

VI. APPENDIX

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 58-0(A-E)
HOURS 0-93
CATALYST Fresh CMS

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	m/hr	m/hr	m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF	YIELDS	BASIS	BROWNSVILLE	DESIGN	FEED RATE*	
					m/hr	#/hr									CORRECTED	RECOVERY	#/hr	gal/hr	TREATING	
															HEAPL. %	%			RECOVERY	gal/hr
CO		14.862					21.710			-12.101										
H ₂		24.440					45.962			-15.868						400 EP	76.6	6.522	98.0	6.392
CO ₂										2.925						400-550	14.3	1.218	91.4	1.113
N ₂																550 +	9.1	0.775	114.6	0.888
CH ₄										0.990										
C ₂ H ₆										0.291										
C ₃ H ₈										0.183										
C ₄ +C ₅										29.54										
C ₂ H ₄										0.344										
C ₂ H ₂										0.045										
C ₂ H ₂										0.198										
C ₂ H ₂										0.065										
C ₂ H ₂										0.074										
C ₂ H ₂										0.011										
C ₂ H ₂										0.013										
C ₂ +C ₃										38.41										
TOTAL																				
H ₂ +CO		39.302			14915	SCFH				67.672										
H ₂ /CO		1.64			Factor	670465														
Weight Recovery, %	94.85				Catalyst Age, hrs.	46.5				Space Velocity, vhr	1563									
Reactor Back Pressure, psig	361				Inlet Velocity, Ft/sec	0.87				Catalyst Vol., CF	10.17									
Temperature, °F	649				Bed Depth, Ft	15.2				Weight, #	1671									
Recycle Ratio	1.09				Bed Density, #/CF	168				Effluent Shift Ratio (H ₂)(CO ₂)/(H ₂ O)(CO)										
FRESH FEED CONVERSION — %				TOTAL FEED CONVERSION — %				SELECTIVITY				NET WATER								
Contraction	CO	H ₂	H ₂ +CO	CO	H ₂	CO+H ₂	C ₃ +C ₄ +C ₅					GROSS WATER								
56.43	81.42	64.93	71.16	55.74	34.52	41.33	79.33					HYDROCARBON TOTAL — C ₁ +								
												142.91 9.582								

Form ML-11 AI = (39.53)(0.5400) = 21.35

Acid = Neut No. x 0.117

R/NCM = 16.91 X #/MCF

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

YIELD CALCULATIONS

Component	FRESH FEED		WET GAS			RECYLE	COMBINED FEED	EFFLUENT	NET CHANGE		CONDENSATE				YIELD BASIS H ₂ + CO FED			
	%	m/hr	#/hr	%	At Wt. Balance	m/hr	m/hr	m/hr	#/hr	#/MCF	#/gal	gal/hr	gal/MCF	YIELDS	BROWN	DESIGN	FEED RATE*	
CO ₂	33.585	13.761	385.47	7.080	0.900	22.41	3.018	16.779	3.918	-18.961	563.06			400	EP	87.5	9.028	98.0
H ₂	63.275	25.929	52.27	41.700	4.714	9.50	17.779	43.707	22.493	-21.214	42.77			400-550	20.0	2.674	91.4	2.444
CO	2.475	1.014	44.63	29.305	3.313	145.80	12.493	15.507	15.906	2.899	101.17	6.717		550 +	12.5	1.871	114.6	1.915
N ₂	0.560	0.229	6.42	1.390	0.156	4.37	0.588	0.817	0.744									
CH ₄	0.105	0.043	0.69	10.640	1.203	19.80	4.538	4.579	5.739	1.160	18.61	1.256						
C ₂ H ₆					2.560	0.239	8.11	1.091	1.091	1.380	0.289	8.11	0.538					
C ₃ H ₈					1.390	0.157	4.72	0.593	0.593	0.760	0.187	4.72	0.313					
C ₄ +C ₅																		
C ₆ H ₁₄																		
C ₇ H ₁₆																		
C ₈ H ₁₈																		
C ₉ H ₂₀																		
C ₁₀ H ₂₂																		
C ₁₁ H ₂₄																		
C ₁₂ H ₂₆																		
C ₁₃ H ₂₈																		
C ₁₄ H ₃₀																		
C ₁₅ H ₃₂																		
C ₁₆ H ₃₄																		
C ₁₇ H ₃₆																		
C ₁₈ H ₃₈																		
C ₁₉ H ₄₀																		
C ₂₀ H ₄₂																		
TOTAL	40.975	489.48		11.305	247.80	42.632	83.607	62.531		32.89	2.831	7.182	0.477					
H ₂ +CO	66.860	39.699	150.62	SCFH	5.914	20.797	60.486	26.311	-34.175									
H ₂ /CO		1.88	Factor: 683992		5.89	2.60	5.89		1.64									

