664 | Bed Depth, Ft 19.44 | Weight, # 1950

Recycle Ratio 0.95 | Bed Density, #/CF 152 | Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+
65.97	91.51	76.88	82.36	74.01	46.75	55.22	77.60

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

RUN NO. 66-D
HOURS 46-70

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA					
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE			
Oxygen	439	Fresh Feed	16498				In Reactor at Start of Period		Screen Analysis			Sedimentation
Natural Gas	432	Recycle	15648	° API	55.0	10.7	Fresh Catalyst Added		Mesh	Microns	%	Microns %
Generator Outlet	410	Combined Feed	32146	Neut. No.	41.0	32.5	Total		On 40	419+	0.5	80+
Reactor Inlet	405	Wet Gas—Measured	5186	Sap. No.	49.2	34.1	Catalyst Recovered	20	100	150	57.6	40—80
Condenser Inlet		Adjusted	5614	Hydrox. No.			In Reactor at End of Period		150	105	21.4	20—40
Product Accumulator	375	Loss	428	Bromine No.	99				200	74	13.0	10—20
				Pour °F.					250	62	2.6	0—20
				Chemicals, % by K_2CO_3		12.0	REACTOR d-p, Inches H_2O		325	44	3.8	
							No. Height		<325		0.6	
TEMPERATURES—°F.		Recycle/Fresh Feed	0.95				0 See Per. A					
Oxygen	522	Inlet Velocity—ft./sec.	1.02				1	73	CATALYST			
Natural Gas	793	Fresh Feed Rate—S.C.F.H.	16010	HEMPEL, DIST. %		°API	2	76	Bulk Density, Lbs./Cu.Ft.			
Generator	2500	per Cu.Ft. Dense Bed	1248	205 °F.			3	82	Aerated			155
Quench Accumulator	151	per Lb. Catalyst	8.21	400	81.6	55.4	4	308	Settled			156
Reactor Inlet	221	per sq ft	24258	400-550	9.2	38.0	Total	539	Compacted			182
Condenser Inlet	585			550+	9.2				Particle Density, gm./cc.			5.10
Product Accumulator	63	Heat Transfer Calculations					CALCULATED FROM dp		NH_3 Value, ml./gm.			
Catalyst No. Height		Steam Rate=386#/hr		A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	152	N_2 Surface, m^2/gm.			
1 See Per. A	--	@ 706 psia & 505=		Naphtha °F.			Inventory, Lbs.	1950				
2	662	1201 BTU/#		IBP	100		Bed Depth, Ft.	19.44	CHEMICAL ANALYSIS			
3	652	Water in @ 58°F=26 BTU/#		10%	126		Vol Cu.Ft	12.83	Fe			
4	665	Net Heat Trans/# steam=		50%	212				C			
5	668	1175 BTU		90%	374				O			
6	671	(1175)(386)=453550		EP	406				H			
7	666	Ave. Bed Temp=664°F dT=664-505=159°F		Rec	95.0				K_2O, W+, % basis Fe			
8	656	Tube Area=35.2 sq ft							X-Ray Analysis—			
9	648	$K = \frac{453550}{(35.2)(159)} =$							$Fe_{20}C_9$			
10	643	81.0 BTU/°F/sq ft							Fe_3O_4			
11	625								Fe			

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 66-E
HOURS 70-94
CATALYST Brownsville Treated MS Red.@ 660F

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS At Wt. Balance m/hr	WET GAS At Wt. Balance #/hr	RECYCLE m/hr	COMBINED FEED m/hr	EFFLUENT m/hr	NET CHANGE m/hr	NET CHANGE #/hr
CO 28.010	36.250	15.452	432.80	9.610	1.373	38.46	3.885	19.337	5.258	-14.079	-394.34
H_2 2.016	60.833	25.929	52.27	39.633	5.663	11.42	16.021	41.950	21.684	-20.266	-40.85
CO_2 44.010	2.137	0.911	40.09	29.533	4.221	185.76	11.938	12.849	16.159	3.310	145.67
N_2 28.016	0.727	0.310	8.68	1.767	0.252	7.06	0.714	1.024	0.966		
CH_4 16.042	0.053	0.023	0.37	9.117	1.303	20.90	3.685	3.708	4.988	1.280	20.53
C_2H_4 28.052				2.220	0.317	8.89	0.897	0.897	1.214	0.317	8.89
C_2H_6 30.068				1.597	0.228	6.86	0.646	0.646	0.874	0.228	6.86
C_1+C_2											36.28
C_3H_6 42.078				3.183	0.455	19.15	1.287	1.287	1.742	0.455	19.15
C_3H_8 44.094				0.363	0.052	2.29	0.147	0.147	0.199	0.052	2.29
C_4H_8 56.104				1.690	0.240	13.46	0.679	0.679	0.919	0.240	13.46
C_4H_{10} 58.120				0.430	0.061	3.55	0.174	0.174	0.235	0.061	3.55
C_5H_{10} 70.130				0.593	0.085	5.96	0.240	0.240	0.325	0.085	5.96
C_5H_{12} 72.146				0.107	0.015	1.08	0.043	0.043	0.058	0.015	1.08
C_6H_{12} 84.156				0.167	0.024	2.02	0.068	0.068	0.092	0.024	2.02
C_5-C_6											47.51
TOTAL		42.825	534.21		14.289	326.86	40.424	83.049	62.542		
H_2+CO	97.083	41.381	15704 SCFH		7.036	20.106	19.906	61.287	26.942	-34.345	
H_2/CO		1.68	Factor 636780		4.12		4.12	2.17	4.12	1.44	

YIELD BASIS H_2+CO FED	CONDENSATE #/MCF	CONDENSATE #/gal	CONDENSATE gal/hr	CONDENSATE gal/MCF
	1.307			
	0.566			
	0.437			
	2.310			
	1.219	4.32	4.433	0.282
	0.146	4.24	0.540	0.034
	0.857	5.00	2.692	0.171
	0.226	4.86	0.730	0.046
	0.380	5.45	1.094	0.070
	0.069	5.25	0.206	0.013
	0.129	5.54	0.365	0.023
	3.026		10.060	0.639
	0.453	63.51	4.044		10.087	0.642
		111.02	7.070		20.147	1.281
	0.313	16.60	1.057		2.083	0.133
		127.62	8.127		22.230	1.414
	0.063	127.24	8.102		15.275	0.973
		143.84	9.159		17.358	1.106
		163.90	10.437			

YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL. %	gal/hr	TREATING RECOVERY.%	gal/hr
400 EP	79.5	8.019	98.0	7.859
400-550	8.8	0.888	91.4	0.812
550 +	11.7	1.180	114.6	1.352

	RECOVERY %	#/hr	gal/hr
PROPYLENE	42.4	8.12	
C_3 POLY GASO.	87.5	7.10	1.187
C_3 POLY TAR	12.5	1.02	0.135

	#/gal	#/hr	gal/hr	RVP
C_4H_8	5.00	1.51	0.302	68.0
C_4 POLY GASO.	5.98	10.46	1.749	1.5
C_4H_{10}	4.86	3.55	0.730	68.0
C_4-FREE GASO.			10.711	5.8
C_4 POLY TAR	7.53	1.49	0.198	

	gal/hr	gal/MCF	Bbl/Day
10 # RVP 400 EP GASOLINE	13.492	0.8591	4658
GAS OIL	0.812	0.0517	280
FUEL OIL	1.352	0.0861	467
POLY TAR	0.333	0.0212	115
TOTAL	15.989	1.0181	5520
W. S. CHEM.	2.083	0.1328	720
TOTAL	18.072	1.1509	6240

Weight Recovery, %	94.29	Catalyst Age, hrs.	
Pressure, psig	404	Inlet Velocity, Ft/sec	1.01
Temperature, °F	663	Bed Depth, Ft	18.78
Recycle Ratio	0.95	Bed Density, #/CF	155
Space Velocity, vhv	1267	Catalyst	Vol CF 12.39
Weight, #	1920		
Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =			

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+
66.48	91.11	78.16	83.00	72.81	48.31	56.04	77.86

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-E
HOURS 70-94

OPERATING CONDITIONS		RATES S.C.F.H.	
PRESSURES PSIG			
Oxygen	436	Fresh Feed	16176
Natural Gas	435	Recycle	15341
Generator Outlet	410	Combined Feed	31517
Reactor Inlet	404	Wet Gas—Measured	4917
Condenser Inlet		Adjusted	5423
Product Accumulator	375	Loss	506
TEMPERATURES—°F.		Recycle/Fresh Feed	0.95
Oxygen	518	Inlet Velocity—ft./sec.	1.01
Natural Gas	792	Fresh Feed Rate—S.C.F.H.	15704
Generator	2495	per Cu. Ft. Dense Bed	1267
Quench Accumulator	148	per Lb. Catalyst	8.18
Reactor Inlet	235	per sq ft	23794
Condenser Inlet	581		
Product Accumulator	61		
Catalyst No. Height			
1 See Per. A	--		
2	662		
3	652		
4	664		
5	666		
6	670		
7	663		
8	652		
9	644		
10	642		
11	623		

PRODUCT TESTS	OIL	WATER
°API	55.6	10.7
Neut. No.	42.1	34.2
Sap. No.	53.9	37.2
Hydrox. No.		
Bromine No.	99	
Pour °F.		
Chemicals, % by K_2CO_3		12.0
HEMPEL, DIST. %		°API
205 °F.		
400	78.5	55.0
400-550	8.8	34.5
550+	12.7	
A. S. T. M. DIST. ON		
Naphtha °F.		
IBP	98	
10%	121	
50%	208	
90%	358	
EP	401	
Rec	96.0	

CATALYST DATA		PARTICLE SIZE				
INVENTORY DATA		Screen Analysis			Sedimentation	
In Reactor at Start of Period		Mesh	Microns	%	Microns	%
Fresh Catalyst Added		On 40	419+		80+	
Total		100	150		40—80	
Catalyst Recovered	12	150	105		20—40	
In Reactor at End of Period		200	74		10—20	
		250	62		0—20	
REACTOR d-p, Inches H_2O		325	44			
No. Height		<325				
0 See Per. A						
1	73	CATALYST				
2	81	Bulk Density, Lbs./Cu.Ft.				
3	81	Aerated				
4	295	Settled				
Total	530	Compacted				
		Particle Density, gm./cc.				
CALCULATED FROM dp		NH_3 Value, ml./gm.				
Density, Lbs./Cu.Ft.	155	N_2 Surface, m^2/gm.				
Inventory, Lbs.	1920					
Bed Depth, Ft.	18.78	CHEMICAL ANALYSIS				
Vol Cu. Ft.	12.39	Fe				
		C				
		O				
		H				
		K_2O, W+. % basis Fe				
		X-Ray Analysis—				
		$Fe_{20}C_9$				
		Fe_3O_4				
		Fe				

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 66-F
HOURS 94-115
CATALYST Brownsville Treated MS RED. @ 660F

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS At Wt. Balance m/hr	WET GAS At Wt. Balance #/hr	RECYCLE m/hr	COMBINED FEED m/hr	EFFLUENT m/hr	NET CHANGE m/hr	NET CHANGE #/hr
CO 28.010	36.775	15.332	429.46	9.210	1.318	36.92	3.699	19.031	5.017	-14.014	-392.54
H_2 2.016	60.385	25.176	50.75	39.375	5.634	11.36	15.812	40.988	21.446	-191542	39.39
CO_2 44.010	2.130	0.888	39.08	29.725	4.253	187.19	11.937	12.825	16.190	3.365	148.11
N_2 28.016	0.625	0.261	7.31	2.025	0.290	8.12	0.813	1.074	1.103		
CH_4 16.042	0.085	0.035	0.56	9.035	1.293	20.74	3.628	3.663	4.921	1.258	20.18
C_2H_4 28.052				2.195	0.314	8.81	0.881	0.881	1.195	0.314	8.81
C_2H_6 30.068				1.640	0.235	7.07	0.659	0.659	0.894	0.235	7.07
C_1+C_2											36.06
C_3H_6 42.078				3.125	0.447	18.81	1.255	1.255	1.702	0.447	18.81
C_3H_8 44.094				0.345	0.049	2.16	0.139	0.139	0.188	0.049	2.16
C_4H_8 56.104				1.765	0.253	14.19	0.709	0.709	0.962	0.253	14.19
C_4H_{10} 58.120				0.555	0.079	4.59	0.223	0.223	0.302	0.079	4.59
C_5H_{10} 70.130				0.670	0.096	6.73	0.269	0.269	0.365	0.096	6.73
C_5H_{12} 72.146				0.140	0.020	1.44	0.056	0.056	0.076	0.020	1.44
C_6H_{12} 84.156				0.195	0.028	2.36	0.078	0.078	0.106	0.028	2.36
C_5-C_6											
TOTAL		41.692	527.16		14.309	330.49	40.158	81.850	61.964		50.28
H_2+CO	97.160	40.508	15373 SCFH		6.952		19.511	60.019	26.463	-33.556	
H_2/CO		1.64	Factor 650491		4.27		4.27	2.15	4.27	1.39	

YIELD BASIS H_2+CO FED — CONDENSATE #/MCF	#/gal	gal/hr	gal/MCF
9.634			
1.313			
0.573			
0.460			
2.346			
1.224	4.32	4.354	0.283
0.141	4.24	0.509	0.033
0.923	5.00	2.838	0.185
0.299	4.86	0.944	0.061
0.438	5.45	1.235	0.080
0.094	5.25	0.274	0.018
0.154	5.54	0.426	0.028
3.273		10.580	0.688

YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL. %	gal/hr	TREATING RECOVERY.%	gal/hr
400 EP	79.7	7.355	98.0	7.208
400-550	9.4	0.868	91.4	0.793
550 +	10.9	1.006	114.6	1.153

	RECOVERY %	#/hr	gal/hr
PROPYLENE	41.2	7.75	
C_3 POLY GASO.	87.5	6.78	1.134
C_3 POLY TAR	12.5	0.97	0.129

	#/gal	#/hr	gal/hr	RVP
C_4H_8	5.00	0.47	0.094	68.0
C_5 POLY GASO.	5.98	12.01	2.008	1.5
C_4H_{10}	4.86	4.59	0.944	68.0
C_4-FREE GASO.			10.277	5.8
C_4 POLY TAR	7.53	1.71	0.227	

	gal/hr	gal/MCF	Bbl/Day
10 # RVP 400 EP GASOLINE	13.323	0.8666	4698
GAS OIL	0.793	0.0516	280
FUEL OIL	1.153	0.0750	407
POLY TAR	0.356	0.0232	126
TOTAL	15.625	1.0164	5511
W. S. CHEM.	2.092	0.1361	738
TOTAL	17.717	1.1525	6249

Weight Recovery, %	93.29	Catalyst Age, hrs.		Space Velocity, vhv	1243	RECOVERED OIL **	0.414	58.08
Pressure, psig	404	Inlet Velocity, Ft/sec	0.99	Catalyst	Vol CF 12.37	TOTAL OIL		108.36
Temperature, °F	660	Bed Depth, Ft	18.74	Weight, #	1954	WATER SOLUBLE CHEMICALS **	0.313	16.62
Recycle Ratio	0.96	Bed Density, #/C.F	158	Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =		TOTAL LIQUID PRODUCTS C_5+		124.98

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY			
Contraction	CO	H_2	H_2+CO	CO	H_2	CO+H_2	C_3 + /C_1 +	NET WATER **	6.770	121.97
65.68	91.40	77.62	82.84	73.64	47.68	55.91	77.61	GROSS WATER		138.59
								HYDROCARBON TOTAL—C_1+		161.04

7.778		9.229	0.600
7.051		19.809	1.288
1.081		2.092	0.136
8.132		21.901	1.424
7.934		14.642	0.952
9.015		16.734	1.088
10.478			

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2 + CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-F
HOURS 94-115

OPERATING CONDITIONS — PRESSURES PSIG		RATES S.C.F.H.	
Oxygen	436	Fresh Feed	15822
Natural Gas	435	Recycle	15240
Generator Outlet	410	Combined Feed	31062
Reactor Inlet	404	Wet Gas—Measured	4849
Condenser Inlet		Adjusted	5431
Product Accumulator	375	Loss	582
TEMPERATURES—°F.		Recycle/Fresh Feed	0.96
Oxygen	494	Inlet Velocity—ft./sec.	0.99
Natural Gas	793	Fresh Feed Rate—S.C.F.H.	15373
Generator	2480	per Cu. Ft. Dense Bed	1243
Quench Accumulator	148	per Lb. Catalyst	7.87
Reactor Inlet	240		23292
Condenser Inlet	577		
Product Accumulator	62		
Catalyst No. Height			
1 See Per. A	--		
2	660		
3	650		
4	661		
5	663		
6	667		
7	661		
8	649		
9	642		
10	640		
11	622		

PRODUCT TESTS	OIL	WATER
° API	55.7	10.8
Neut. No.	42.5	34.3
Sap. No.	51.2	39.4
Hydrox. No.		
Bromine No.	96	
Pour °F.		
Chemicals, % by K_2CO_3		12.5
HEMPEL. DIST. %		°API
205 °F.		
400	78.7	54.7
400-550	9.4	34.9
550+	11.9	
A. S. T. M. DIST. ON		
Naphtha °F.		
IBP	101	
10%	124	
50%	201	
90%	334	
EP	401	
Rec	97.0	

CATALYST DATA — INVENTORY DATA		PARTICLE SIZE: Screen Analysis Mesh	Microns	%	Sedimentation Microns	%
In Reactor at Start of Period						
Fresh Catalyst Added		On 40	419+		80+	
Total						
Catalyst Recovered	12	100	150		40—80	
In Reactor at End of Period		150	105		20—40	
		200	74		10—20	
REACTOR d-p, Inches H_2O		250	62		0—20	
No. Height		325	44			
0 See Per. A		<325				
1	75	CATALYST				
2	80	Bulk Density, Lbs./Cu.Ft.				
3	84	Aerated				
4	300	Settled				
Total	539	Compacted				
		Particle Density, gm./cc.				
CALCULATED FROM dp		NH_3 Value, ml./gm.				
Density, Lbs./Cu.Ft.	158	N_2 Surface, m^2/gm.				
Inventory, Lbs.	1954					
Bed Depth, Ft.	18.74	CHEMICAL ANALYSIS				
Vol. Cu. Ft.	12.37	Fe				
		C				
		O				
		H				
		K_2O, W+, % basis Fe				
		X-Ray Analysis—				
		$Fe_{20}C_9$				
		Fe_3O_4				
		Fe				

