

*Included in Reactor Effluent Total

$$\sigma^2/M2 = 14.91 \times \sigma^2/MCE$$
$$ss/M2 = 141.3 \times \text{grl}/(MCF)$$
[illegible]

GAS ANALYSES					GENERATOR BALANCE										WEIGHT BALANCE							
				AVERAGE	M/HR	C	H	O	Mol %		M/HR	C	H	O	#/hr Measured		At. Wt. Balance					
FRESH FEED																						
CO	37.01	36.61	36.82	36.813	10.147	10.147		10.147	CO	0.50	4.948			13.992	WET GAS	188.03	206.94					
H ₂	59.04	59.10	58.99	59.043	16.274				H ₂		6.996				OIL	48.09	48.09					
CO ₂	2.87	2.60	2.41	2.627	0.724	0.724		1.448	CO ₂	2.16	0.215	0.215		0.430	TOTAL	539.55	558.46					
N ₂	0.86	0.86	0.86	0.867	0.239				N ₂	1.21	0.190				FRESH FEED	358.46	358.46					
CH ₄	0.22	0.81	0.92	0.680	0.179	0.179	0.179	0.716	CH ₄	81.33	8.104	8.104	38.416		WEIGHT BALANCE	94.72						
M. W. 13.004945									C ₂ H ₆	8.99	0.896	1.792	5.376									
H ₂ O 18.016							7.150	3.575	C ₂ H ₄	4.93	0.491	1.473	3.988		WET GAS FACTOR	1.10057						
2.2260765				11.060	40.414	16.170			C ₂ H ₂	0.14	0.014	0.058	0.140		INDICATED LOSS-S C F H	3397						
									C ₂ H ₂	0.04	0.004	0.020	0.046									
BALANCE				94.77	98.44	105.19			TOTAL	19.879854	11.660	41.908	14.428			310						
WET GAS										GAS FLOW RATES					LIQUID PRODUCT RATES							
										1.4710474												
CO	8.74	8.76	9.15	8.883	V/R				PRESSURE	TEMP.	S. C. F. H.	M. W.	M/HR	HOUR	GAGE	GAL.	'F	FACTOR	GAL. AT 9	APP. #/GAL	#	#/HR GAL/HR
H ₂	38.59	37.67	39.13	38.464	FRESH FEED				111.5	58					OIL	7'15"	395.14	60	1.0000	395.14	51.5	48.09
CO ₂	28.86	29.87	28.76	29.098	79.31	4.31	20.64	0.9924	10446	1.492	27.553					7'18"	377.68	61	0.9995	377.49	6.434	7.474
N ₂	2.80	1.83	2.16	2.130	WET GAS				1.80	58						3'3"	174.73	58	1.0010	174.90		
CH ₄	8.47	10.70	10.43	10.333	79.31	8.82	4.085	1.0019	3087	1.119	8.146					0'34"	15.49	58			15.50	
C ₂ H ₆	2.70	2.59	2.61	2.600	RECYCLE				414.7	124											177.05	
C ₂ H ₄	1.83	1.63	1.63	1.663	115.14	4.05	20.72	0.9436	10210	1.119	26.940										8.33	+15.0
C ₂ H ₂	3.91	3.65	3.17	3.543			414.7	124													179.38	
C ₂ H ₂	0.87	0.86	0.82	0.853	BLEED				20.78	0.9436	1011	1.119	2.668		WATER							
C ₂ H ₂	2.01	1.61	1.55	1.790			424.2	195			11291		29.908			7'8"	397.38	68	0.9994	397.08	11.1	103.43
C ₂ H ₂	0.44	0.40	0.34	0.393	NATURAL GAS				20.35	0.8890	3776	1.2128	9.984			3'8"	170.36	62	0.9998	170.35	8.884	18.516
C ₂ H ₂	0.87	0.82	0.54	0.610	OXYGEN				425.8	58						1'8"	87.01	70	0.9990	86.92		
C ₂ H ₂	0.07	0.07	0.07	0.070	27.07	4.68	20.94	0.9924	2633		6.946					0'8"	13.88	68	0.9998	13.88		
C ₂ H ₂	0.14	0.14	0.14	0.140	STEAM				32.6	57.3										300.39		
M. W. 23.081888				216.7	6.14	0.3016	=	399.4 #/hr.														