FORM ML-11
*Included in Reactor Effluent Total
R(NCM)=16.91%/MCF
*948MCF H₂+CO, Bbl/Day = 5411.6 X gal/MCF

OPERATING CONDITIONS				PRODUCT TESTS				CATALYST DATA							
Pressure, psig	414	Inlet Velocity, ft/sec	0.98	Catalyst	New CM&S	TOTAL OIL	0.615**	86.36	5.734	13.370	0.888	GAS OIL	2.444	0.1628	880
Temperature, °F	652	Bed Depth, ft	20.5	Weight, #	1709	WATER SOLUBLE CHEMICALS	0.330**	17.52	1.163	2.107	0.140	POLY TAR	0.358	0.0258	129
Recycle Ratio	1.04	Bed Density, #/CF	126	Volume, cu ft	13.56	TOTAL LIQUID PRODUCT (L+T)		137.47	9.128	22.659	1.606	TOTAL	17.684	1.1728	6358
FRESH FEED CONVERSION - %		TOTAL FEED CONVERSION - %		SELECTIVITY		NET WATER	7.649**	137.90	9.149	16.543	1.098	W.S. CHEM.	2.107	0.1399	758
Conversion	CO 75.41 H ₂ 94.19	H ₂ +CO 81.82 CO 77.25	H ₂ 86.11 CO 46.54	CO+H ₂ 56.60 C ₂ +C ₃ +C ₄ +C ₅ +C ₆ 81.39		GROSS WATER		165.32	10.212	18.650	1.238	TOTAL	19.771	1.3126	7116
						HYDROCARBON PRODUCT (L+T)		168.91	11.214						

GAS ANALYSES				GENERATOR BALANCE				WEIGHT BALANCE							
CO ₂	33.585	13.761	385.47	CO	2.475	1.014	44.63	H ₂	63.275	25.929	52.27	CO ₂	33.585	13.761	385.47
H ₂	63.275	25.929	52.27	CO ₂	2.475	1.014	44.63	H ₂	63.275	25.929	52.27	H ₂	63.275	25.929	52.27
CO	2.475	1.014	44.63	CO	2.475	1.014	44.63	CO	2.475	1.014	44.63	CO	2.475	1.014	44.63
CO ₂	33.585	13.761	385.47	CO ₂	2.475	1.014	44.63	CO ₂	2.475	1.014	44.63	CO ₂	33.585	13.761	385.47

WET GAS						GAS FLOW RATES						LIQUID PRODUCT RATES (4 hours basis)					
CO ₂	33.585	13.761	385.47	CO	2.475	1.014	44.63	H ₂	63.275	25.929	52.27	CO ₂	33.585	13.761	385.47		
H ₂	63.275	25.929	52.27	CO ₂	2.475	1.014	44.63	H ₂	63.275	25.929	52.27	H ₂	63.275	25.929	52.27		
CO	2.475	1.014	44.63	CO	2.475	1.014	44.63	CO	2.475	1.014	44.63	CO	2.475	1.014	44.63		

THE TEXAS COMPANY - MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 59-0(A-D)
HOURS 0-86
CATALYST

Main data table for Run 59-0(A-D) showing FRESH FEED, WET GAS, RECYCLE, COMBINED FEED, EFFLUENT, NET CHANGE, CONDENSATE, and YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*.

Form ML-11 AI = (38.37)(0.8904) = 34.16 g/NCM = 16.91 X#/MCF *9488 MCFH H2 + CO, Bbl/Day = 5421.6 X gal/MCF

THE TEXAS COMPANY - MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 59-1(E-H)
HOURS 86-178
CATALYST Spent CM&S

Main data table for Run 59-1(E-H) showing FRESH FEED, WET GAS, RECYCLE, COMBINED FEED, EFFLUENT, NET CHANGE, CONDENSATE, and YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*.