RUN NO. 66-G
HOURS 115-135
CATALYST Brownsville Treated MS Red. @ 660F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS At Wt. Balance m/hr	WET GAS At Wt. Balance #/hr	RECYCLE m/hr	COMBINED FEED m/hr	EFFLUENT m/hr	NET CHANGE m/hr	NET CHANGE #/hr
CO 28.010	36.980	15.231	426.62	9.203	1.315	36.83	3.675	18.906	4.990	-13.916	-389.79
H_2 2.016	60.237	24.811	50.02	39.574	5.654	11.40	15.803	40.614	21.457	-19.157	-38.62
CO_2 44.010	2.267	0.934	41.11	30.123	4.305	189.43	12.030	12.964	16.335	3.371	148.32
N_2 28.016	0.433	0.178	4.99	1.780	0.254	7.12	0.711	0.889	0.965		
CH_4 16.042	0.083	0.034	0.55	8.750	1.250	20.05	3.494	3.528	4.744	1.216	19.50
C_2H_4 28.052				2.273	0.325	9.12	0.908	0.908	1.233	0.325	9.12
C_3H_6 30.068				1.627	0.232	6.98	0.650	0.650	0.882	0.232	6.98
C_4+C_5											35.60
C_3H_6 42.078				3.097	0.442	18.60	1.237	1.237	1.679	0.442	18.60
C_3H_8 44.094				0.323	0.046	2.03	0.129	0.129	0.175	0.046	2.03
C_4H_8 56.104				1.730	0.247	13.86	0.691	0.691	0.938	0.247	13.86
C_4H_{10} 58.120				0.500	0.071	4.13	0.200	0.200	0.271	0.071	4.13
C_5H_{10} 70.130				0.693	0.099	6.94	0.277	0.277	0.376	0.099	6.94
C_6H_{12} 72.146				0.130	0.019	1.37	0.052	0.019	0.071	0.019	1.37
C_6H_{12} 84.156				0.197	0.028	2.36	0.079	0.028	0.107	0.028	2.36
C_5-C_6											49.29
TOTAL		41.188			14.287	330.22	39.936	81.124	61.624		
H_2+CO	97.217	40.042	15196 SCFH	6.969			19.478	59.520	26.447	-33.073	
H_2/CO		1.63	Factor 658067	4.30			4.30	2.15	4.30	1.38	

Weight Recovery, % 94.30	Catalyst Age, hrs.	Space Velocity, vhv 1232	RECOVERED OIL **	0.404	56.61	3.725
Pressure, psig 401	Inlet Velocity, Ft/sec 0.99	Catalyst Vol CF 12.33	TOTAL OIL		105.90	6.969
Temperature, °F 661	Bed Depth, Ft 18.68	Weight, # 1911	WATER SOLUBLE CHEMICALS **	0.297	15.75	1.036
Recycle Ratio 0.97	Bed Density, #/CF 155	Effluent $\frac{(H_2)(CO_2)}{(H_2O)(CO)}$ Shift Ratio =	TOTAL LIQUID PRODUCTS C_3+		121.65	8.005
			NET WATER **	6.700	120.71	7.944
			GROSS WATER		136.46	8.980
			HYDROCARBON TOTAL—C_1+		157.25	10.347

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+
65.31	91.37	77.21	82.60	73.61	47.17	55.57	77.36

YIELD BASIS H_2+CO FED — CONDENSATE #/MCF	#/gal	gal/hr	gal/MCF
9.760			
1.283			
0.600			
0.459			
2.342			
1.224	4.32	4.306	0.283
0.134	4.24	0.479	0.032
0.912	5.00	2.772	0.182
0.272	4.86	0.850	0.056
0.457	5.45	1.273	0.084
0.090	5.25	0.261	0.017
0.155	5.34	0.426	0.028
3.244		10.367	0.682
7.944		14.491	0.954
8.980		16.467	1.084

YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*

	CORRECTED HEMPEL. %	gal/hr	TREATING RECOVERY.%	gal/hr
400 EP	81.0	7.284	98.0	7.138
400-550	9.2	0.827	91.4	0.756
550 +	9.8	0.881	114.6	1.010

	RECOVERY %	#/hr	gal/hr
PROPYLENE	40.7	7.57	
C_3 POLY GASO.	87.5	6.62	1.107
C_3 POLY TAR	12.5	0.95	0.126

	#/gal	#/hr	gal/hr	RVP
C_4H_8	5.00	0.84	0.168	68.0
C_4 POLY GASO.	5.98	11.39	1.905	1.5
C_4H_{10}	4.86	4.13	0.850	68.0
C_4-FREE GASO.			10.205	5.8
C_4 POLY TAR	7.58	1.63	0.216	

	gal/hr	gal/MCF	Bbl/Day
10 # RVP 400 EP GASOLINE	13.128	0.8639	4684
GAS OIL	0.756	0.0497	269
FUEL OIL	1.010	0.0665	361
POLY TAR	0.342	0.0225	122
TOTAL	15.236	1.0026	5436
W. S. CHEM.	1.976	0.1300	705
TOTAL	17.212	1.1326	6141

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

RUN NO. 66-G
HOURS 115-135

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

OPERATING CONDITIONS			
PRESSURES PSIG		RATES S.C.F.H.	
Oxygen	430	Fresh Feed	15631
Natural Gas	429	Recycle	15156
Generator Outlet	406	Combined Feed	30787
Reactor Inlet	401	Wet Gas—Measured	4932
Condenser Inlet		Adjusted	5422
Product Accumulator	372	Loss	490
TEMPERATURES—°F.		Recycle/Fresh Feed	0.97
Oxygen	490	Inlet Velocity—ft./sec.	0.99
Natural Gas	811	Fresh Feed Rate—S.C.F.H.	15196
Generator	2453	per Cu. Ft. Dense Bed	1232
Quench Accumulator	158	per Lb. Catalyst	7.95
Reactor Inlet	247	per sq ft	23024
Condenser Inlet	575		
Product Accumulator	63		
Catalyst No. Height			
1 See Per. A	--		
2	661		
3	651		
4	662		
5	664		
6	667		
7	662		
8	648		
9	641		
10	641		
11	618		

PRODUCT TESTS	OIL	WATER
°API	55.6	10.7
Neut. No.	45.6	34.8
Sap. No.	57.4	39.2
Hydrox. No.		
Bromine No.	96	
Pour °F.	below -30	
Chemicals, % by K_2CO_3		12.0
HEMPEL. DIST. %		°API
205 °F.		
400	80.0	55.1
400-550	9.2	37.0
550+	10.8	
A. S. T. M. DIST. ON		
Naphtha °F.		
IBP	100	
10%	142	
50%	224	
90%	350	
EP	394	
Rec	96.5	

CATALYST DATA		
INVENTORY DATA		
In Reactor at Start of Period		
Fresh Catalyst Added		
Total		
Catalyst Recovered	11	
In Reactor at End of Period		
REACTOR d-p, Inches H_2O		
No. Height		
0 See Per. A		
1	74	
2	81	
3	80	
4	292	
Total	527	
CALCULATED FROM dp		
Density, Lbs./Cu.Ft.	155	
Inventory, Lbs.	1911	
Bed Depth, Ft.	18.68	
Vol cu ft	12.33	

PARTICLE SIZE

Screen Analysis Mesh	Microns	%	Sedimentation Microns	%
On 40	419+		80+	
100	150		40—80	
150	105		20—40	
200	74		10—20	
250	62		0—20	
325	44			
<325				

CATALYST

Bulk Density, Lbs./Cu.Ft.
Aerated
Settled
Compacted
Particle Density, gm./cc.
NH_3 Value, ml./gm.
N_2 Surface, m^2/gm.

CHEMICAL ANALYSIS
Fe
C
O
H
K_2O, W+, % basis Fe
X-Ray Analysis—
$Fe_{20}C_9$
Fe_3O_4
Fe

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 66-H
HOURS 135-159
CATALYST Brownsville Treated MS Red. @ 660F

FRESH FEED	%	m/hr	#/hr	WET GAS	At Wt. Balance m/hr	At Wt. Balance #/hr	RECYCLE m/hr	COMBINED FEED m/hr	EFFLUENT m/hr	NET CHANGE m/hr	NET CHANGE #/hr	YIELD BASIS H_2+CO FED CONDENSATE #/MCF	#/gal	gal/hr	gal/MCF
CO 28.010	37.427	15.519	434.66	9.000	1.319	36.95	3.608	19.127	4.927	-14.200	-397.71				
H_2 2.016	59.876	24.827	50.05	40.620	5.952	12.00	16.286	41.113	22.238	-18.875	-38.05				
CO_2 44.010	2.097	0.870	38.29	30.320	4.444	195.57	12.156	13.026	16.600	3.574	157.28	10.272			
N_2 28.016	0.537	0.223	6.25	1.657	0.243	6.81	0.664	0.887	0.907						
CH_4 16.042	0.063	0.026	0.42	7.770	1.139	18.27	3.115	3.141	4.254	1.113	17.85	1.166			
C_2H_4 28.052				2.343	0.343	9.62	0.939	0.939	1.282	0.343	9.62	0.628			
C_2H_6 30.068				1.663	0.244	7.34	0.667	0.667	0.911	0.244	7.34	0.479			
C_1+C_2											34.81	2.273			
C_3H_6 42.079				2.977	0.436	18.35	1.198	1.198	1.630	0.436	18.35	1.198	4.32	4.248	0.277
C_3H_8 44.094				0.323	0.047	2.07	0.129	0.129	0.176	0.047	2.07	0.135	4.24	0.488	0.032
C_4H_8 56.104				1.743	0.255	14.31	0.699	0.699	0.954	0.255	14.31	0.935	5.00	2.862	0.187
C_4H_{10} 58.120				0.583	0.085	4.94	0.234	0.234	0.319	0.085	4.94	0.323	4.86	1.016	0.066
C_5H_{10} 70.130				0.647	0.095	6.66	0.259	0.259	0.354	0.095	6.66	0.435	5.45	1.222	0.080
C_5H_{12} 72.146				0.177	0.026	1.88	0.071	0.071	0.097	0.026	1.88	0.123	5.25	0.358	0.023
C_6H_{12} 84.156				0.177	0.026	2.19	0.071	0.071	0.097	0.026	2.19	0.143	5.54	0.395	0.026
C_3-C_6											50.40	3.292		10.589	0.691
TOTAL		41.465	529.67		14.654	336.96	40.092	81.557	62.117						
H_2+CO	97.303	40.346	15312 SCFH		7.271		19.894	60.240	27.165	-33.075					
H_2/CO		1.60	Factor 655082		4.51		4.51	2.15	4.51	1.33					

YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL. %	gal/hr	TREATING RECOVERY.%	gal/hr
400 EP	82.0	7.409	98.0	7.261
400-550	8.0	0.723	91.4	0.661
550 +	10.0	0.904	114.6	1.036

	RECOVERY %	#/hr	gal/hr
PROPYLENE	40.0	7.34	
C_3 POLY GASO.	87.5	6.42	1.074
C_3 POLY TAR	12.5	0.92	0.122

	#/gal	#/hr	gal/hr	RVP
C_4H_8	5.00	0.17	0.034	68.0
C_4 POLY GASO.	5.98	12.37	2.069	1.5
C_4H_{10}	4.86	4.94	1.016	68.0
C_4-FREE GASO.			10.310	5.8
C_4 POLY TAR	7.53	1.77	0.235	

	gal/hr	gal/MCF	Bbl/Day
10 # RVP 400 EP GASOLINE	13.428	0.8770	4755
GAS OIL	0.661	0.0432	234
FUEL OIL	1.036	0.0677	367
POLY TAR	0.357	0.0233	126
TOTAL	15.483	1.0112	5482
W. S. CHEM.	1.967	0.1285	697
TOTAL	17.450	1.1397	6179

RECOVERED OIL **	0.406	56.89	3.715		9.036	0.590			
TOTAL OIL		107.29	7.007		19.625	1.281			
WATER SOLUBLE CHEMICALS **	0.296	15.68	1.024		1.967	0.128			
TOTAL LIQUID PRODUCTS C_3+		122.97	8.031		21.592	1.409			
NET WATER **	6.669	120.14	7.846		14.422	0.942			
GROSS WATER		135.82	8.870		16.389	1.070			
HYDROCARBON TOTAL—C_1+		157.78	10.304						

Weight Recovery, % 94.00 — Catalyst Age, hrs. — Space Velocity, vhv 1247
Pressure, psig 404 — Inlet Velocity, Ft/sec 0.99 — Catalyst Vol CF 12.28
Temperature, °F 663 — Bed Depth, Ft 18.61 — Weight, # 1903
Recycle Ratio 0.97 — Bed Density, #/CF 155 — Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+
64.66	91.50	76.02	81.98	74.24	45.91	54.91	77.94

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-H
HOURS 135-159

OPERATING CONDITIONS		RATES S.C.F.H.	
PRESSURES PSIG			
Oxygen	434	Fresh Feed	15736
Natural Gas	431	Recycle	15215
Generator Outlet	409	Combined Feed	30951
Reactor Inlet	404	Wet Gas—Measured	5037
Condenser Inlet		Adjusted	5561
Product Accumulator	375	Loss	524
TEMPERATURES—°F.		Recycle/Fresh Feed	0.97
Oxygen	498	Inlet Velocity—ft./sec.	0.99
Natural Gas	801	Fresh Feed Rate—S.C.F.H.	15312
Generator	2427	per Cu. Ft. Dense Bed	1247
Quench Accumulator	159	per Lb. Catalyst	8.05
Reactor Inlet	248	per sq ft	23200
Condenser Inlet	580		
Product Accumulator	65		
Catalyst No. Height			
1 See Per. A	—		
2	662		
3	653		
4	664		
5	665		
6	669		
7	663		
8	651		
9	644		
10	645		
11	625		

PRODUCT TESTS	OIL	WATER
° API	55.6	10.7
Neut. No.	45.7	35.7
Sap. No.	59.8	39.2
Hydrox. No.		
Bromine No.	96	
Pour °F.		
Chemicals, % by K_2CO_3		12.0
HEMPEL DIST. %		°API
205 °F.		
400	81.0	54.9
400-550	8.0	37.4
550+	11.0	
A. S. T. M. DIST. ON		
Naphtha °F.		
IBP	100	
10%	126	
50%	210	
90%	356	
EP	402	
Rec	97.0	

CATALYST DATA		PARTICLE SIZE				
INVENTORY DATA.		Screen Analysis			Sedimentation	
In Reactor at Start of Period		Mesh	Microns	%	Microns	%
Fresh Catalyst Added		On 40	419+		80+	
Total		100	150		40—80	
Catalyst Recovered	10	150	105		20—40	
In Reactor at End of Period		200	74		10—20	
		250	62		0—20	
REACTOR d-p, Inches H_2O		325	44			
No. Height						
0 See Per. A		<325				
1	74	CATALYST				
2	81	Bulk Density, Lbs./Cu.Ft.				
3	80	Aerated				
4	290	Settled				
Total	525	Compacted				
		Particle Density, gm./cc.				
CALCULATED FROM dp		NH_3 Value, ml./gm.				
Density, Lbs./Cu.Ft.	155	N_2 Surface, m^2/gm.				
Inventory, Lbs.	1903					
Bed Depth, Ft.	18.61	CHEMICAL ANALYSIS				
Vol cu ft	12.28	Fe				
		C				
		O				
		H				
		K_2O, W+, % basis Fe				
		X-Ray Analysis—				
		$Fe_{20}C_9$				
		Fe_3O_4				
		Fe				

RUN NO. 66-I
HOURS 159-183
CATALYST Brownsville Treated MS Red. @ 660F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

FRESH FEED				WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED				
					At Wt. Balance							CONDENSATE				
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	m/hr	m/hr	m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*
CO 28.010	37.730	15.706	439.94	8.320	1.288	36.08	3.357	19.063	4.645	-14.418	-403.86					
H_2 2.016	59.484	24.762	49.92	41.326	6.397	12.90	16.676	41.438	23.073	-18.365	-37.02					400 EP
CO_2 44.010	2.160	0.899	39.56	29.423	4.555	200.42	11.874	12.773	16.429	3.656	160.86	10.474				400-550
N_2 28.016	0.543	0.226	6.33	1.857	0.287	8.04	0.749	0.975	1.036							550 +
CH_4 16.042	0.083	0.035	0.56	8.677	1.343	21.54	3.501	3.536	4.844	1.308	20.98	1.366				
C_2H_4 28.052				2.137	0.331	9.29	0.862	0.862	1.193	0.331	9.29	0.605				
C_2H_6 30.068				1.663	0.257	7.73	0.671	0.671	0.928	0.257	7.73	0.503				PROPYLENE
C_1+C_2											38.00	2.474				C_3 POLY GASO.
C_3H_4 42.078				3.130	0.485	20.41	1.263	1.268	1.748	20.485	20.41	1.329	4.32	4.725	0.308	C_3 POLY TAR
C_3H_8 44.094				0.350	0.054	2.38	0.141	0.141	0.195	0.054	2.38	0.155	4.24	0.561	0.037	
C_4H_8 56.104				1.737	0.269	15.09	0.701	0.701	0.970	0.269	15.09	0.983	5.00	3.018	0.197	
C_4H_{10} 58.120				0.483	0.075	4.36	0.195	0.195	0.270	0.075	4.36	0.284	4.86	0.897	0.058	C_4H_8
C_5H_{10} 70.130				0.640	0.099	6.94	0.258	0.258	0.357	0.099	6.94	0.452	5.48	1.273	0.083	C_4 POLY GASO.
C_5H_{12} 72.146				0.120	0.019	1.37	0.048	0.048	0.067	0.019	1.37	0.089	5.25	0.261	0.017	C_4H_{10}
C_6H_{12} 84.156				0.137	0.021	1.77	0.055	0.055	0.076	0.021	1.77	0.115	5.54	0.319	0.021	C_4-FREE GASO.
C_5-C_6											52.32	3.407		11.054	0.721	C_4 POLY TAR
TOTAL		41.628	536.31		15.480	348.32	40.351	81.979	63.063							
H_2+CO	97.214	40.468	15358 SCFH		7.685		20.033	60.501	27.718	-32.783						
H_2/CO		1.58	Factor 651126		4.97		4.97	2.17	4.97	1.27						10 # RVP 400 EP GASOLINE
GAS OIL																
FUEL OIL																
POLY TAR																
TOTAL																
W. S. CHEM.																
TOTAL																

YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*				
	CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY,%	gal/hr
400 EP	82.6	7.080	98.0	6.938
400-550	8.0	0.686	91.4	0.627
550 +	9.4	0.806	114.6	0.924
	RECOVERY %	#/hr	gal/hr	
PROPYLENE	37.8	7.71		
C_3 POLY GASO.	87.5	6.75	1.129	
C_3 POLY TAR	12.5	0.96	0.127	
	#/gal	#/hr	gal/hr	RVP
C_4H_8	5.00	0.65	0.130	68.0
C_4 POLY GASO.	5.98	12.64	2.113	1.5
C_4H_{10}	4.86	4.36	0.897	68.0
C_4-FREE GASO.			9.920	5.8
C_4 POLY TAR	7.53	1.80	0.239	
	gal/hr	gal/MCF	Bbl/Day	
10 # RVP 400 EP GASOLINE	13.060	0.8504	4611	
GAS OIL	0.627	0.0408	221	
FUEL OIL	0.924	0.0602	326	
POLY TAR	0.366	0.0238	129	
TOTAL	14.977	0.9752	5287	
W. S. CHEM.	2.022	0.1317	714	
TOTAL	16.999	1.1069	6001	

Weight Recovery, %	93.54	Catalyst Age, hrs.		Space Velocity, vhv	1245	RECOVERED OIL **	0.385	54.03	3.518
Pressure, psig	404	Inlet Velocity, Ft/sec	0.99	Catalyst Vol CF	12.34	TOTAL OIL		106.35	6.925
Temperature, °F	663	Bed Depth, Ft	18.69	Weight, #	1900	WATER SOLUBLE CHEMICALS **	0.303	16.07	1.046
Recycle Ratio	0.97	Bed Density, #/CF	154	Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =		TOTAL LIQUID PRODUCTS C_4+		122.42	7.971
						NET WATER **	6.544	117.89	7.676
						GROSS WATER		133.96	8.722
						HYDROCARBON TOTAL—C_1+		160.42	10.445

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+
62.81	91.80	74.17	81.01	75.63	44.32	54.19	76.31

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-I
HOURS 159-183

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA					
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE			
Oxygen	435	Fresh Feed	15798	° API	55.4	10.8	In Reactor at Start of Period		Screen Analysis			Sedimentation
Natural Gas	431	Recycle	15313	Neut. No.	46.5	35.4	Fresh Catalyst Added		Mesh	Microns	%	Microns %
Generator Outlet	408	Combined Feed	31111	Sap. No.	60.2	39.8	Total		On 40	419+		80+
Reactor Inlet	404	Wet Gas—Measured	5290	Hydrox. No.			Catalyst Recovered	13	100	150		40—80
Condenser Inlet		Adjusted	5875	Bromine No.	96		In Reactor at End of Period		150	105		20—40
Product Accumulator	375	Loss	585	Pour °F.					200	74		10—20
				Chemicals, % by K_2CO_3		12.5	REACTOR d-p, Inches H_2O		250	62		0—20
							No. Height		325	44		
TEMPERATURES—°F.		Recycle/Fresh Feed	0.97				0 See Per. A		<325			
Oxygen	495	Inlet Velocity—ft./sec.	0.99				1	74	CATALYST			
Natural Gas	795	Fresh Feed Rate—S.C.F.H.	15358	HEMPEL, DIST. %		°API	2	80	Bulk Density, Lbs./Cu.Ft.			
Generator	2411	per Cu.Ft. Dense Bed	1245	205 °F.			3	80	Aerated			
Quench Accumulator	161	per Lb. Catalyst	8.08	400	81.6	54.6	4	290	Settled			
Reactor Inlet	244	per sq ft	23270	400-550	8.0	37.2	Total	524	Compacted			
Condenser Inlet	576			550+	10.4				Particle Density, gm./cc.			
Product Accumulator	66						CALCULATED FROM dp		NH_3 Value, ml./gm.			
Catalyst No. Height				A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	154	N_2 Surface, m^2/gm.			
1 See Per. A	--			Naphtha °F.			Inventory, Lbs.	1900				
2	662			IBP	100		Bed Depth, Ft.	18.69	CHEMICAL ANALYSIS			
3	652			10%	126		Vol Cu. Ft.	12.34	Fe			
4	664			50%	208				C			
5	667			90%	340				O			
6	670			EP	398				H			
7	664			Red.	97.0				K_2O, W+, % basis Fe			
8	652								X-Ray Analysis—			
9	645								$Fe_{20}C_9$			
10	647								Fe_3O_4			
11	625								Fe			

RUN NO. 66-J
HOURS 183-207
CATALYST Brownsville
Treated MS Red. @ 660F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED				
					At Wt. Balance							CONDENSATE				
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	m/hr	m/hr	m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*
CO 28.010	36.915	15.212	426.05	9.393	1.469	41.15	34818	19.030	5.287	-13.743	-384.90					
H_2 2.016	59.995	24.721	49.84	41.326	6.462	13.03	16.796	41.517	23.258	-18.259	36.81					
CO_2 44.010	2.300	0.948	41.72	28.907	4.521	198.96	11.749	12.697	16.270	3.573	157.24	10.375				
N_2 28.016	0.720	0.297	8.32	1.973	0.308	8.63	0.802	1.099	1.110							
CH_4 16.042	0.070	0.029	0.47	8.447	1.321	21.19	3.433	3.462	4.754	1.292	20.72	1.367				
C_2H_2 26.052				2.177	0.340	9.54	0.885	0.885	1.225	0.340	9.54	0.629				
C_2H_6 30.068				1.613	0.252	7.58	0.656	0.656	0.908	0.252	7.58	0.500				
C_1+C_2											37.84	2.496				
C_3H_6 42.078				3.047	0.476	20.03	1.238	1.238	1.714	0.476	20.03	1.322	4.32	4.637	0.306	
C_3H_8 44.094				0.340	0.053	2.34	0.138	0.138	0.191	0.053	2.34	0.154	4.24	0.552	0.036	
C_4H_8 56.104				1.550	0.242	13.58	0.630	0.630	0.872	0.242	13.58	0.896	5.00	2.716	0.179	
C_4H_{10} 58.120				0.387	0.061	3.55	0.157	0.157	0.218	0.061	3.55	0.234	4.86	0.730	0.048	
C_5H_{10} 70.130				0.507	0.079	5.54	0.206	0.206	0.285	0.079	5.54	0.366	5.45	1.017	0.067	
C_5H_{12} 72.146				0.170	0.027	1.95	0.069	0.069	0.096	0.027	1.95	0.129	5.25	0.371	0.028	
C_6H_{14} 84.156				0.163	0.025	2.10	0.066	0.066	0.091	0.025	2.10	0.139	5.54	0.379	0.025	
C_3-C_6											49.09	3.240		10.402	0.685	
TOTAL		41.207	526.40		15.636	349.17	40.643	81.950	63.078							
H_2+CO	96.910	39.933	15155 SCFH		7.931		20.614	60.547	28.545	-32.002						
H_2/CO		1.63	Factor 659848		4.40		4.40	2.18	4.40	1.33						

Weight Recovery, % 92.31	Catalyst Age, hrs.	Space Velocity, vhv 1236	RECOVERED OIL **	0.360	50.45	3.329	7.987 0.527
Pressure, psig 404	Inlet Velocity, Ft/sec 0.99	Catalyst Vol CF 12.26	TOTAL OIL		99.54	6.569	18.389 1.212
Temperature, °F 662	Bed Depth, Ft 18.57	Weight, # 1876	WATER SOLUBLE CHEMICALS **	0.308	16.32	1.077	2.070 0.137
Recycle Ratio 0.99	Bed Density, #/CF 153	Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =	TOTAL LIQUID PRODUCTS C_4+		115.86	7.646	20.459 1.349
			NET WATER **	6.131	110.46	7.289	13.260 0.875
			GROSS WATER		126.78	8.366	15.330 1.012
			HYDROCARBON TOTAL—C_1+		153.70	10.142	

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+
62.05	90.34	73.86	80.14	72.22	43.98	52.85	75.38

YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY, %	gal/hr
400 EP	82.0	6.549	98.0	6.418
400-550	8.8	0.703	91.4	0.643
550 +	9.2	0.735	114.6	0.842

	RECOVERY %	#/hr	gal/hr
PROPYLENE	37.0	7.41	
C_3 POLY GASO.	87.5	6.48	1.084
C_3 POLY TAR	12.5	0.93	0.124

	#/gal	#/hr	gal/hr	RVP
C_4H_8	5.00	1.05	0.210	68.0
C_4 POLY GASO.	5.98	10.96	1.833	1.5
C_4H_{10}	4.86	3.55	0.730	68.0
C_4-FREE GASO.			9.269	5.8
C_4 POLY TAR	7.53	1.57	0.208	

	gal/hr	gal/MCF	Bbl/Day
10 # RVP 400 EP GASOLINE	12.042	0.7946	4308
GAS OIL	0.643	0.0424	230
FUEL OIL	0.842	0.0556	301
POLY TAR	0.332	0.0219	119
TOTAL	13.859	0.9145	4958
W. S. CHEM.	2.070	0.1366	741
TOTAL	15.929	1.0511	5699

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF

*9488 MCFH H_2 + CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-J
HOURS 183-207

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA				
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE		
Oxygen	435	Fresh Feed	15638	°API	55.0	11.0	In Reactor at Start of Period		Screen Analysis		Sedimentation
Natural Gas	430	Recycle	15424	Neut. No.	47.0	36.2	Fresh Catalyst Added		Mesh / Microns / %		Microns / %
Generator Outlet	407	Combined Feed	31052	Sap. No.	65.3	39.8	Total		On 40 / 419+		80+
Reactor Inlet	404	Wet Gas—Measured	5246	Hydrox. No.			Catalyst Recovered	9	100 / 150		40—80
Condenser Inlet		Adjusted	5934	Bromine No.	96		In Reactor at End of Period		150 / 105		20—40
Product Accumulator	375	Loss	688	Pour °F.					200 / 74		10—20
				Chemicals, % by K_2CO_3		13.5	REACTOR d-p, Inches H_2O		250 / 62		0—20
							No. Height		325 / 44		
TEMPERATURES—°F.		Recycle/Fresh Feed	0.99				0 See Per. A		<325		
Oxygen	490	Inlet Velocity—ft./sec.	0.99				1	73	CATALYST		
Natural Gas	801	Fresh Feed Rate—S.C.F.H.	15155	HEMPEL. DIST. %		°API	2	79	Bulk Density, Lbs./Cu.Ft.		
Generator	2438	per Cu. Ft. Dense Bed	1236	205 °F.			3	80	Aerated		
Quench Accumulator	163	per Lb. Catalyst	8.08	400	81.0	56.4	4	285	Settled		
Reactor Inlet	248	per sq ft	22962	400-550	8.8	37.4	Total	517	Compacted		
Condenser Inlet	581			550+	10.2				Particle Density, gm./cc.		
Product Accumulator	65						CALCULATED FROM dp		NH_3 Value, ml./gm.		
Catalyst No. Height				A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	153	N_2 Surface, $m^2/gm.$		
1 See Per. A	--			Naphtha °F.			Inventory, Lbs.	1876			
2	662			IBP	100		Bed Depth, Ft.	18.57	CHEMICAL ANALYSIS		
3	650			10%	126		Vol cu ft	12.26	Fe		
4	662			50%	210				C		
5	666			90%	340				O		
6	670			EP	394				H		
7	664			Rec.	96.5				K_2O, W+, % basis Fe		
8	652								X-Ray Analysis—		
9	645								$Fe_{20}C_9$		
10	650								Fe_3O_4		
11	631								Fe		

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 66-K
HOURS 207-231
CATALYST Brownsville Treated MS Red. @ 660F

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED							
	%	m/hr	#/hr	%	At Wt. Balance m/hr	At Wt. Balance #/hr	m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE #/MCF	CONDENSATE #/gal	CONDENSATE gal/hr	CONDENSATE gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY,%	gal/hr
CO 28.010	37.140	15.277	427.89	9.107	1.446	40.50	3.705	18.982	5.151	-13.831	-387.39								
H_2 2.016	59.723	24.565	49.52	41.793	6.634	13.37	17.003	41.568	23.637	-17.931	-36.15					400 EP	84.3	6.629	98.0	6.496
CO_2 44.010	2.350	0.967	42.56	28.653	4.548	200.19	11.657	12.624	16.205	3.581	157.63	10.425				400-550	8.0	0.629	91.4	0.575
N_2 28.016	0.710	0.292	8.18	1.900	0.302	8.46	0.773	1.065	1.075							550 +	7.7	0.606	114.6	0.694
CH_4 16.042	0.077	0.032	0.51	8.553	1.358	21.79	3.480	3.512	4.838	1.326	21.28	1.407								
C_2H_4 28.052				2.317	0.368	10.32	0.943	0.943	1.311	0.368	10.32	0.683					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.700	0.270	8.12	0.692	0.692	0.962	0.270	8.12	0.537				PROPYLENE	36.4	6.43		
C_1+C_2											39.72	2.627				C_3 POLY GASO.	87.5	5.63	0.941	
C_3H_6 42.078				2.647	0.420	17.67	1.077	1.077	1.497	0.420	17.67	1.169	4.32	4.090	0.271	C_3 POLY TAR	12.5	0.80	0.106	
C_3H_8 44.094				0.240	0.038	1.68	0.098	0.098	0.138	0.038	1.68	0.111	4.24	0.396	0.026					
C_4H_8 56.104				1.573	0.250	14.03	0.640	0.640	0.890	0.250	14.03	0.928	5.00	2.806	0.186		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.557	0.088	5.11	0.227	0.227	0.315	0.088	5.11	0.338	4.86	1.051	0.070	C_4H_8	5.00	--	--	68.0
C_5H_{10} 70.130				0.610	0.097	6.80	0.248	0.248	0.345	0.097	6.80	0.450	5.45	1.248	0.083	C_4 POLY GASO.	5.98	12.28	2.053	1.5
C_5H_{12} 72.146				0.160	0.025	1.80	0.065	0.065	0.090	0.025	1.80	0.119	5.25	0.343	0.023	C_4H_{10}	4.86	(5.11) 4.80	(1.051) 0.988	68.0
C_6H_{12} 84.156				0.190	0.030	2.52	0.077	0.077	0.107	0.030	2.52	0.167	5.54	0.455	0.030	C_4-FREE GASO.			9.483	5.8
C_5-C_6											49.61	3.282		10.389	0.689	C_4 POLY TAR	7.53	1.75	0.232	
TOTAL		41.133	528.66		15.874	352.36	40.685	81.818	63.342											
H_2+CO	96.863	39.842	15120 SCFH		8.080		20.708	60.550	28.788	-31.762								gal/hr	gal/MCF	Bbl/Day
H_2/CO		1.61	Factor 661375		4.59		4.59	2.19	4.59	1.30						10 # RVP 400 EP GASOLINE		12.524	0.8283	4491
									RECOVERED OIL **	0.355	49.73	3.289		7.864	0.520	GAS OIL		0.575	0.0380	206
									TOTAL OIL		99.34	6.571		18.253	1.209	FUEL OIL		0.694	0.0459	249
									WATER SOLUBLE CHEMICALS **	0.307	16.29	1.077		2.066	0.137	POLY TAR		0.338	0.0224	121
									TOTAL LIQUID PRODUCTS C_5+		115.63	7.648		20.319	1.346	TOTAL		14.131	0.9346	5067
									NET WATER **	6.121	110.28	7.294		13.239	0.876	W. S. CHEM.		2.066	0.1366	741
									GROSS WATER		126.57	8.371		15.305	1.013	TOTAL		16.197	1.0712	5808
									HYDROCARBON TOTAL—C_1+		155.35	10.274								

Weight Recovery, % 92.40	Catalyst Age, hrs.	Space Velocity, vhv 1240
Pressure, psig 403	Inlet Velocity, Ft/sec 0.99	Catalyst Vol CF 12.19
Temperature, °F 663	Bed Depth, Ft 18.47	Weight, # 1865
Recycle Ratio 0.99	Bed Density, #/CF 153	Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+
61.41	90.53	72.99	79.72	72.86	43.14	52.46	74.43