*Included in Reactor Effluent Total
$$cc/M3 = 141.3 \times gal/MCF$$
[illegible]

FRESH FEED				WET GAS				RECYCL		COMBINED FEED		EFFLUENT		NET CHANGE		YIELD BASIS H ₂ + CO FED											

Note: Mechanical difficulties during period Y, hours 522-525 necessitated a temporary shutdown. RUN NO. 51 Z HOURS 525-549

$$cc/M3 = 141.3 \times gal/MCF.$$

CHEMICAL ANALYSIS

LIQUID PRODUCT RATE

Gages from 10 AM to 6 AM = 20 hour

FRESH FEED				WET GAS				RECYCLE		COMBINED FEED		EFFLUENT		NET CHANGE		YIELD BASIS H ₂ +CO FED									
	%	m/hr	#/hr	%	At. Wt. Balance			m/hr	m/hr	m/hr	m/hr	m/hr	#/hr	m/hr	#/hr	CONDENSATE				POLYMER				% Unsat.	
						m/hr	#/hr							#/MCF	#/gal	gal/MCF	#/hr	#/MCF	#/gal	gal/MCF	#/hr	#/MCF	gal/MCF		
CO H ₂ O ₂	38.880	7.229	202.48	6.310	0.586	10.81	1.393	8.622	1.779	-5.843	-191.67						Distribution of								
H ₂ O ₂	57.475	10.854	21.88	33.940	2.075	4.18	7.493	18.347	9.568	-8.779	-17.70						Recovered Oil								
CO H ₂ O ₂	3.095	0.584	26.70	33.475	2.047	90.09	7.390	7.974	9.437	1.453	64.39	9.395					400 BP						0.679		
H ₂ O ₂	0.810	0.153	4.89	2.645	0.168	4.54	0.584	0.737	0.745								400-550						0.083		
CH ₄ (C) N ₂	0.340	0.054	1.03	12.195	0.743	11.27	2.692	2.756	3.438	0.682	10.94	1.596					350						0.090		
C ₂ H ₆ C ₃ H ₈ C ₄ H ₁₀ C ₅ H ₁₂					2.755	0.168	4.71	0.608	0.608	0.776	0.168	4.71	0.687										56.0		
C ₆ H ₁₄ C ₇ H ₁₆ C ₈ H ₁₈ C ₉ H ₂₀					2.160	0.132	3.97	0.477	0.477	0.609	0.132	3.97	0.579												