Form ML-11 AI = (40.71)(0.8193) = 33.35 g/NCM = 16.91 X#/MCF *9488 MCFH H2 + CO, Bbl/Day = 5421.6 X gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 59-2(I-M)
HOURS 178-291
CATALYST Spent CMS

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

Form ML-11 AI = (42.58)(0.8139) = 34.66

R/NCM = 16.91 X # / MCF * 9488 MCFH H2 + CO, Bbl/Day = 5421.6 X gal / MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 59-3(N-T)
HOURS 291-445
CATALYST Spent CMS

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

Form ML-11 AI = (35.00)(0.8100) = 28.35

R/NCM = 16.91 X # / MCF * 9488 MCFH H2 + CO, Bbl/Day = 5421.6 X gal / MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 59-4(U-X)
HOURS 445-541
CATALYST Spent CM&S

Table with columns: FRESH FEED, WET GAS, RECYCLE, COMBINED FEED, EFFLUENT, NET CHANGE, YIELD BASIS H2 + CO FED, CONDENSATE, YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*. Rows include CO, H2, CO2, N2, CH4, C2H6, C3H8, C4H10, C4H8, C5H12, C6H14, C7H16, C8H18, C9H20, C10H22, C11H24, C12H26, C13H28, C14H30, C15H32, C16H34, C17H36, C18H38, C19H40, C20H42, C21H44, C22H46, C23H48, C24H50, C25H52, C26H54, C27H56, C28H58, C29H60, C30H62, C31H64, C32H66, C33H68, C34H70, C35H72, C36H74, C37H76, C38H78, C39H80, C40H82, C41H84, C42H86, C43H88, C44H90, C45H92, C46H94, C47H96, C48H98, C49H100, C50H102, C51H104, C52H106, C53H108, C54H110, C55H112, C56H114, C57H116, C58H118, C59H120, C60H122, C61H124, C62H126, C63H128, C64H130, C65H132, C66H134, C67H136, C68H138, C69H140, C70H142, C71H144, C72H146, C73H148, C74H150, C75H152, C76H154, C77H156, C78H158, C79H160, C80H162, C81H164, C82H166, C83H168, C84H170, C85H172, C86H174, C87H176, C88H178, C89H180, C90H182, C91H184, C92H186, C93H188, C94H190, C95H192, C96H194, C97H196, C98H198, C99H200, C100H202.

Form ML-11 AI = (32.51)(0.8429) = 27.40 g/NCM = 16.91 X #/MCF *9488 MCFH H2 + CO, Bbl/Day = 5421.6 X gal/MCF

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 59-5(Y-CC)
HOURS 541-661
CATALYST Spent CM&S

Table with columns: FRESH FEED, WET GAS, RECYCLE, COMBINED FEED, EFFLUENT, NET CHANGE, YIELD BASIS H2 + CO FED, CONDENSATE, YIELDS BASIS BROWNSVILLE DESIGN FEED RATE*. Rows include CO, H2, CO2, N2, CH4, C2H6, C3H8, C4H10, C4H8, C5H12, C6H14, C7H16, C8H18, C9H20, C10H22, C11H24, C12H26, C13H28, C14H30, C15H32, C16H34, C17H36, C18H38, C19H40, C20H42, C21H44, C22H46, C23H48, C24H50, C25H52, C26H54, C27H56, C28H58, C29H60, C30H62, C31H64, C32H66, C33H68, C34H70, C35H72, C36H74, C37H76, C38H78, C39H80, C40H82, C41H84, C42H86, C43H88, C44H90, C45H92, C46H94, C47H96, C48H98, C49H100, C50H102, C51H104, C52H106, C53H108, C54H110, C55H112, C56H114, C57H116, C58H118, C59H120, C60H122, C61H124, C62H126, C63H128, C64H130, C65H132, C66H134, C67H136, C68H138, C69H140, C70H142, C71H144, C72H146, C73H148, C74H150, C75H152, C76H154, C77H156, C78H158, C79H160, C80H162, C81H164, C82H166, C83H168, C84H170, C85H172, C86H174, C87H176, C88H178, C89H180, C90H182, C91H184, C92H186, C93H188, C94H190, C95H192, C96H194, C97H196, C98H198, C99H200, C100H202.

Form ML-11 AI = (32.74)(0.8248) = 27.00 g/NCM = 16.91 X #/MCF *9488 MCFH H2 + CO, Bbl/Day = 5421.6 X gal/MCF