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-K
HOURS 207-231

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA			
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE	
Oxygen	435	Fresh Feed	15610	°API	54.8	11.0	In Reactor at Start of Period		Screen Analysis	Sedimentation
Natural Gas	431	Recycle	15440	Neut. No.	48.7	37.2	Fresh Catalyst Added		Mesh / Microns / %	Microns / %
Generator Outlet	407	Combined Feed	31050	Sap. No.	65.6	41.1	Total		On 40 / 419+	80+
Reactor Inlet	403	Wet Gas—Measured	5337	Hydrox. No.			Catalyst Recovered	13	100 / 150	40—80
Condenser Inlet		Adjusted	6024	Bromine No.	96		In Reactor at End of Period		150 / 105	20—40
Product Accumulator	375	Loss	687	Pour °F.	Below -30				200 / 74	10—20
				Chemicals, % by K_2CO_3		13.5	REACTOR d-p, Inches H_2O		250 / 62	0—20
							No. Height		325 / 44	
TEMPERATURES—°F.		Recycle/Fresh Feed	0.99				0 See Per. A		<325	
Oxygen	501	Inlet Velocity—ft./sec.	0.99				1	73	CATALYST	
Natural Gas	791	Fresh Feed Rate—S.C.F.H.	15120	HEMPEL. DIST. %		°API	2	79	Bulk Density, Lbs./Cu.Ft.	
Generator	2418	per Cu.Ft. Dense Bed	1240	205 °F.			3	80	Aerated	
Quench Accumulator	160	per Lb. Catalyst	8.11	400	83.3	55.8	4	282	Settled	
Reactor Inlet	255	per sq ft	22909	400-550	8.0	37.4	Total	514	Compacted	
Condenser Inlet	583			550+	8.7				Particle Density, gm./cc.	
Product Accumulator	66						CALCULATED FROM dp		NH_3 Value, ml./gm.	
Catalyst No. Height				A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	153	N_2 Surface, m^2/gm.	
1 See Per. A	--			Naphtha °F.			Inventory, Lbs.	1865		
2	662			IBP	100		Bed Depth, Ft.	18.47	CHEMICAL ANALYSIS	
3	653			10%	126		Vol cu ft	12.19	Fe	
4	664			50%	210				C	
5	666			90%	350				O	
6	670			EP	408				H	
7	665			Rec.	96.5				K_2O, W+. % basis Fe	
8	652								X-Ray Analysis—	
9	645								$Fe_{20}C_9$	
10	652								Fe_3O_4	
11	644								Fe	

RUN NO. 66-L
HOURS 231-238
CATALYST Brownsville Treated MS Red. @ 660F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

FRESH FEED				WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED								
					At Wt. Balance							CONDENSATE								
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	m/hr	m/hr	m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*				
CO 28.010	37.260	15.242	426.90	9.305	1.505	42.16	3.804	19.046	5.309	-13.737	-384.74						CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY,%	gal/hr
H_2 2.016	59.210	24.219	48.82	41.815	6.761	13.63	17.095	41.314	23.856	-17.458	-35.19					400 EP	82.8	6.519	98.0	6.389
CO_2 44.010	2.815	1.152	50.69	28.795	4.656	204.90	11.772	12.924	16.428	3.504	154.21	10.297				400-550	8.3	0.654	91.4	0.598
N_2 28.016	0.635	0.260	7.28	1.640	0.265	7.42	0.670	0.930	0.935							550 +	8.9	0.701	114.6	0.803
CH_4 16.042	0.090	0.033	0.53	8.425	1.362	21.85	3.444	3.477	4.806	1.329	21.32	1.424								
C_2H_4 28.052				2.260	0.365	10.24	0.924	0.924	1.289	0.365	10.24	0.684					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.795	0.290	8.72	0.734	0.734	1.024	0.290	8.72	0.582				PROPYLENE	35.5	6.39		
C_1+C_2											40.28	2.690				C_3 POLY GASO.	87.5	5.59	0.935	
C_3H_6 42.078				2.645	0.428	18.01	1.081	1.081	1.509	0.428	18.01	1.203	4.32	4.169	0.278	C_3 POLY TAR	12.5	0.80	0.106	
C_3H_8 44.094				0.300	0.049	2.16	0.123	0.123	0.172	0.049	2.16	0.144	4.24	0.509	0.034					
C_4H_8 56.104				1.545	0.250	14.03	0.632	0.632	0.882	0.250	14.03	0.937	5.00	2.806	0.187		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.495	0.080	4.65	0.202	0.202	0.282	0.080	4.65	0.310	4.86	0.957	0.064	C_4H_8	5.00	0.13	0.026	68.0
C_5H_{10} 70.130				0.645	0.104	7.29	0.264	0.264	0.368	0.104	7.29	0.487	5.45	1.338	0.089	C_4 POLY GASO.	5.98	12.16	2.034	1.5
C_5H_{12} 72.146				0.145	0.023	1.66	0.059	0.059	0.082	0.023	1.66	0.111	5.25	0.316	0.021	C_4H_{10}	4.86	4.65	0.957	68.0
C_6H_{12} 84.156				0.190	0.031	2.61	0.078	0.078	0.109	0.031	2.61	0.174	5.54	0.471	0.031	C_4-FREE GASO.			9.449	5.8
C_3-C_6											50.41	3.366		10.566	0.704	C_4 POLY TAR	7.53	1.74	0.231	
TOTAL		40.906	534.22		16.169	359.33	40.882	81.788	63.759											
H_2+CO	96.470	39.461	14976 SCFH	8.266			20.899	60.360	29.165	-31.195							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.59	Factor 667735	4.49			4.49	2.17	4.49	1.27						10 # RVP 400 EP GASOLINE	12.466	0.8324	4513	
Weight Recovery, % 92.07			Catalyst Age, hrs.		Space Velocity, vhv 1224		RECOVERED OIL **			0.355	49.84	3.328		7.874	0.526	GAS OIL	0.598	0.0399	216	
Pressure, psig 401			Inlet Velocity, Ft/sec 1.00		Catalyst Vol CF 12.24		TOTAL OIL				100.25	6.694		18.440	1.230	FUEL OIL	0.803	0.0536	291	
Temperature, °F 662			Bed Depth, Ft 18.55		Weight, # 1860		WATER SOLUBLE CHEMICALS **			0.302	16.03	1.070		2.043	0.136	POLY TAR	0.337	0.0225	122	
Recycle Ratio 1.00			Bed Density, #/C.F 152		Effluent $\frac{(H_2)(CO_2)}{(H_2O)(CO)}$ = Shift Ratio		TOTAL LIQUID PRODUCTS C_5+ **				116.28	7.764		20.483	1.366	TOTAL	14.204	0.9484	5142	
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY			NET WATER **		6.051	109.02	7.280		13.088	0.874	W. S. CHEM.	2.043	0.1364	740	
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+			GROSS WATER			125.05	8.350		15.131	1.010	TOTAL	16.247	1.0848	5882	
60.47	90.13	72.08	79.05	72.13	42.26	51.68	74.27			HYDROCARBON TOTAL—C_1+			156.56	10.454						

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2 + CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-L
HOURS 231-238

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA					
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE			
Oxygen	435	Fresh Feed	15524	°API	54.6	11.1	In Reactor at Start of Period		Screen Analysis			Sedimentation
Natural Gas	431	Recycle	15515	Neut. No.	49.4	36.7	Fresh Catalyst Added		Mesh	Microns	%	Microns %
Generator Outlet	406	Combined Feed	31039	Sap. No.	66.2	40.3	Total		On 40	419+		80+
Reactor Inlet	401	Wet Gas—Measured	5413	Hydrox. No.			Catalyst Recovered	2	100	150		40—80
Condenser Inlet		Adjusted	6136	Bromine No.	96		In Reactor at End of Period		150	105		20—40
Product Accumulator	374	Loss	723	Pour °F.					200	74		10—20
				Chemicals, % by K_2CO_3		13.5	REACTOR d-p, Inches H_2O		250	62		0—20
							No. Height		325	44		
TEMPERATURES—°F.		Recycle/Fresh Feed	1.00				0 See Per. A		<325			
Oxygen	508	Inlet Velocity—ft./sec.	1.00				1	73	CATALYST			
Natural Gas	773	Fresh Feed Rate—S.C.F.H.	14976	HEMPEL DIST. %		°API	2	78	Bulk Density, Lbs./Cu.Ft.			
Generator	2441	per Cu. Ft. Dense Bed	1224	205 °F.			3	80	Aerated			
Quench Accumulator	158	per Lb. Catalyst	8.05	400	81.8	55.5	4	282	Settled			
Reactor Inlet	255	per sq ft	22691	400-550	8.3	36.8	Total	513	Compacted			
Condenser Inlet	583			550+	9.9				Particle Density, gm./cc.			
Product Accumulator	65						CALCULATED FROM dp		NH_3 Value, ml./gm.			
Catalyst No. Height				A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	152	N_2 Surface, m^2/gm.			
1 See Per. A	--			Naphtha °F.			Inventory, Lbs.	1860				
2	661			IBP	104		Bed Depth, Ft.	18.55	CHEMICAL ANALYSIS			
3	653			10%	130		Vol cu ft	12.24	Fe			
4	663			50%	214				C			
5	664			90%	353				O			
6	668			EP	404				H			
7	665			Rec	97				K_2O, W+. % basis Fe			
8	655								X-Ray Analysis—			
9	650								$Fe_{20}C_9$			
10	653								Fe_3O_4			
11	656								Fe			

RUN NO. 66-M
HOURS 238-248
CATALYST Brownsville Treated MS Red. @ 660F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

FRESH FEED				WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED								
	%	m/hr	#/hr	%	At Wt. Balance m/hr	#/hr	m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE #/MCF	#/gal	gal/hr	gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*				
CO 28.010	36.025	13.788	386.22	9.085	1.248	34.96	3.720	17.508	4.968	-12.540	-351.26						CORRECTED HEMPEL. %	gal/hr	TREATING RECOVERY,%	gal/hr
H_2 2.016	61.185	23.419	47.21	41.785	5.738	11.57	17.110	40.529	22.848	-17.681	-35.64					400 EP	82.7	6.582	98.0	6.450
CO_2 44.010	2.135	0.817	35.96	28.505	3.915	172.29	11.673	12.490	15.588	3.098	136.33	9.655				400-550	8.0	0.637	91.4	0.582
N_2 28.016	0.560	0.214	6.00	1.335	0.183	5.13	0.547	0.761	0.730							550 +	9.3	0.740	114.6	0.848
CH_4 16.042	0.095	0.036	0.58	8.990	1.235	19.81	3.681	3.717	4.916	1.199	19.23	1.362								
C_2H_4 28.052				2.325	0.319	8.95	0.952	0.952	1.271	0.319	8.95	0.634					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.730	0.238	7.16	0.708	0.708	0.946	0.238	7.16	0.507				PROPYLENE	39.3	6.60		
C_1+C_2											35.34	2.503				C_3 POLY GASO.	87.5	5.77	0.965	
C_3H_6 42.078				2.905	0.399	16.79	1.190	1.190	1.589	0.399	16.79	1.189	4.32	3.387	0.275	C_3 POLY TAR	12.5	0.83	0.110	
C_3H_8 44.094				0.360	0.049	2.16	0.147	0.147	0.196	0.049	2.16	0.153	4.24	0.509	0.036					
C_4H_8 56.104				1.595	0.219	12.29	0.653	0.653	0.872	0.219	12.29	0.870	5.00	2.458	0.174		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.425	0.058	3.37	0.174	0.174	0.232	0.058	3.37	0.239	4.86	0.693	0.049	C_4H_8	5.00	1.06	0.212	68.0
C_5H_{10} 70.130				0.625	0.086	6.03	0.256	0.256	0.342	0.086	6.03	0.427	5.45	1.106	0.078	C_4 POLY GASO.	5.98	9.83	1.643	1.5
C_5H_{12} 72.146				0.160	0.022	1.59	0.066	0.066	0.088	0.022	1.59	0.113	5.25	0.303	0.021	C_4H_{10}	4.86	3.37	0.693	68.0
C_6H_{12} 84.156				0.175	0.024	2.02	0.072	0.072	0.096	0.024	2.02	0.143	5.54	0.365	0.026	C_4-FREE GASO.			9.189	5.8
C_3-C_6											44.25	3.134		9.321	0.659	C_4 POLY TAR	7.53	1.40	0.186	
TOTAL		38.274	475.97		13.733	304.12	40.949	79.223	61.183											
H_2+CO	97.210	37.207	14120 SCFH		6.986		20.830	58.037	47.816	-30.221							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.70	Factor 708215		4.60		4.60	2.31	4.60	1.41						10 # RVP 400 EP GASOLINE	11.737	0.8312	4506	
Weight Recovery, % 95.09			Catalyst Age, hrs.			Space Velocity, vhv 1138			RECOVERED OIL **	0.360	50.54	3.579		7.959	0.564	GAS OIL	0.582	0.0412	223	
Pressure, psig 403			Inlet Velocity, Ft/sec 0.96			Catalyst Vol CF 12.41			TOTAL OIL		94.79	6.713		17.280	1.223	FUEL OIL	0.848	0.0601	326	
Temperature, °F 656			Bed Depth, Ft 18.80			Weight, # 1849			WATER SOLUBLE CHEMICALS **	0.304	16.15	1.144		2.055	0.146	POLY TAR	0.296	0.0210	114	
Recycle Ratio 1.07			Bed Density, #/CF 149			Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =			TOTAL LIQUID PRODUCTS C_5+ **		110.94	7.857		19.335	1.369	TOTAL	13.463	0.9535	5169	
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY		NET WATER	5.837	105.16	7.448		12.624	0.894	W. S. CHEM.	2.055	0.1455	789	
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+		GROSS WATER		121.31	8.592		14.679	1.040	TOTAL	15.518	1.0990	5958	
64.12	90.95	75.50	81.22	71.62	43.63	52.07	75.84		HYDROCARBON TOTAL—C_1+		146.28	10.360								

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-M
HOURS 238-248

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA					
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE			
Oxygen	425	Fresh Feed	14525	°API	54.0	11.1	In Reactor at Start of Period		Screen Analysis			Sedimentation
Natural Gas	420	Recycle	15540	Neut. No.	48.3	37.0	Fresh Catalyst Added		Mesh	Microns	%	Microns %
Generator Outlet	406	Combined Feed	30065	Sap. No.	66.1	40.8	Total		On 40	419+		80+
Reactor Inlet	403	Wet Gas—Measured	4811	Hydrox. No.			Catalyst Recovered		100	150		40—80
Condenser Inlet		Adjusted	5212	Bromine No.	96		In Reactor at End of Period		150	105		20—40
Product Accumulator	375	Loss	401	Pour °F.					200	74		10—20
				Chemicals, % by K_2CO_3		14.0	REACTOR d-p, Inches H_2O		250	62		0—20
							No. Height		325	44		
TEMPERATURES—°F.		Recycle/Fresh Feed	1.07				0 See Per. A		<325			
Oxygen	473	Inlet Velocity—ft./sec.	0.96				1	70	CATALYST			
Natural Gas	776	Fresh Feed Rate—S.C.F.H.	14120	HEMPEL. DIST. %		°API	2	77	Bulk Density, Lbs./Cu.Ft.			
Generator	2502	per Cu. Ft. Dense Bed	1138	205 °F.			3	78	Aerated			
Quench Accumulator	140	per Lb. Catalyst	7.64	400	81.7	54.7	4	285	Settled			
Reactor Inlet	296	per sq ft	21394	400-550	8.0	37.0	Total	510	Compacted			
Condenser Inlet	563			550+	10.3				Particle Density, gm./cc.			
Product Accumulator	67						CALCULATED FROM dp		NH_3 Value, ml./gm.			
Catalyst No. Height				A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	149	N_2 Surface, m^2/gm.			
1 See Per. A	--			Naphtha °F.			Inventory, Lbs.	1849				
2	658			IBP	104		Bed Depth, Ft.	18.80	CHEMICAL ANALYSIS			
3	647			10%	130		Vol cu ft	12.41	Fe			
4	657			50%	214				C			
5	658			90%	353				O			
6	661			EP	404				H			
7	657			Rec.	97				K_2O, W+, % basis Fe			
8	641								X-Ray Analysis—			
9	637								$Fe_{20}C_9$			
10	638								Fe_3O_4			
11	615								Fe			

RUN NO. 66-N
HOURS 248-272
CATALYST Brownsville Treated MS Red. @ 660F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS At Wt. Balance m/hr	WET GAS At Wt. Balance #/hr	RECYCLE m/hr	COMBINED FEED m/hr	EFFLUENT m/hr	NET CHANGE m/hr	NET CHANGE #/hr	YIELD BASIS H_2+CO FED CONDENSATE #/MCF	#/gal	gal/hr	gal/MCF
CO 28.010	36.820	14.459	405.00	8.517	1.208	33.84	3.433	17.892	4.641	-13.251	-371.16				
H_2 2.016	60.497	23.757	47.89	40.760	5.780	11.65	16.430	40.187	22.210	-17.977	-36.24				
CO_2 44.010	2.213	0.869	38.24	29.333	4.160	183.06	11.824	12.693	15.984	3.291	144.82	9.986			
N_2 28.016	0.353	0.139	3.89	1.313	0.186	5.21	0.529	0.668	0.715						
CH_4 16.042	0.117	0.046	0.74	9.406	1.334	21.40	3.791	3.837	5.125	1.288	20.66	1.425			
C_2H_4 28.052				2.397	0.340	9.54	0.966	0.966	1.306	0.340	9.54	0.658			
C_2H_6 30.068				1.930	0.274	8.24	0.778	0.778	1.052	0.274	8.24	0.568			
C_1+C_2											38.44	2.651			
C_3H_6 42.078				2.997	0.425	17.88	1.208	1.208	1.633	0.425	17.88	1.233	4.32	4.139	0.285
C_3H_8 44.094				0.393	0.056	2.47	0.158	0.158	0.214	0.056	2.47	0.170	4.24	0.583	0.040
C_4H_8 56.104				1.587	0.225	12.62	0.640	0.640	0.865	0.225	12.62	0.870	5.00	2.524	0.174
C_4H_{10} 58.120				0.420	0.060	3.49	0.169	0.169	0.229	0.060	3.49	0.241	4.86	0.718	0.049
C_5H_{10} 70.130				0.637	0.090	6.31	0.257	0.257	0.347	0.090	6.31	0.435	5.45	1.158	0.079
C_5H_{12} 72.146				0.100	0.014	1.01	0.040	0.040	0.054	0.014	1.01	0.070	5.25	0.192	0.013
C_6H_{12} 84.156				0.210	0.030	2.52	0.085	0.085	0.115	0.030	2.52	0.174	5.84	0.455	0.031
C_3-C_6											46.30	3.193		9.769	0.671
TOTAL		39.270	495.76		14.182	319.24	40.308	79.578	61.297						
H_2+CO	97.317	38.216	14503 SCFH		6.988		19.863	58.079	26.851	-31.228					
H_2/CO		1.64	Factor 689512		4.79		4.79	2.25	4.79	1.36					
									** RECOVERED OIL	0.356	49.96	3.445		7.915	0.546
									TOTAL OIL		96.26	6.638		17.684	1.217
									WATER SOLUBLE CHEMICALS **	0.295	15.65	1.079		1.989	0.137
									TOTAL LIQUID PRODUCTS C_5+		111.91	7.717		19.673	1.354
									NET WATER **	6.156	110.91	7.647		13.314	0.918
									GROSS WATER		126.56	8.726		15.303	1.055
									HYDROCARBON TOTAL—C_1+		150.35	10.367			

Weight Recovery, % 94.13 | Catalyst Age, hrs. | Space Velocity, vhv 1171
Pressure, psig 404 | Inlet Velocity, Ft/sec 0.97 | Catalyst Vol CF 12.38
Temperature, °F 665 | Bed Depth, Ft 18.76 | Weight, # 1820
Recycle Ratio 1.03 | Bed Density, #/CF 147 | Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+
63.89	91.65	75.67	81.71	74.06	44.73	53.77	74.43

YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY, %	gal/hr
400 EP	81.0	6.411	98.0	6.283
400-550	9.1	0.720	91.4	0.658
550 +	9.9	0.784	114.6	0.898

	RECOVERY %	#/hr	gal/hr
PROPYLENE	39.0	6.97	
C_3 POLY GASO.	87.5	6.10	1.020
C_3 POLY TAR	12.5	0.87	0.116

	#/gal	#/hr	gal/hr	RVP
C_4H_8	5.00	0.96	0.192	68.0
C_4 POLY GASO.	5.98	10.20	1.706	1.5
C_4H_{10}	4.86	3.49	0.718	68.0
C_4 FREE GASO.			9.108	5.8
C_4 POLY TAR	7.53	1.46	0.194	

	gal/hr	gal/MCF	Bbl/Day
10 # RVP 400 EP GASOLINE	11.724	0.8084	4383
GAS OIL	0.658	0.0454	246
FUEL OIL	0.898	0.0619	336
POLY TAR	0.310	0.0214	116
TOTAL	13.590	0.9371	5081
W. S. CHEM.	1.989	0.1371	743
TOTAL	15.579	1.0742	5824

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF

*9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

RUN NO. 66-N
HOURS 248-272

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

OPERATING CONDITIONS			
PRESSURES PSIG		RATES S.C.F.H.	
Oxygen	428	Fresh Feed	14903
Natural Gas	425	Recycle	15297
Generator Outlet	407	Combined Feed	30200
Reactor Inlet	404	Wet Gas—Measured	4891
Condenser Inlet		Adjusted	5382
Product Accumulator	375	Loss	491
TEMPERATURES—°F.		Recycle/Fresh Feed	1.03
Oxygen	487	Inlet Velocity—ft./sec.	0.97
Natural Gas	768	Fresh Feed Rate—S.C.F.H.	14503
Generator	2406	per Cu. Ft. Dense Bed	1171
Quench Accumulator	141	per Lb. Catalyst	7.97
Reactor Inlet	271	per sq ft	21974
Condenser Inlet	560		
Product Accumulator	66		
Catalyst No. Height			
1 See Per. A	--		
2	664		
3	658		
4	667		
5	666		
6	668		
7	664		
8	648		
9	643		
10	647		
11	624		

PRODUCT TESTS	OIL	WATER
	OIL	WATER
°API	55.1	11.0
Neut. No.	46.5	35.2
Sap. No.	62.9	39.7
Hydrox. No.		
Bromine No.	80	
Pour °F.		
Chemicals, % by K_2CO_3		13.0
HEMPEL, DIST. %		°API
205 °F.		
400	80.0	53.6
400-550	9.1	36.0
550+	10.9	
A. S. T. M. DIST. ON		
Naphtha °F.		
IBP	100	
10%	137	
50%	210	
90%	344	
EP	373	
Rec	96	

CATALYST DATA		
INVENTORY DATA		
In Reactor at Start of Period		
Fresh Catalyst Added		
Total		
Catalyst Recovered	12	
In Reactor at End of Period		
REACTOR d-p, Inches H_2O		
No. Height		
0 See Per. A		
1	69	
2	75	
3	78	
4	280	
Total	502	
CALCULATED FROM dp		
Density, Lbs./Cu.Ft.	147	
Inventory, Lbs.	1820	
Bed Depth, Ft.	18.76	
Vol cu ft	12.38	

PARTICLE SIZE					
	Screen Analysis			Sedimentation	
	Mesh	Microns	%	Microns	%
	On 40	419+		80+	
	100	150		40—80	
	150	105		20—40	
	200	74		10—20	
	250	62		0—20	
	325	44			
	<325				

CATALYST	
Bulk Density, Lbs./Cu.Ft.	
Aerated	
Settled	
Compacted	
Particle Density, gm./cc.	
NH_3 Value, ml./gm.	
N_2 Surface, m^2/gm.	
CHEMICAL ANALYSIS	
Fe	
C	
O	
H	
K_2O, W+, % basis Fe	
X-Ray Analysis—	
$Fe_{20}C_9$	
Fe_3O_4	
Fe	

RUN NO. 66-0
HOURS 272-296
CATALYST

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		CONDENSATE				YIELD BASIS H_2+CO FED				
	%	m/hr	#/hr	%	At Wt. Balance m/hr	At Wt. Balance #/hr	m/hr	m/hr	m/hr	m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY,%	gal/hr
CO 28.010	36.647	14.131	395.82	8.100	1.151	32.24	3.285	17.416	4.436	-12.980	-363.58									
H_2 2.016	60.367	23.279	46.93	41.160	5.851	11.80	16.693	39.972	22.544	-17.428	-35.13					400 EP	81.6	6.089	98.0	5.967
CO_2 44.010	2.113	0.815	35.87	28.720	4.083	179.66	11.648	12.463	15.731	3.268	143.79	10.128				400-550	9.0	0.672	91.4	0.614
N_2 28.014	0.750	0.289	8.10	1.963	0.279	7.82	0.796	1.085	1.075							550 +	9.4	0.702	114.6	0.804
CH_4 16.042	0.123	0.047	0.75	9.370	1.332	21.37	3.800	3.847	5.132	1.285	20.62	1.452								
C_2H_6 28.052				2.343	0.333	9.34	0.950	0.950	1.283	0.333	9.34	0.658					RECOVERY %	#/hr	gal/hr	
C_3H_8 30.068				2.003	0.285	8.57	0.812	0.812	1.097	0.285	8.57	0.604				PROPYLENE	38.1	6.45		
C_1+C_2											38.53	2.714				C_3 POLY GASO.	87.5	5.64	0.943	
C_2H_4 42.079				2.830	0.402	16.92	1.148	1.148	1.550	0.402	16.92	1.192	4.32	3.917	0.276	C_3 POLY TAR	12.5	0.81	0.108	
C_3H_8 44.094				0.307	0.044	1.94	0.125	0.125	0.169	0.044	1.94	0.137	4.24	0.458	0.032					
C_4H_8 56.104				1.637	0.233	13.07	0.664	0.664	0.897	0.233	13.07	0.921	5.00	2.614	0.184		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.560	0.080	4.65	0.227	0.227	0.307	0.080	4.65	0.328	4.86	0.957	0.067	C_4H_8	5.00	--	--	68.0
C_5H_{10} 70.130				0.657	0.093	6.52	0.266	0.266	0.359	0.093	6.52	0.459	5.45	1.196	0.084	C_4 POLY GASO.	5.98	11.44	1.912	1.5
C_6H_{12} 72.146				0.170	0.024	1.73	0.069	0.069	0.093	0.024	1.73	0.122	3.25	0.330	0.023	C_4H_{10}	4.86	(4.65) 4.47	(0.9571) 0.920	68.0
C_6H_{12} 84.156				0.180	0.026	2.19	0.073	0.073	0.099	0.026	2.19	0.154	5.54	0.395	0.028	C_4 FREE GASO.			8.831	5.8
C_3-C_6											47.02	3.313		9.867	0.694	C_4 POLY TAR	7.53	1.63	0.216	
TOTAL		38.561	487.47		14.216	317.82	40.556	79.117	61.353											
H_2+CO	97.014	37.410	14197 SCFH		7.002		19.978	57.388	26.980	-30.408							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.65	Factor 704374		5.08		5.08	2.30	5.08	1.34						10 # RVP 400 EP GASOLINE	11.663	0.8215	4454	
GAS OIL												0.336	47.19	3.324		7.463	0.526	0.614	0.0432	234
FUEL OIL												6.637		17.330	1.220					
POLY TAR												0.284	15.07	1.061		1.926	0.136	0.804	0.0566	307
TOTAL													94.21	6.637		17.330	1.220	0.324	0.0228	124
W.S. CHEM.													109.28	7.698		19.256	1.356	13.405	0.9441	5119
TOTAL												5.961	107.39	7.564		12.892	0.908	1.926	0.1358	736
													122.46	8.625		14.818	1.044	15.331	1.0799	5855
													147.81	10.412						

Weight Recovery, % 93.32 | Catalyst Age, hrs. | Space Velocity, vhv 1124
Pressure, psig 403 | Inlet Velocity, Ft/sec 0.96 | Catalyst Vol CF 12.63
Temperature, °F 660 | Bed Depth, Ft 19.13 | Weight, # 1793
Recycle Ratio 1.05 | Bed Density, #/CF 142 | Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =

FRESH FEED CONVERSION — %: Contraction 63.13 | CO 91.85 | H_2 74.87 | H_2+CO 81.28
TOTAL FEED CONVERSION — %: CO 74.53 | H_2 43.60 | $CO+H_2$ 52.99
SELECTIVITY: C_3+/C_1+ 73.93

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

RUN NO. 66-0
HOURS 272-296

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA						
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE				
Oxygen	428	Fresh Feed	14634	° API	54.8	11.1	In Reactor at Start of Period		Screen Analysis			Sedimentation	
Natural Gas	427	Recycle	15391	Neut. No.	48.4	36.2	Fresh Catalyst Added		Mesh	Microns	%	Microns	%
Generator Outlet	407	Combined Feed	30025	Sap. No.	63.0	39.6	Total		On 40	419+		80+	
Reactor Inlet	403	Wet Gas—Measured	4842	Hydrox. No.			Catalyst Recovered		100	150		40—80	
Condenser Inlet		Adjusted	5395	Bromine No.	93		In Reactor at End of Period	5	150	105		20—40	
Product Accumulator	375	Loss	553	Pour °F.					200	74		10—20	
				Chemicals, % by K_2CO_3		13.0	REACTOR d-p, Inches H_2O		250	62		0—20	
							No. Height		325	44			
TEMPERATURES—°F.		Recycle/Fresh Feed	1.05				0 See Per. A		<325				
Oxygen	783	Inlet Velocity—ft./sec.	0.96				1	69	CATALYST				
Natural Gas	465	Fresh Feed Rate—S.C.F.H.	14197	HEMPEL, DIST. %		°API	2	74	Bulk Density, Lbs./Cu.Ft.				
Generator	2501	per Cu. Ft. Dense Bed	1124	205 °F.			3	72	Aerated				
Quench Accumulator	142	per Lb. Catalyst	7.92	400	80.6	53.6	4	280	Settled				
Reactor Inlet	286	per sq ft	21511	400-550	9.0	35.8	Total	495	Compacted				
Condenser Inlet	569			550+	10.4				Particle Density, gm./cc.				
Product Accumulator	70						CALCULATED FROM dp		NH_3 Value, ml./gm.				
Catalyst No. Height				A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	142	N_2 Surface, m^2/gm.				
1 See Per. A	--			Naphtha °F.			Inventory, Lbs.	1793					
2	660			IBP	100		Bed Depth, Ft.	19.13	CHEMICAL ANALYSIS				
3	654			10%	129		Vol cu ft	12.63	Fe				
4	664			50%	213				C				
5	663			90%	348				O				
6	660			EP	392				H				
7	660			Rec	96.5				K_2O, W+, % basis Fe				
8	645								X-Ray Analysis—				
9	640								$Fe_{20}C_9$				
10	643								Fe_3O_4				
11	632								Fe				

RUN NO. 66-P
HOURS 296-320
CATALYST

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED								
	%	m/hr	#/hr	%	At Wt. Balance m/hr	At Wt. Balance #/hr	m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE #/MCF	CONDENSATE #/gal	CONDENSATE gal/hr	CONDENSATE gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY,%	gal/hr
CO 28.010	35.927	13.690	383.45	8.395	1.155	32.35	3.397	17.087	4.552	-12.535	-351.10									
H_2 2.016	60.887	23.201	46.77	40.865	5.623	11.34	16.536	39.737	22.159	-17.578	-35.43					400 EP	82.0	5.999	98.0	5.879
CO_2 44.010	2.223	0.847	37.28	28.830	3.967	174.61	11.666	12.513	15.633	3.120	137.33	9.809				400-550	8.6	0.629	91.4	0.575
N_2 28.016	0.850	0.324	9.08	2.095	0.288	8.07	0.848	1.172	1.136							550 +	9.4	0.688	114.6	0.788
CH_4 16.042	0.113	0.043	0.69	9.075	1.249	20.04	3.672	3.715	4.921	1.206	19.35	1.382								
C_2H_4 28.052				2.365	0.325	9.12	0.957	0.957	1.282	0.325	9.12	0.651					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.780	0.245	7.37	0.720	0.720	0.965	0.245	7.37	0.526				PROPYLENE	39.0	6.48		
C_1+C_2											35.84	2.559				C_3 POLY GASO.	87.5	5.67	0.948	
C_3H_6 42.078				2.870	0.395	16.62	1.161	1.161	1.556	0.395	16.62	1.187	4.32	3.847	0.275	C_3 POLY TAR	12.5	0.81	0.108	
C_3H_8 44.094				0.290	0.040	1.76	0.117	0.117	0.157	0.040	1.76	0.126	4.24	0.415	0.030					
C_4H_8 56.104				1.775	0.244	13.69	0.718	0.718	0.962	0.244	13.69	0.978	5.00	2.738	0.196		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.510	0.070	4.07	0.206	0.206	0.276	0.070	4.07	0.291	4.86	0.837	0.060	C_4H_8	5.00	0.47	0.094	68.0
C_5H_{10} 70.130				0.755	0.104	7.29	0.305	0.305	0.409	0.104	7.29	0.521	5.45	1.338	0.096	C_4 POLY GASO.	5.98	11.57	1.934	1.5
C_5H_{12} 72.146				0.185	0.025	1.80	0.075	0.075	0.100	0.025	1.80	0.129	5.25	0.343	0.024	C_4H_{10}	4.86	4.07	0.837	68.0
C_6H_{12} 84.156				0.210	0.029	2.44	0.085	0.085	0.114	0.029	2.44	0.174	5.54	0.440	0.031	C_4-FREE GASO.			8.948	5.8
C_3-C_6											47.67	3.406		9.958	0.712	C_4 POLY TAR	7.53	1.65	0.219	
TOTAL		38.105	477.27		13.759	310.57	40.463	78.568	60.656											
H_2+CO	96.814	36.891	14000 SCFH		6.778		19.933	56.824	26.731	-30.113								gal/hr	gal/MCF	Bbl/Day
H_2/CO		1.69	Factor 714285		4.87		4.87	2.33	4.87	1.40						10 # RVP 400 EP GASOLINE	11.813	0.8438	4575	
Weight Recovery, % 94.56			Catalyst Age, hrs.			Space Velocity, vhv 1115			RECOVERED OIL **	0.332	46.61	3.329		7.316	0.523	GAS OIL	0.575	0.0411	223	
Pressure, psig 403			Inlet Velocity, Ft/sec 0.95			Catalyst Vol CF 12.56			TOTAL OIL		94.28	6.735		17.274	1.235	FUEL OIL	0.788	0.0563	305	
Temperature, °F 662			Bed Depth, Ft 19.03			Weight, # 1771			WATER SOLUBLE CHEMICALS **	0.290	15.39	1.099		1.962	0.140	POLY TAR	0.327	0.0234	126	
Recycle Ratio 1.06			Bed Density, #/CF 141			Effluent $\frac{(H_2)(CO_2)}{(H_2O)(CO)}$ = Shift Ratio			TOTAL LIQUID PRODUCTS C_5+		109.67	7.834		19.236	1.375	TOTAL	13.503	0.9646	5229	
FRESH FEED CONVERSION — %					TOTAL FEED CONVERSION — %			SELECTIVITY	NET WATER **	5.812	104.70	7.479		12.569	0.898	W. S. CHEM.	1.962	0.1401	760	
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+		GROSS WATER		120.09	8.578		14.531	1.038	TOTAL	15.465	1.0047	5989	
63.89	91.56	75.76	81.63	73.36	44.24	52.99	75.37		HYDROCARBON TOTAL—C_1+		145.51	10.393								

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-P
HOURS 296-320

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA					
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE			
Oxygen	428	Fresh Feed	14461	°API	53.4	11.1	In Reactor at Start of Period		Screen Analysis			Sedimentation
Natural Gas	428	Recycle	15356	Neut. No.	46.8	36.4	Fresh Catalyst Added		Mesh	Microns	%	Microns %
Generator Outlet	407	Combined Feed	29817	Sap. No.	63.8	39.6	Total		On 40	419+		80+
Reactor Inlet	403	Wet Gas—Measured	4785	Hydrox. No.			Catalyst Recovered	13	100	150		40—80
Condenser Inlet		Adjusted	5221	Bromine No.	91		In Reactor at End of Period		150	105		20—40
Product Accumulator	375	Loss	436	Pour °F.					200	74		10—20
				Chemicals, % by K_2CO_3		13.5	REACTOR d-p, Inches H_2O		250	62		0—20
							No. Height		325	44		
TEMPERATURES—°F.		Recycle/Fresh Feed	1.06				0 See Per. A		<325			
Oxygen	479	Inlet Velocity—ft./sec.	0.95				1	68	CATALYST			
Natural Gas	793	Fresh Feed Rate—S.C.F.H.	14000	HEMPEL, DIST. %		°API	2	74	Bulk Density, Lbs./Cu.Ft.			
Generator	2473	per Cu. Ft. Dense Bed	1115	205 °F.			3	72	Aerated			
Quench Accumulator	141	per Lb. Catalyst	7.91	400	81.0	53.0	4	275	Settled			
Reactor Inlet	292	per sq ft	21212	400-550	8.6	35.1	Total	489	Compacted			
Condenser Inlet	575			550+	10.4				Particle Density, gm./cc.			
Product Accumulator	69						CALCULATED FROM dp		NH_3 Value, ml./gm.			
Catalyst No. Height				A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	141	N_2 Surface, m^2/gm.			
1 See Per. A	--			Naphtha °F.			Inventory, Lbs.	1771				
2	661			IBP	100		Bed Depth, Ft.	19.03	CHEMICAL ANALYSIS			
3	654			10%	123		Vol cu ft	12.56	Fe			
4	664			50%	200				C			
5	664			90%	333				O			
6	668			EP	379				H			
7	662			Rec	96				K_2O, W+, % basis Fe			
8	648								X-Ray Analysis—			
9	644								$Fe_{20}C_9$			
10	650								Fe_3O_4			
11	651								Fe			

RUN NO. 66-Q
HOURS 320-344
CATALYST Brownsville Treated MS Red. @ 660F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED								
					At Wt. Balance							CONDENSATE								
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	m/hr	m/hr	m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*				
CO 28.010	37.153	13.914	389.74	9.110	1.308	36.64	3.669	17.583	4.977	12.606	353.10						CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY,%	gal/hr
H_2 2.016	59.287	22.204	44.76	40.610	5.829	11.75	16.353	38.557	22.182	16.375	33.01					400 EP	80.7	5.696	98.0	5.582
CO_2 44.010	2.510	0.940	41.37	29.283	4.203	184.98	11.792	12.732	15.995	3.263	143.61	10.477				400-550	10.0	0.706	91.4	0.645
N_2 28.016	0.923	0.346	9.69	2.220	0.319	8.94	0.894	1.240	1.215							550 +	9.3	0.656	114.6	0.752
CH_4 16.042	0.127	0.048	0.77	8.716	1.251	20.07	3.510	3.558	4.761	1.203	19.30	1.486								
C_2H_4 28.052				2.270	0.326	9.15	0.914	0.914	1.240	0.326	9.15	0.668					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.837	0.264	7.94	0.740	0.740	1.004	0.264	7.94	0.579				PROPYLENE	36.5	6.39		
C_1+C_2											36.39	2.655				C_3 POLY GASO.	87.5	5.59	0.935	
C_3H_6 42.078				2.897	0.416	17.50	1.167	1.167	1.583	0.416	17.50	1.277	4.32	4.051	0.296	C_3 POLY TAR	12.5	0.080	0.106	
C_3H_8 44.094				0.300	0.043	1.90	0.121	0.121	0.164	0.043	1.90	0.139	4.24	0.448	0.033					
C_4H_8 56.104				1.487	0.213	11.95	0.599	0.599	0.812	0.213	11.95	0.872	5.00	2.390	0.174		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.497	0.071	4.13	0.200	0.200	0.271	0.071	4.13	0.301	4.86	0.850	0.062	C_4H_8	5.00	--	--	68.0
C_5H_{10} 70.130				0.510	0.073	5.12	0.205	0.205	0.278	0.073	5.12	0.374	5.45	0.939	0.069	C_4 POLY GASO.	5.98	10.46	1.749	1.5
C_5H_{12} 72.146				0.140	0.020	1.44	0.056	0.056	0.076	0.020	1.44	0.105	5.25	0.274	0.020	C_4H_{10}	4.86	(4.13) 4.06	(0.850) 0.836	68.0
C_6H_{12} 84.156				0.123	0.018	1.51	0.050	0.050	0.068	0.018	1.51	0.110	5.54	0.273	0.020	C_4 FREE GASO.			8.003	5.8
C_3-C_6											43.55	3.177		9.225	0.674	C_4 POLY TAR	7.58	1.49	0.198	
TOTAL		37.452	486.33		14.354	323.02	40.269	77.721	60.979											
H_2+CO	96.440	36.118	13707 SCFH	7.137			20.022	56.140	27.159	28.981							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.60	Factor 729554	4.46			4.46	2.19	4.46	1.30						10 # RVP 400 EP GASOLINE	10.588	0.7725	4188	
Weight Recovery, % 93.64			Catalyst Age, hrs.			Space Velocity, vhv 1091			RECOVERED OIL **	0.318	44.64	3.257		7.058	0.515	GAS OIL	0.645	0.0471	255	
Pressure, psig 403			Inlet Velocity, Ft/sec 0.94			Catalyst Vol CF 12.56			TOTAL OIL		88.19	6.434		16.283	1.189	FUEL OIL	0.752	0.0549	298	
Temperature, °F 662			Bed Depth, Ft 19.03			Weight, # 1746			WATER SOLUBLE CHEMICALS ***	0.283	14.99	1.094		1.866	0.136	POLY TAR	0.304	0.0222	120	
Recycle Ratio 1.08			Bed Density, #/CF 139			Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =			TOTAL LIQUID PRODUCTS C_5+		103.18	7.528		18.149	1.325	TOTAL	12.289	0.8967	4861	
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY		NET WATER **	5.755	103.69	7.565		12.484	0.911	W.S. CHEM.	1.866	0.1361	738	
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+		GROSS WATER		118.68	8.658		14.350	1.047	TOTAL	14.155	1.0328	5599	
61.67	90.60	73.75	80.24	71.69	42.47	51.62	73.93		HYDROCARBON TOTAL—C_1+		139.57	10.183								

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2 + CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-Q
HOURS 320-344

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA						
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE				
Oxygen	428	Fresh Feed	14213	°API	54.8	11.0	In Reactor at Start of Period		Screen Analysis			Sedimentation	
Natural Gas	429	Recycle	15282	Neut. No.	48.2	37.6	Fresh Catalyst Added		Mesh	Microns	%	Microns	%
Generator Outlet	407	Combined Feed	29495	Sap. No.	64.5	40.6	Total		On 40	419+		80+	
Reactor Inlet	403	Wet Gas—Measured	4926	Hydrox. No.			Catalyst Recovered		100	150		40—80	
Condenser Inlet		Adjusted	5447	Bromine No.	98		In Reactor at End of Period		150	105		20—40	
Product Accumulator	375	Loss	521	Pour °F.	Below -30				200	74		10—20	
				Chemicals, % by K_2CO_3		13.0	REACTOR d-p, Inches H_2O		250	62		0—20	
							No. Height		325	44			
TEMPERATURES—°F.		Recycle/Fresh Feed	1.08				0 See Per. A		<325				
Oxygen	490	Inlet Velocity—ft./sec.	0.94				1	67	CATALYST				
Natural Gas	802	Fresh Feed Rate—S.C.F.H.	13707	HEMPEL, DIST. %		°API	2	73	Bulk Density, Lbs./Cu.Ft.				
Generator	2478	per Cu.Ft. Dense Bed	1091	205 °F.			3	70	Aerated				
Quench Accumulator	143	per Lb. Catalyst	7.85	400	79.7	53.9	4	272	Settled				
Reactor Inlet	292	per sq ft	20768	400-550	10.0	37.1	Total	482	Compacted				
Condenser Inlet	580			550+	10.3				Particle Density, gm./cc.				
Product Accumulator	68						CALCULATED FROM dp		NH_3 Value, ml./gm.				
Catalyst No. Height				A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	139	N_2 Surface, m^2/gm.				
1 See Per. A	--			Naphtha °F.			Inventory, Lbs.	1746					
2	662			IBP	100		Bed Depth, Ft.	19.03	CHEMICAL ANALYSIS				
3	655			10%	124		Vol cu ft	12.56	Fe				
4	664			50%	208				C				
5	664			90%	339				O				
6	667			EP	373				H				
7	663			Rec	96.5				K_2O, W+, % basis Fe				
8	649								X-Ray Analysis—				
9	646								$Fe_{20}C_9$				
10	655								Fe_3O_4				
11	652								Fe				

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 66-R
HOURS 344-368
CATALYST Brownsville Treated MS Rec. @ 660°F

FRESH FEED	%	m/hr	#/hr	WET GAS	At Wt. Balance m/hr	At Wt. Balance #/hr	RECYCLE m/hr	COMBINED FEED m/hr	EFFLUENT m/hr	NET CHANGE m/hr	NET CHANGE #/hr
CO 28.010	36.427	13.634	381.89	9.003	1.310	36.69	3.680	17.314	4.990	-12.324	-345.20
H_2 2.016	60.086	22.489	45.34	41.787	6.080	12.26	17.080	39.569	23.160	-16.409	-33.08
CO_2 44.010	2.250	0.842	37.06	27.963	4.070	179.11	11.430	12.272	15.500	3.228	142.05
N_2 28.014	1.137	0.426	11.93	2.793	0.406	11.37	1.142	1.568	1.548		
CH_4 16.042	0.100	0.037	0.59	8.417	1.225	19.65	3.440	3.477	4.665	1.188	19.06
C_2H_6 28.052				2.223	0.323	9.06	0.909	0.909	1.232	0.323	9.06
C_3H_8 30.068				1.737	0.253	7.61	0.710	0.710	0.963	0.253	7.61
C_1+C_2											35.73
C_3H_6 42.078				2.767	0.403	16.96	1.131	1.131	1.534	0.403	16.96
C_3H_8 44.094				0.300	0.044	1.94	0.123	0.123	0.167	0.044	1.94
C_4H_8 56.104				1.570	0.228	12.79	0.642	0.642	0.870	0.228	12.79
C_4H_{10} 58.120				0.490	0.071	4.13	0.200	0.200	0.271	0.071	4.13
C_5H_{10} 70.130				0.613	0.089	6.24	0.251	0.251	0.340	0.089	6.24
C_5H_{12} 72.146				0.160	0.023	1.66	0.065	0.065	0.088	0.023	1.66
C_6H_{12} 84.156				0.177	0.026	2.19	0.072	0.072	0.098	0.026	2.19
C_3-C_6											45.91
TOTAL		37.428	476.81		14.551	321.66	40.875	78.303	61.381		
H_2+CO	96.513	36.123	13709 SCFH		7.390		20.760	56.883	28.150	-28.733	
H_2/CO		1.65	Factor 729447		4.64		4.64	2.29	4.64	1.33	

YIELD BASIS H_2+CO FED — CONDENSATE #/MCF	#/gal	gal/hr	gal/MCF
10.362			
1.390			
0.661			
0.555			
2.606			
1.237	4.32	3.926	0.286
0.142	4.24	0.458	0.033
0.933	5.00	2.558	0.187
0.301	4.86	0.850	0.062
0.455	5.48	1.145	0.084
0.121	5.25	0.316	0.023
0.160	5.54	0.395	0.029
3.349		9.648	0.704
0.306	42.93	3.132	
	88.84	6.481	
0.298	15.81	1.153	
	104.65	7.634	
5.351	96.41	7.033	
	112.22	8.186	
	140.38	10.240	

YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY,%	gal/hr
400 EP	80.5	5.480	98.0	5.370
400-550	8.0	0.545	91.4	0.498
550 +	11.5	0.783	114.6	0.897

	RECOVERY %	#/hr	gal/hr
PROPYLENE	36.2	6.14	
C_3 POLY GASO.	87.5	5.33	0.898
C_3 POLY TAR	12.5	0.77	0.102

	#/gal	#/hr	gal/hr	RVP
C_4H_8	5.00	0.06	0.012	68.0
C_4 POLY GASO.	5.98	11.14	1.863	1.5
C_4H_{10}	4.86	4.13	0.850	68.0
C_4 FREE GASO.			8.124	5.8
C_4 POLY TAR	7.53	1.59	0.211	

	gal/hr	gal/MCF	Bbl/Day
10 # RVP 400 EP GASOLINE	10.849	0.7914	4291
GAS OIL	0.498	0.0363	197
FUEL OIL	0.897	0.0654	355
POLY TAR	0.313	0.0228	124
TOTAL	12.557	0.9159	4967
W. S. CHEM.	1.995	0.1455	789
TOTAL	14.552	1.0614	5756

Weight Recovery, %	93.75	Catalyst Age, hrs.		Space Velocity, vhv	1111	RECOVERED OIL **	0.306	42.93
Pressure, psig	401	Inlet Velocity, Ft/sec	0.95	Catalyst Vol CF	12.34	TOTAL OIL		88.84
Temperature, °F	659	Bed Depth, Ft	18.69	Weight, #	1715	WATER SOLUBLE CHEMICALS **	0.298	15.81
Recycle Ratio	1.09	Bed Density, #/CF	139	Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =		TOTAL LIQUID PRODUCTS C_3+		104.65
						NET WATER **	5.351	96.41
						GROSS WATER		112.22
						HYDROCARBON TOTAL—C_1+		140.38

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	CO+H_2	C_3 + /C_1 +
61.12	90.39	72.96	79.54	71.18	41.47	50.51	74.55

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2 + CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-R
HOURS 344-368

OPERATING CONDITIONS		RATES S.C.F.H.	
PRESSURES PSIG			
Oxygen	427	Fresh Feed	14204
Natural Gas	430	Recycle	15512
Generator Outlet	406	Combined Feed	29716
Reactor Inlet	401	Wet Gas—Measured	5011
Condenser Inlet		Adjusted	5522
Product Accumulator	375	Loss	511
TEMPERATURES—°F.		Recycle/Fresh Feed	1.09
Oxygen	479	Inlet Velocity—ft./sec.	0.95
Natural Gas	797	Fresh Feed Rate—S.C.F.H.	13709
Generator	2489	per Cu. Ft. Dense Bed	1111
Quench Accumulator	140	per Lb. Catalyst	7.99
Reactor Inlet	290	per sq ft	20771
Condenser Inlet	572		
Product Accumulator	65		
Catalyst No. Height			
1 See Per. A	--		
2	658		
3	651		
4	661		
5	661		
6	665		
7	660		
8	648		
9	645		
10	654		
11	642		

PRODUCT TESTS	OIL	WATER
°API	55.3	11.0
Neut. No.	49.2	37.8
Sap. No.	66.9	41.5
Hydrox. No.		
Bromine No.	98	
Pour °F.		
Chemicals, % by K_2CO_3		14.7
HEMPEL, DIST. %		°API
205 °F.		
400	79.5	55.6
400-550	8.0	36.0
550+	12.5	
A. S. T. M. DIST. ON		
Naphtha °F.		
IBP	100	
10%	124	
50%	200	
90%	330	
EP	374	
Rec	96	

CATALYST DATA — INVENTORY DATA	
In Reactor at Start of Period	
Fresh Catalyst Added	
Total	
Catalyst Recovered	21
In Reactor at End of Period	
REACTOR d-p, Inches H_2O	
No. Height	
0 See Per. A	
1	66
2	72
3	73
4	262
Total	473
CALCULATED FROM dp	
Density, Lbs./Cu.Ft.	139
Inventory, Lbs.	1715
Bed Depth, Ft.	18.69
Vol cu ft	12.34

PARTICLE SIZE — Screen Analysis			Sedimentation	
Mesh	Microns	%	Microns	%
On 40	419+		80+	
100	150		40—80	
150	105		20—40	
200	74		10—20	
250	62		0—20	
325	44			
<325				

CATALYST	
Bulk Density, Lbs./Cu.Ft.	
Aerated	
Settled	
Compacted	
Particle Density, gm./cc.	
NH_3 Value, ml./gm.	
N_2 Surface, m^2/gm.	
CHEMICAL ANALYSIS	
Fe	
C	
O	
H	
K_2O, W+. % basis Fe	
X-Ray Analysis—	
$Fe_{20}C_9$	
Fe_3O_4	
Fe	

RUN NO. 66-S
HOURS 368-392
CATALYST Brownsville Treated MS Red. @ 660F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

FRESH FEED				WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED								
	%	m/hr	#/hr	%	At Wt. Balance m/hr	#/hr	m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE #/MCF	#/gal	gal/hr	gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY,%	gal/hr
CO 28.010	38.387	13.988	391.80	10.410	1.534	42.97	4.153	18.141	5.687	-12.454	-348.83									
H_2 2.016	57.843	21.078	42.49	39.390	5.802	11.70	15.715	36.793	21.517	-15.276	-30.79					400 EP	80.9	5.090	98.0	4.988
CO_2 44.010	2.420	0.882	38.82	28.890	4.256	187.31	11.526	12.408	15.782	3.374	148.49	11.158				400-550	8.1	0.510	91.4	0.499
N_2 28.016	1.200	0.437	12.24	2.700	0.398	11.15	1.077	1.514	1.475							550 +	11.0	0.692	114.6	0.793
CH_4 16.042	0.150	0.055	0.88	8.367	1.233	19.78	3.338	3.283	4.571	1.178	18.90	1.420								
C_2H_6 28.052				2.327	0.343	9.62	0.928	0.928	1.271	0.343	9.62	0.723					RECOVERY %	#/hr	gal/hr	
C_3H_6 30.068				1.820	0.268	8.06	0.726	0.726	0.994	0.268	8.06	0.606				PROPYLENE	33.0	5.900		
C_1+C_2											36.58	2.749				C_3 POLY GASO.	87.5	5.163	0.863	
C_3H_8 42.078				2.887	0.425	17.88	1.152	1.152	1.577	0.425	17.88	1.344	4.32	4.139	0.311	C_3 POLY TAR	12.5	0.737	0.098	
C_4H_8 44.094				0.323	0.048	2.12	0.129	0.129	0.177	0.048	2.12	0.159	4.24	0.500	0.038					
C_4H_8 56.104				1.563	0.230	12.90	0.624	0.624	0.854	0.230	12.90	0.969	5.00	2.580	0.194		#/gal	#/hr	gal/hr	RVP
C_5H_{10} 58.120				0.460	0.068	3.95	0.184	0.184	0.252	0.068	3.95	0.297	4.86	0.813	0.061	C_4H_8	5.00	0.05	0.010	68.0
C_5H_{10} 70.130				0.573	0.084	5.89	0.229	0.229	0.313	0.084	5.89	0.443	5.45	1.081	0.081	C_4 POLY GASO.	5.98	11.24	1.880	1.5
C_6H_{12} 72.146				0.140	0.021	1.52	0.056	0.056	0.077	0.021	1.52	0.114	5.25	0.290	0.022	C_4H_{10}	4.86	3.95	0.813	68.0
C_6H_{12} 84.156				0.150	0.022	1.85	0.060	0.060	0.082	0.022	1.85	0.139	5.54	0.334	0.025	C_4-FREE GASO.			7.556	5.8
C_5-C_6											46.11	3.465		9.737	0.732	C_4 POLY TAR	7.53	1.61	0.214	
TOTAL	38.410	36.440	486.24		14.732	336.68	39.897	76.337	60.422											
H_2+CO		35.066	13308 SCFH	7.336			19.868	54.934	27.204	-27.730							gal/hr	gal/MCF	Bbl/Day	
H_2/CO		1.51	Factor 751427	3.78			3.78	2.03	3.78	1.23						10 # RVP 400 EP GASOLINE	10.259	0.7709	4180	
Weight Recovery, % 92.74			Catalyst Age, hrs.			Space Velocity, vhv 1104		RECOVERED OIL **		0.285	39.94	3.001		6.292	0.472	GAS OIL	0.499	0.0375	203	
Pressure, psig 401			Inlet Velocity, Ft/sec 0.93			Catalyst Vol CF 12.05		TOTAL OIL			86.05	6.466		16.029	1.204	FUEL OIL	0.793	0.0596	323	
Temperature, °F 658			Bed Depth, Ft 18.25			Weight, # 1639		WATER SOLUBLE CHEMICALS **		0.295	15.70	1.180		1.990	0.150	POLY TAR	0.312	0.0234	127	
Recycle Ratio 1.09			Bed Density, #/CF 136			Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =		TOTAL LIQUID PRODUCTS C_3+			101.75	7.646		18.019	1.354	TOTAL	11.863	0.8914	4833	
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY	NET WATER **		5.213	93.92	7.057		11.275	0.847	W. S CHEM.	1.990	0.1495	811	
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+	GROSS WATER			109.62	8.237		13.265	0.997	TOTAL	13.853	1.0409	5644	
59.57	89.03	72.47	79.08	68.65	41.52	50.48	73.56	HYDROCARBON TOTAL—C_1+			138.33	10.394								

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-S
HOURS 368-392

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA					
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE			
Oxygen	427	Fresh Feed	13829	° API	54.1	11.1	In Reactor at Start of Period		Screen Analysis			Sedimentation
Natural Gas	426	Recycle	15141	Neut. No.	50.7	38.2	Fresh Catalyst Added		Mesh	Microns	%	Microns %
Generator Outlet	406	Combined Feed	28970	Sap. No.	67.4	41.2	Total		On 40	419+		80+
Reactor Inlet	401	Wet Gas—Measured	5005	Hydrox. No.			Catalyst Recovered	16	100	150		40—80
Condenser Inlet		Adjusted	5591	Bromine No.	100		In Reactor at End of Period		150	105		20—40
Product Accumulator	375	Loss	586	Pour °F.					200	74		10—20
				Chemicals, % by K_2CO_3		15.0	REACTOR d-p, Inches H_2O		250	62		0—20
							No. Height		325	44		
TEMPERATURES—°F.		Recycle/Fresh Feed	1.09				0 See Per. A		<325			
Oxygen	496	Inlet Velocity—ft./sec.	0.93				1	64	CATALYST			
Natural Gas	793	Fresh Feed Rate—S.C.F.H.	13308	HEMPEL, DIST. %			2	73	Bulk Density, Lbs./Cu.Ft.			
Generator	2463	per Cu.Ft. Dense Bed	1104	205 °F.			3	69	Aerated			
Quench Accumulator	139	per Lb. Catalyst	8.12	400	79.9	54.0	4	245	Settled			
Reactor Inlet	300	per sq ft	20164	400-550	8.1	34.5	Total	451	Compacted			
Condenser Inlet	572			550+	12.0				Particle Density, gm./cc.			
Product Accumulator	67						CALCULATED FROM dp		NH_3 Value, ml./gm.			
Catalyst No. Height				A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	136	N_2 Surface, m^2/gm.			
1 See Per. A	--			Naphtha °F.			Inventory, Lbs.	1639				
2	657			IBP	101		Bed Depth, Ft.	18.25	CHEMICAL ANALYSIS			
3	651			10%	121		Vol cu ft	12.05	Fe			
4	660			50%	196				C			
5	660			90%	324				O			
6	663			EP	378				H			
7	659			Rec	97				K_2O, W+, % basis Fe			
8	643								X-Ray Analysis—			
9	647								$Fe_{20}C_9$			
10	656								Fe_3O_4			
11	639								Fe			

RUN NO. 66-T
HOURS 392-416
CATALYST Brownsville Treated MS Red. @ 660F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED			
					At Wt. Balance							CONDENSATE			
	%	m/hr	#/hr	%	m/hr	#/hr	m/hr	m/hr	m/hr	m/hr	#/hr	#/MCF	#/gal	gal/hr.	gal/MCF
CO 28.010	36.713	14.280	399.97	9.840	1.525	42.72	3.952	18.232	5.477	-12.755	-357.25				
H_2 2.016	60.457	23.515	47.41	43.015	6.669	13.44	17.278	40.793	23.947	-16.846	-33.97				
CO_2 44.010	2.173	0.845	37.19	27.860	4.319	190.11	11.191	12.036	15.510	3.474	152.92	10.662			
N_2 28.016	0.547	0.213	5.97	1.420	0.220	6.16	0.570	0.785	0.790						
CH_4 16.042	0.110	0.043	0.69	7.810	1.211	19.43	3.137	3.180	4.348	1.168	18.74	1.307			
C_2H_4 28.052				2.090	0.324	9.09	0.839	0.839	1.163	0.324	9.09	0.634			
C_2H_6 30.068				1.520	0.236	7.10	0.611	0.611	0.847	0.236	7.10	0.495			
C_1+C_2											34.93	2.436			
C_3H_4 42.078				2.765	0.429	18.05	1.111	1.111	1.540	0.429	18.05	1.258	4.32	4.178	0.291
C_3H_8 44.094				0.295	0.046	2.03	0.118	0.118	0.164	0.046	2.03	0.142	4.24	0.479	0.033
C_4H_8 56.104				1.795	0.278	15.60	0.721	0.721	0.999	0.278	15.60	1.088	5.00	3.120	0.218
C_4H_{10} 58.120				0.465	0.072	4.18	0.187	0.187	0.259	0.072	4.18	0.291	4.86	0.860	0.060
C_5H_{10} 70.130				0.765	0.119	8.35	0.307	0.307	0.426	0.119	8.35	0.582	5.45	1.532	0.107
C_5H_{12} 72.146				0.145	0.022	1.59	0.058	0.058	0.080	0.022	1.59	0.111	5.25	0.303	0.021
C_6H_{12} 84.156				0.215	0.033	2.78	0.086	0.086	0.119	0.033	2.78	0.194	5.54	0.502	0.035
C_3-C_4											52.58	3.666		10.974	0.765
TOTAL		38.896	491.23		15.503	340.63	40.166	79.062	61.464						
H_2+CO	97.170	37.795	14343 SCFH		8.194		21.230	59.025	29.424	-29.601					
H_2/CO		1.65	Factor 697204		4.37		4.37	2.24	4.37	1.32					

Weight Recovery, %	95.45	Catalyst Age, hrs.		Space Velocity, vhv	1203	RECOVERED OIL **	0.295	41.40	2.886		6.484	0.452
Pressure, psig	396	Inlet Velocity, Ft/sec	0.98	Catalyst	Vol CF 11.92	TOTAL OIL		93.98	6.552		17.458	1.217
Temperature, °F	662	Bed Depth, Ft	18.06	Weight, #	1621	WATER SOLUBLE CHEMICALS **	0.288	15.30	1.067		1.942	0.135
Recycle Ratio	1.03	Bed Density, #/C.F	136	Effluent $\frac{(H_2)(CO_2)}{(H_2O)(CO)}$ = Shift Ratio		TOTAL LIQUID PRODUCTS C_3+		109.28	7.619		19.400	1.352
						NET WATER **	5.212	93.90	6.547		11.272	0.786
						GROSS WATER		109.20	7.614		13.214	0.921
						HYDROCARBON TOTAL—C_1+		144.21	10.055			

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+
60.14	89.32	71.64	78.32	69.96	41.30	50.15	75.78

YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL. %	gal/hr.	TREATING RECOVERY.%	gal/hr
400 EP	80.8	5.239	98.0	5.134
400-550	8.8	0.571	91.4	0.522
550 +	10.4	0.674	114.6	0.772

	RECOVERY %	#/hr	gal/hr
PROPYLENE	35.0	6.318	
C_3 POLY GASO.	87.5	5.528	0.924
C_3 POLY TAR	12.5	0.790	0.105

	#/gal	#/hr	gal/hr	RVP
C_4H_8	5.00	0.37	0.074	68.0
C_4 POLY GASO.	5.98	13.33	2.228	1.5
C_4H_{10}	4.86	4.18	0.860	68.0
C_4-FREE GASO.			8.395	5.8
C_4 POLY TAR	7.53	1.90	0.252	

	gal/hr	gal/MCF	Bbl/Day
10 # RVP 400 EP GASOLINE	11.557	0.8058	4369
GAS OIL	0.522	0.0364	197
FUEL OIL	0.772	0.0538	292
POLY TAR	0.357	0.0249	135
TOTAL	13.208	0.9209	4993
W. S. CHEM.	1.942	0.1354	734
TOTAL	15.150	1.0563	5727

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2 + CO, Bbl/Day = 5421.6 × gal/MCF

RUN NO. 66-T
HOURS 392-416

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

OPERATING CONDITIONS			
PRESSURES PSIG		RATES S.C.F.H.	
Oxygen	423	Fresh Feed	14761
Natural Gas	425	Recycle	15243
Generator Outlet	401	Combined Feed	30004
Reactor Inlet	396	Wet Gas—Measured	5498
Condenser Inlet		Adjusted	5884
Product Accumulator	371	Loss	386
		Chemicals, % by K_2CO_3	14.7
TEMPERATURES—°F.		Recycle/Fresh Feed	1.03
Oxygen	498	Inlet Velocity—ft./sec.	0.98
Natural Gas	795	Fresh Feed Rate—S.C.F.H.	14343
Generator	2468	per Cu. Ft. Dense Bed	1203
Quench Accumulator	141	per Lb. Catalyst	8.85
Reactor Inlet	291	per sq ft	21732
Condenser Inlet	585		
Product Accumulator	69		
Catalyst No. Height			
1 See Per. A	--		
2	660		
3	654		
4	664		
5	664		
6	668		
7	663		
8	647		
9	653		
10	664		
11	648		

PRODUCT TESTS	OIL	WATER
°API	53.0	11.1
Neut. No.	48.8	38.3
Sap. No.	66.8	41.2
Hydrox. No.		
Bromine No.	99	
Pour °F.		
HEMPEL, DIST. %		°API
205 °F.		
400	79.8	53.0
400-550	8.8	33.7
550+	11.4	
A. S. T. M. DIST. ON		
Naphtha °F.		
IBP	100	
10%	123	
50%	201	
90%	335	
EP	380	
Red	96.5	

CATALYST DATA		
INVENTORY DATA		
In Reactor at Start of Period		
Fresh Catalyst Added		
Total		
Catalyst Recovered	44	
In Reactor at End of Period		
REACTOR d-p, Inches H_2O		
No. Height		
0 See Per. A		
1	64	
2	73	
3	69	
4	240	
Total	446	
CALCULATED FROM dp		
Density, Lbs./Cu.Ft.	136	
Inventory, Lbs.	1621	
Bed Depth, Ft.	18.06	
Vol cu ft	11.92	

PARTICLE SIZE					
	Screen Analysis			Sedimentation	
	Mesh	Microns	%	Microns	%
	On 40	419+		80+	
	100	150		40—80	
	150	105		20—40	
	200	74		10—20	
	250	62		0—20	
	325	44			
	<325				

CATALYST	
Bulk Density, Lbs./Cu.Ft.	
Aerated	
Settled	
Compacted	
Particle Density, gm./cc.	
NH_3 Value, ml./gm.	
N_2 Surface, m^2/gm.	
CHEMICAL ANALYSIS	
Fe	
C	
O	
H	
K_2O, W+, % basis Fe	
X-Ray Analysis—	
$Fe_{20}C_9$	
Fe_3O_4	
Fe	

RUN NO. 66-U
HOURS 416-440
CATALYST

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED								
	%	m/hr	#/hr	%	At Wt. Balance m/hr	At Wt. Balance #/hr	m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE #/MCF	CONDENSATE #/gal	CONDENSATE gal/hr	CONDENSATE gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL. %	gal/hr	TREATING RECOVERY.%	gal/hr
CO 28.010	36.690	14.885	416.94	11.017	1.957	54.82	4.575	19.460	6.532	-12.928	-362.12									
H_2 2.016	60.413	24.509	49.41	45.680	8.113	16.35	18.971	43.480	27.084	-16.396	33.06					400 EP	80.2	4.726	98.0	4.631
CO_2 44.010	2.170	0.880	38.73	25.787	4.579	201.51	10.709	11.589	15.288	3.699	162.78	10.888				400-550	7.9	0.465	91.4	0.425
N_2 28.016	0.647	0.262	7.34	1.893	0.336	9.41	0.786	1.048	1.122							550 +	11.9	0.701	114.6	0.803
CH_4 16.042	0.080	0.033	0.53	7.320	1.300	20.85	3.040	3.073	4.340	1.267	20.32	1.359								
C_2H_4 28.052				1.840	0.327	9.17	0.764	0.764	1.091	0.327	9.17	0.613					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.390	0.247	7.43	0.577	0.577	0.824	0.247	7.43	0.497				PROPYLENE	32.2	5.38		
C_1+C_2											36.92	2.469				C_3 POLY GASO.	87.5	4.71	0.788	
C_3H_6 42.078				2.233	0.397	16.70	0.927	0.927	1.324	0.397	16.70	1.117	4.32	3.866	0.259	C_3 POLY TAR	12.5	0.67	0.089	
C_3H_8 44.094				0.260	0.046	2.03	0.108	0.108	0.154	0.046	2.03	0.136	4.24	0.479	0.032					
C_4H_8 56.104				1.317	0.234	13.13	0.547	0.547	0.781	0.234	13.13	0.878	5.00	2.626	0.176		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.370	0.066	3.84	0.154	0.154	0.220	0.066	3.84	0.257	4.86	0.790	0.053	C_4H_8	5.00	0.18	0.036	68.0
C_5H_{10} 70.130				0.573	0.102	7.15	0.238	0.238	0.340	0.102	7.15	0.478	5.45	1.312	0.088	C_4 POLY GASO.	5.98	11.33	1.895	1.5
C_5H_{12} 72.146				0.130	0.023	1.66	0.054	0.054	0.077	0.023	1.66	0.111	5.25	0.316	0.021	C_4H_{10}	4.86	3.84	0.790	68.0
C_6H_{12} 84.156				0.190	0.034	2.86	0.079	0.079	0.113	0.034	2.86	0.191	5.54	0.516	0.035	C_4-FREE GASO.			7.563	5.8
C_3-C_6											47.37	3.168		9.905	0.664	C_4 POLY TAR	7.53	1.62	0.215	
TOTAL		40.569	512.95		17.761	366.91	41.529	82.098	65.018											
H_2+CO	97.103	39.394	14950 SCFH		10.070		23.546	62.940	33.616	-29.324								gal/hr	gal/MCF	Bbl/Day
H_2/CO		1.65	Factor 668896		4.15		4.15	2.23	4.15	1.27						10 # RVP 400 EP GASOLINE	10.284	0.6879	3730	

Weight Recovery, % 93.24	Catalyst Age, hrs.	Space Velocity, vhv 1276	RECOVERED OIL **	0.270	37.83	2.530		5.892	0.394	GAS OIL	0.425	0.0284	154	
Pressure, psig 395	Inlet Velocity, Ft/sec 1.02	Catalyst Vol CF 11.72	TOTAL OIL		85.20	5.698		15.797	1.058	FUEL OIL	0.803	0.0537	291	
Temperature, °F 664	Bed Depth, Ft 17.75	Weight, # 1547	WATER SOLUBLE CHEMICALS **	0.282	14.96	1.001		1.899	0.127	POLY TAR	0.304	0.0203	110	
Recycle Ratio 1.02	Bed Density, #/CF 132	Effluent $(H_2)(CO_2)$ / Shift Ratio $(H_2O)(CO)$ =	TOTAL LIQUID PRODUCTS C_3+		100.16	6.699		17.696	1.185	TOTAL	11.816	0.7903	4285	
			NET WATER **	5.176	93.25	6.237		11.195	0.749	W. S. CHEM.	1.899	0.1270	689	
			GROSS WATER		108.21	7.238		13.094	0.876	TOTAL	13.715	0.9173	4974	
			HYDROCARBON TOTAL—C_1+		137.08	9.168								

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+
56.22	86.85	66.90	74.44	66.43	37.71	46.59	73.07

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-U
HOURS 416-440

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA			
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE	
Oxygen	423	Fresh Feed	15396	°API	52.0	11.1	In Reactor at Start of Period		Screen Analysis	Sedimentation
Natural Gas	434	Recycle	15760	Neut. No.	48.4	38.5	Fresh Catalyst Added		Mesh / Microns / %	Microns / %
Generator Outlet	400	Combined Feed	31156	Sap. No.	66.7	41.3	Total		On 40 / 419+	80+
Reactor Inlet	395	Wet Gas—Measured	6104	Hydrox. No.			Catalyst Recovered	42	100 / 150	40—80
Condenser Inlet		Adjusted	6741	Bromine No.	99		In Reactor at End of Period		150 / 105	20—40
Product Accumulator	370	Loss	637	Pour °F.					200 / 74	10—20
				Chemicals, % by K_2CO_3		14.5	REACTOR d-p, Inches H_2O		250 / 62	0—20
							No. Height		325 / 44	
TEMPERATURES—°F.		Recycle/Fresh Feed	1.02				0 See Per. A		<325	
Oxygen	494	Inlet Velocity—ft./sec.	1.02				1	63	CATALYST	
Natural Gas	800	Fresh Feed Rate—S.C.F.H.	14950	HEMPEL. DIST. %		°API	2	70	Bulk Density, Lbs./Cu.Ft.	
Generator	2473	per Cu. Ft. Dense Bed	1276	205 °F.			3	67	Aerated	
Quench Accumulator	145	per Lb. Catalyst	9.66	400	79.2	53.9	4	225	Settled	
Reactor Inlet	272	per sq ft	22652	400-550	7.9	36.6	Total	425	Compacted	
Condenser Inlet	589			550+	12.9				Particle Density, gm./cc.	
Product Accumulator	70						CALCULATED FROM dp		NH_3 Value, ml./gm.	
Catalyst No. Height				A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	132	N_2 Surface, m^2/gm.	
1 See Per.A	--			Naphtha °F.			Inventory, Lbs.	1547		
2	661			IBP	108		Bed Depth, Ft.	17.75	CHEMICAL ANALYSIS	
3	654			10%	140		Vol cu ft	11.72	Fe	
4	664			50%	225				C	
5	666			90%	345				O	
6	670			EP	401				H	
7	666			Rec	96.5				K_2O, W+. % basis Fe	
8	649								X-Ray Analysis—	
9	656								$Fe_{20}C_9$	
10	668								Fe_3O_4	
11	652								Fe	

RUN NO. 66-V
HOURS 440-464
CATALYST Brownsville Treated MS Red. @ 660F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED			WET GAS			RECYCLE	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H_2+CO FED							
	%	m/hr	#/hr	%	At Wt. Balance m/hr	At Wt. Balance #/hr	m/hr	m/hr	m/hr	m/hr	#/hr	CONDENSATE #/MCF	CONDENSATE #/gal	CONDENSATE gal/hr	CONDENSATE gal/MCF	YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL, %	gal/hr	TREATING RECOVERY,%	gal/hr
CO 28.010	35.910	14.598	408.87	11.270	1.990	55.74	4.708	19.306	6.698	-12.608	-353.13								
H_2 2.016	60.763	24.700	49.80	46.127	8.145	16.42	19.271	43.971	27.416	-16.555	-33.38					400 EP	82.4	5.067	98.0	4.966
CO_2 44.010	2.253	0.916	40.31	25.437	4.490	197.57	10.627	11.543	15.117	3.574	157.26	10.544				400-550	7.0	0.430	91.4	0.393
N_2 28.016	0.957	0.389	10.90	2.020	0.357	10.00	0.844	1.233	1.201							550 +	10.6	0.652	114.6	0.747
CH_4 16.042	0.117	0.048	0.77	7.080	1.250	20.05	2.958	3.006	4.208	1.202	19.28	1.293								
C_2H_4 28.052				1.717	0.303	8.50	0.717	0.717	1.020	0.303	8.50	0.570					RECOVERY %	#/hr	gal/hr	
C_2H_6 30.068				1.283	0.227	6.83	0.536	0.536	0.763	0.227	6.83	0.458				PROPYLENE	32.4	5.22		
C_1+C_2											34.61	2.321				C_3 POLY GASO.	87.5	4.57	0.764	
C_3H_6 42.078				2.167	0.383	16.12	0.905	0.905	1.288	0.383	16.12	1.081	4.32	3.731	0.250	C_3 POLY TAR	12.5	0.65	0.086	
C_3H_8 44.094				0.233	0.041	1.81	0.097	0.097	0.138	0.041	1.81	0.121	4.24	0.427	0.029					
C_4H_8 56.104				1.177	0.208	11.67	0.492	0.492	0.700	0.208	11.67	0.782	5.00	2.334	0.156		#/gal	#/hr	gal/hr	RVP
C_4H_{10} 58.120				0.473	0.084	4.88	0.198	0.198	0.282	0.084	4.88	0.327	4.86	1.004	0.067	C_4H_8	5.00	--	--	68.0
C_5H_{10} 70.130				0.573	0.101	7.08	0.239	0.239	0.340	0.101	7.08	0.475	5.45	1.299	0.087	C_4 POLY GASO.	5.98	10.21	1.708	1.5
C_6H_{12} 72.146				0.253	0.045	3.25	0.106	0.106	0.151	0.045	3.25	0.218	5.25	0.619	0.042	C_4H_{10}	4.86	(4.88) 4.09	(1.004) 0.841	68.0
C_6H_{12} 84.156				0.190	0.034	2.86	0.079	0.079	0.113	0.034	2.86	0.192	5.54	0.516	0.035	C_4-FREE GASO.			8.164	5.8
C_3-C_6											47.67	3.196		9.930	0.666	C_4 POLY TAR	7.53	1.46	0.194	
TOTAL		40.651	510.65		17.658	362.78	41.779	82.430	65.162											
H_2+CO	96.673	39.298	14914 SCFH		10.135		23.979	63.277	34.114	-29.163								gal/hr	gal/MCF	Bbl/Day
H_2/CO		1.69	Factor 670510		4.09		4.09	2.28	4.09	1.31						10 # RVP 400 EP GASOLINE	10.713	0.7183	3894	
Weight Recovery, %	95.05	Catalyst Age, hrs.		Space Velocity, vhv	1348	RECOVERED OIL **				0.282	39.56	2.653		6.149	0.412	GAS OIL	0.393	0.0264	143	
Pressure, psig	396	Inlet Velocity, Ft/sec	1.02	Catalyst	VolCF 11.06	TOTAL OIL					87.23	5.949		16.079	1.078	FUEL OIL	0.747	0.0501	272	
Temperature, °F	662	Bed Depth, Ft	16.76	Weight, #	1460	WATER SOLUBLE CHEMICALS **				0.292	15.51	1.040		1.966	0.132	POLY TAR	0.280	0.0188	102	
Recycle Ratio	1.03	Bed Density, #/CF	132	Effluent $\frac{(H_2)(CO_2)}{(H_2O)(CO)}$ = Shift Ratio		TOTAL LIQUID PRODUCTS C_3+					102.74	6.889		18.045	1.210	TOTAL	12.133	0.8136	4411	
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY		NET WATER **	5.151	92.80	6.222		11.140	0.747	W. S. CHEM.	1.966	0.1318	715	
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+		GROSS WATER		108.31	7.262		13.106	0.879	TOTAL	14.099	0.9454	5126	
56.56	86.31	67.02	74.21	65.31	37.65	46.09	74.80		HYDROCARBON TOTAL—C_1+		137.35	9.210								

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-V
HOURS 440-464

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA			
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA		PARTICLE SIZE	
Oxygen	424	Fresh Feed	15427	° API	51.6	11.1	In Reactor at Start of Period		Screen Analysis	Sedimentation
Natural Gas	435	Recycle	15855	Neut. No.	48.4	38.7	Fresh Catalyst Added		Mesh / Microns / %	Microns / %
Generator Outlet	400	Combined Feed	31282	Sap. No.	66.9	42.2	Total		On 40 / 419+	80+
Reactor Inlet	396	Wet Gas—Measured	6234	Hydrox. No.			Catalyst Recovered	65	100 / 150	40—80
Condenser Inlet		Adjusted	6701	Bromine No.	94		In Reactor at End of Period		150 / 105	20—40
Product Accumulator	371	Loss	467	Pour °F.	Below -30				200 / 74	10—20
				Chemicals, % by K_2CO_3		15.0	REACTOR d-p, Inches H_2O		250 / 62	0—20
							No. Height		325 / 44	
TEMPERATURES—°F.		Recycle/Fresh Feed	1.03				0 See Per. A		<325	
Oxygen	486	Inlet Velocity—ft./sec.	1.02				1	63	CATALYST	
Natural Gas	799	Fresh Feed Rate—S.C.F.H.	14914	HEMPEL. DIST. %		°API	2	70	Bulk Density, Lbs./Cu.Ft.	
Generator	2491	per Cu. Ft. Dense Bed	1348	205 °F.			3	67	Aerated	
Quench Accumulator	150	per Lb. Catalyst	10.22	400	81.4	50.8	4	200	Settled	
Reactor Inlet	259	per sq ft	22597	400-550	7.0	36.5	Total	400	Compacted	
Condenser Inlet	590			550+	11.6				Particle Density, gm. cc.	
Product Accumulator	73						CALCULATED FROM dp		NH_3 Value, ml./gm.	
Catalyst No. Height				A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	132	N_2 Surface, m^2/gm.	
1 See Per. A	--			Naphtha °F.			Inventory, Lbs.	1460		
2	659			IBP	103		Bed Depth, Ft.	16.76	CHEMICAL ANALYSIS	
3	652			10%	138		Vol cu ft	11.06	Fe	
4	662			50%	220				C	
5	664			90%	358				O	
6	669			EP	400				H	
7	663			Rec	97.5				K_2O, W+, % basis Fe	
8	645								X-Ray Analysis—	
9	654								$Fe_{20}C_9$	
10	664								Fe_3O_4	
11	648								Fe	

RUN NO. 66-W
HOURS 464-477
CATALYST Brownsville Treated MB Red. @ 660F

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

	FRESH FEED %	FRESH FEED m/hr	FRESH FEED #/hr	WET GAS %	WET GAS At Wt. Balance m/hr	WET GAS At Wt. Balance #/hr	RECYCLE m/hr	COMBINED FEED m/hr	EFFLUENT m/hr	NET CHANGE m/hr	NET CHANGE #/hr	YIELD BASIS H_2+CO FED — CONDENSATE #/MCF	#/gal	gal/hr	gal/MCF
CO 28.010	36.260	14.807	414.75	11.640	2.178	61.01	4.911	19.718	7.089	-12.629	-353.74				
H_2 2.016	60.485	24.699	49.79	46.950	8.786	17.71	19.808	44.507	28.594	-15.913	-32.08				
CO_2 44.010	2.320	0.947	41.68	24.850	4.650	204.65	10.484	11.431	15.134	3.703	162.97	10.870			
N_2 28.016	0.795	0.325	9.11	1.900	0.356	9.97	0.802	1.127	1.158						
CH_4 16.042	0.140	0.057	0.91	6.955	1.301	20.87	2.934	2.991	4.235	1.244	19.96	1.331			
C_2H_4 28.052				1.785	0.334	9.37	0.753	0.753	1.087	0.334	9.37	0.625			
C_2H_6 30.068				1.250	0.234	7.04	0.527	0.527	0.761	0.234	7.04	0.470			
C_1+C_2											36.37	2.426			
C_3H_6 42.078				2.100	0.393	16.54	0.886	0.886	1.279	0.393	16.54	1.103	4.32	3.829	0.255
C_3H_8 44.094				0.235	0.044	1.94	0.099	0.099	0.143	0.044	1.94	0.129	4.24	0.458	0.031
C_4H_8 56.104				1.205	0.225	12.62	0.508	0.508	0.733	0.225	12.62	0.842	5.00	2.524	0.168
C_4H_{10} 58.120				0.330	0.062	3.60	0.139	0.139	0.201	0.062	3.60	0.240	4.86	0.741	0.049
C_5H_{10} 70.130				0.530	0.099	6.94	0.224	0.224	0.323	0.099	6.94	0.463	5.48	1.273	0.085
C_5H_{12} 72.146				0.115	0.022	1.59	0.049	0.049	0.071	0.022	1.59	0.106	5.28	0.303	0.020
C_6H_{12} 84.156				0.155	0.029	2.44	0.065	0.065	0.094	0.029	2.44	0.163	5.64	0.440	0.029
C_3-C_4											45.67	3.046		9.568	0.637
TOTAL		40.835	516.24		18.713	376.29	42.190	83.025	66.292						
H_2+CO	96.745	39.506	14993 SCFH		10.964		24.719	64.225	35.683	-28.542					
H_2/CO		1.67	Factor 666977		4.03		4.03	2.26	4.03	1.26					

YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*	CORRECTED HEMPEL. %	gal/hr	TREATING RECOVERY %	gal/hr
400 EP	81.4	4.835	98.0	4.738
400-550	8.8	0.523	91.4	0.478
550 +	9.8	0.582	114.6	0.667

	RECOVERY %	#/hr	gal/hr
PROPYLENE	31.0	5.13	
C_3 POLY GASO.	87.5	4.49	0.751
C_3 POLY TAR	12.5	0.64	0.085

	#/gal	#/hr	gal/hr	RVP
C_4H_8	5.00	0.33	0.066	68.0
C_4 POLY GASO.	5.98	10.75	1.798	1.5
C_4H_{10}	4.86	3.60	0.741	68.0
C_4-FREE GASO.			7.505	5.8
C_4 POLY TAR	7.53	1.54	0.205	

	gal/hr	gal/MCF	Bbl/Day
10 # RVP 400 EP GASOLINE	10.110	0.6743	3656
GAS OIL	0.478	0.0319	173
FUEL OIL	0.667	0.0445	241
POLY TAR	0.290	0.0193	105
TOTAL	11.545	0.7700	4175
W. S. CHEM.	1.806	0.1205	653
TOTAL	13.351	0.8905	4828

Weight Recovery, %	92.25	Catalyst Age, hrs.		Space Velocity, vhv	1388	RECOVERED OIL **	0.274	38.41	2.562		5.940	0.396	GAS OIL	0.478	0.0319	173
Pressure, psig	399	Inlet Velocity, Ft/sec	1.02	Catalyst	Vol CF 10.80	TOTAL OIL		84.08	5.608		15.508	1.033	FUEL OIL	0.667	0.0445	241
Temperature, °F	663	Bed Depth, Ft	16.36	Weight, #	1426	WATER SOLUBLE CHEMICALS **	0.268	14.23	0.949		1.806	0.121	POLY TAR	0.290	0.0193	105
Recycle Ratio	1.03	Bed Density, #/CF	132	Effluent $\frac{(H_2)(CO_2)}{(H_2O)(CO)}$ =		TOTAL LIQUID PRODUCTS C_5+		98.31	6.557		17.314	1.154	TOTAL	11.545	0.7700	4175
						NET WATER **	4.847	87.32	5.824		10.482	0.699	W. S. CHEM.	1.806	0.1205	653
						GROSS WATER		101.55	6.773		12.288	0.820	TOTAL	13.351	0.8905	4828
						HYDROCARBON TOTAL—C_1+		134.68	8.983							

FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %			SELECTIVITY
Contraction	CO	H_2	H_2+CO	CO	H_2	$CO+H_2$	C_3+/C_1+
54.17	85.29	64.43	72.25	64.05	35.75	44.44	73.00

Form ML—11

** Included in Reactor Effluent Total

g/NCM = 16.91 × #/MCF *9488 MCFH H_2+CO, Bbl/Day = 5421.6 × gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
DATA SUMMARY

RUN NO. 66-W
HOURS 464-477

OPERATING CONDITIONS — PRESSURES PSIG		RATES S.C.F.H.	
Oxygen	426	Fresh Feed	15497
Natural Gas	438	Recycle	16011
Generator Outlet	403	Combined Feed	31508
Reactor Inlet	399	Wet Gas—Measured	6346
Condenser Inlet		Adjusted	7101
Product Accumulator	373	Loss	755
TEMPERATURES—°F.		Recycle/Fresh Feed	1.03
Oxygen	503	Inlet Velocity—ft./sec.	1.02
Natural Gas	793	Fresh Feed Rate—S.C.F.H.	14993
Generator	2481	per Cu. Ft. Dense Bed	1388
Quench Accumulator	148	per Lb. Catalyst	10.51
Reactor Inlet	254	per sq ft	22717
Condenser Inlet	593		
Product Accumulator	72		
Catalyst No. Height			
1 See Per. A	--		
2	660		
3	654		
4	664		
5	666		
6	671		
7	661		
8	643		
9	655		
10	662		
11	649		

PRODUCT TESTS	OIL	WATER
°API	50.7	11.1
Neut. No.	48.2	38.4
Sap. No.	66.4	41.7
Hydrox. No.		
Bromine No.	94	
Pour °F.		
Chemicals, % by K_2CO_3		14.7
HEMPEL DIST. %		°API
205 °F.		
400	80.4	52.7
400-550	8.8	33.3
550+	10.8	
A. S. T. M. DIST. ON		
Naphtha °F.		
IBP	102	
10%	141	
50%	221	
90%	351	
EP	399	
Rec	96.0	

CATALYST DATA — INVENTORY DATA	
In Reactor at Start of Period	
Fresh Catalyst Added	
Total	
Catalyst Recovered	39
In Reactor at End of Period	
REACTOR d-p, Inches H_2O	
No. Height	
0 See Per. A	
1	63
2	70
3	67
4	190
Total	390
CALCULATED FROM dp	
Density, Lbs./Cu.Ft.	132
Inventory, Lbs.	1426
Bed Depth, Ft.	16.36
Vol cu ft	10.80

PARTICLE SIZE — Screen Analysis			Sedimentation	
Mesh	Microns	%	Microns	%
On 40	419+		80+	
100	150		40—80	
150	105		20—40	
200	74		10—20	
250	62		0—20	
325	44			
<325				

CATALYST
Bulk Density, Lbs./Cu.Ft.
Aerated
Settled
Compacted
Particle Density, gm./cc.
NH_3 Value, ml./gm.
N_2 Surface, m^2/gm.

CHEMICAL ANALYSIS
Fe
C
O
H
K_2O, W+, % basis Fe
X-Ray Analysis—
$Fe_{20}C_9$
Fe_3O_4
Fe