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 C ₂₁ H ₄₄ C ₂₂ H ₄₆ C ₂₃ H ₄₈ C ₂₄ H ₅₀ C ₂₅ H ₅₂ C ₂₆ H ₅₄ C ₂₇ H ₅₆ C ₂₈ H ₅₈ C ₂₉ H ₆₀ C ₃₀ H ₆₂ C ₃₁ H ₆₄ C ₃₂ H ₆₆ C ₃₃ H ₆₈ C ₃₄ H ₇₀ C ₃₅ H ₇₂ C ₃₆ H ₇₄ C ₃₇ H ₇₆ C ₃₈ H ₇₈ C ₃₉ H ₈₀ C ₄₀ H ₈₂ C ₄₁ H ₈₄ C ₄₂ H ₈₆ C ₄₃ H ₈₈ C ₄₄ H ₉₀ C ₄₅ H ₉₂ C ₄₆ H ₉₄ C ₄₇ H ₉₆ C ₄₈ H ₉₈ C ₄₉ H ₁₀₀ C ₅₀ H ₁₀₂ C ₅₁ H ₁₀₄ C ₅₂ H ₁₀₆ C ₅₃ H ₁₀₈ C ₅₄ H ₁₁₀ C ₅₅ H ₁₁₂ C ₅₆ H ₁₁₄ C ₅₇ H ₁₁₆ C ₅₈ H ₁₁₈ C ₅₉ H ₁₂₀ C ₆₀ H ₁₂₂ C ₆₁ H ₁₂₄ C ₆₂ H ₁₂₆ C ₆₃ H ₁₂₈ C ₆₄ H ₁₃₀ C ₆₅ H ₁₃₂ C ₆₆ H ₁₃₄ C ₆₇ H ₁₃₆ C ₆₈ H ₁₃₈ C ₆₉ H ₁₄₀ C ₇₀ H ₁₄₂ C ₇₁ H ₁₄₄ C ₇₂ H ₁₄₆ C ₇₃ H ₁₄₈ C ₇₄ H ₁₅₀ C ₇₅ H ₁₅₂ C ₇₆ H ₁₅₄ C ₇₇ H ₁₅₆ C ₇₈ H ₁₅₈ C ₇₉ H ₁₆₀ C ₈₀ H ₁₆₂ C ₈₁ H ₁₆₄ C ₈₂ H ₁₆₆ C ₈₃ H ₁₆₈ C ₈₄ H ₁₇₀ C ₈₅ H ₁₇₂ C ₈₆ H ₁₇₄ C ₈₇ H ₁₇₆ C ₈₈ H ₁₇₈ C ₈₉ H ₁₈₀ C ₉₀ H ₁₈₂ C ₉₁ H ₁₈₄ C ₉₂ H ₁₈₆ C ₉₃ H ₁₈₈ C ₉₄ H ₁₉₀ C ₉₅ H ₁₉₂ C ₉₆ H ₁₉₄ C ₉₇ H ₁₉₆ C ₉₈ H ₁₉₈ C ₉₉ H ₂₀₀ C ₁₀₀ H ₂₀₂ C ₁₀₁ H ₂₀₄ C ₁₀₂ H ₂₀₆ C ₁₀₃ H ₂₀₈ C 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H ₃₇₆ C ₁₈₈ H ₃₇₈ C ₁₈₉ H ₃₈₀ C ₁₉₀ H ₃₈₂ C ₁₉₁ H ₃₈₄ C ₁₉₂ H ₃₈₆ C ₁₉₃ H ₃₈₈ C ₁₉₄ H ₃₉₀ C ₁₉₅ H ₃₉₂ C ₁₉₆ H ₃₉₄ C ₁₉₇ H ₃₉₆ C ₁₉₈ H ₃₉₈ C ₁₉₉ H ₄₀₀ C ₂₀₀ H ₄₀₂ C ₂₀₁ H ₄₀₄ C ₂₀₂ H ₄₀₆ C ₂₀₃ H ₄₀₈ C ₂₀₄ H ₄₁₀ C ₂₀₅ H ₄₁₂ C ₂₀₆ H ₄₁₄ C ₂₀₇ H ₄₁₆ C ₂₀₈ H ₄₁₈ C ₂₀₉ H ₄₂₀ C ₂₁₀ H ₄₂₂ C ₂₁₁ H ₄₂₄ C ₂₁₂ H ₄₂₆ C ₂₁₃ H ₄₂₈ C ₂₁₄ H ₄₃₀ C ₂₁₅ H ₄₃₂ C ₂₁₆ H ₄₃₄ C ₂₁₇ H ₄₃₆ C ₂₁₈ H ₄₃₈ C ₂₁₉ H ₄₄₀ C ₂₂₀ H ₄₄₂ C ₂₂₁ H ₄₄₄ C ₂₂₂ H ₄₄₆ C ₂₂₃ H ₄₄₈ C ₂₂₄ H ₄₅₀ C ₂₂₅ H ₄₅₂ C ₂₂₆ H ₄₅₄ C ₂₂₇ H ₄₅₆ C ₂₂₈ H ₄₅₈ C ₂₂₉ H ₄₆₀ C ₂₃₀ H ₄₆₂ C ₂₃₁ H ₄₆₄ C ₂₃₂ H ₄₆₆ C ₂₃₃ H ₄₆₈ C ₂₃₄ H ₄₇₀ C ₂₃₅ H ₄₇₂ C ₂₃₆ H ₄₇₄ C ₂₃₇ H ₄₇₆ C ₂₃₈ H ₄₇₈ C ₂₃₉ H ₄₈₀ C ₂₄₀ H ₄₈₂ C ₂₄₁ H ₄₈₄ C ₂₄₂ H ₄₈₆ C ₂₄₃ H ₄₈₈ C ₂₄₄ H ₄₉₀ C ₂₄₅ H ₄₉₂ C ₂₄₆ H ₄₉₄ C ₂₄₇ H ₄₉₆ C ₂₄₈ H ₄₉₈ C ₂₄₉ H ₅₀₀ C ₂₅₀ H ₅₀₂ C ₂₅₁ H ₅₀₄ C ₂₅₂ H ₅₀₆ C ₂₅₃ H ₅₀₈ C ₂₅₄ H ₅₁₀ C ₂₅₅ H ₅₁₂ C ₂₅₆ H ₅₁₄ C ₂₅₇ H ₅₁₆ C ₂₅₈ H ₅₁₈ C ₂₅₉ H ₅₂₀ C ₂₆₀ H ₅₂₂ C ₂₆₁ H ₅₂₄ C ₂₆₂ H ₅₂₆ C ₂₆₃ H ₅₂₈ C ₂₆₄ H ₅₃₀ C ₂₆₅ H ₅₃₂ C ₂₆₆ H ₅₃₄ C ₂₆₇ H ₅₃₆ C ₂₆₈ H ₅₃₈ C ₂₆₉ H ₅₄₀ C ₂₇₀ H ₅₄₂ C ₂₇₁ H ₅₄₄ C ₂₇₂ H ₅₄₆ C ₂₇₃ H ₅₄₈ C ₂₇₄ H ₅₅₀ C ₂₇₅ H ₅₅₂ C ₂₇₆ H ₅₅₄ C ₂₇₇ H ₅₅₆ C ₂₇₈ H ₅₅₈ C ₂₇₉ H ₅₆₀ C ₂₈₀ H ₅₆₂ C ₂₈₁ H ₅₆₄ C ₂₈₂ H ₅₆₆ C ₂₈₃ H ₅₆₈ C ₂₈₄ H ₅₇₀ C ₂₈₅ H ₅₇₂ C ₂₈₆ H ₅₇₄ C ₂₈₇ H ₅₇₆ C ₂₈₈ H ₅₇₈ C ₂₈₉ H ₅₈₀ C ₂₉₀ H ₅₈₂ C ₂₉₁ H ₅₈₄ C ₂₉₂ H ₅₈₆ C ₂₉₃ H ₅₈₈ C ₂₉₄ H ₅₉₀ C ₂₉₅ H ₅₉₂ C ₂₉₆ H ₅₉₄ C ₂₉₇ H ₅₉₆ C ₂₉₈ H ₅₉₈ C ₂₉₉ H ₆₀₀ C ₃₀₀ H ₆₀₂ C ₃₀₁ H ₆₀₄ C ₃₀₂ H ₆₀₆ C ₃₀₃ H ₆₀₈ C ₃₀₄ H ₆₁₀ C ₃₀₅ H ₆₁₂ C ₃₀₆ H ₆₁₄ C ₃₀₇ H ₆₁₆ C ₃₀₈ H ₆₁₈ C ₃₀₉ H ₆₂₀ C ₃₁₀ H ₆₂₂ C ₃₁₁ H ₆₂₄ C ₃₁₂ H ₆₂₆ C ₃₁₃ H ₆₂₈ C ₃₁₄ H ₆₃₀ C ₃₁₅ H ₆₃₂ C ₃₁₆ H ₆₃₄ C ₃₁₇ H ₆₃₆ C ₃₁₈ H ₆₃₈ C ₃₁₉ H ₆₄₀ C ₃₂₀ H ₆₄₂ C ₃₂₁ H ₆₄₄ C ₃₂₂ H ₆₄₆ C ₃₂₃ H ₆₄₈ C ₃₂₄ H ₆₅₀ C ₃₂₅ H ₆₅₂ C ₃₂₆ H ₆₅₄ C ₃₂₇ H ₆₅₆ C ₃₂₈ H ₆₅₈ C ₃₂₉ H ₆₆₀ C ₃₃₀ H ₆₆₂ C ₃₃₁ H ₆₆₄ C ₃₃₂ H ₆₆₆ C ₃₃₃ H ₆₆₈ C ₃₃₄ H ₆₇₀ C ₃₃₅ H ₆₇₂ C ₃₃₆ H ₆₇₄ C ₃₃₇ H ₆₇₆ C ₃₃₈ H ₆₇₈ C ₃₃₉ H ₆₈₀ C ₃₄₀ H ₆₈₂ C ₃₄₁ H ₆₈₄ C ₃₄₂ H ₆₈₆ C ₃₄₃ H ₆₈₈ C ₃₄₄ H ₆₉₀ C ₃₄₅ H ₆₉₂ C ₃₄₆ H ₆₉₄ C ₃₄₇ H ₆₉₆ C ₃₄₈ H ₆₉₈ C ₃₄₉ H ₇₀₀ C ₃₅₀ H ₇₀₂ C ₃₅₁ H ₇₀₄ C ₃₅₂ H ₇₀₆ C ₃₅₃ H ₇₀₈ 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₄₃₇ H ₈₇₆ C ₄₃₈ H ₈₇₈ C ₄₃₉ H ₈₈₀ C ₄₄₀ H ₈₈₂ C ₄₄₁ H ₈₈₄ C ₄₄₂ H ₈₈₆ C ₄₄₃ H ₈₈₈ C ₄₄₄ H ₈₉₀ C ₄₄₅ H ₈₉₂ C ₄₄₆ H ₈₉₄ C ₄₄₇ H ₈₉₆ C ₄₄₈ H ₈₉₈ C ₄₄₉ H ₉₀₀ C ₄₅₀ H ₉₀₂ C ₄₅₁ H ₉₀₄ C ₄₅₂ H ₉₀₆ C ₄₅₃ H ₉₀₈ C ₄₅₄ H ₉₁₀ C ₄₅₅ H ₉₁₂ C ₄₅₆ H ₉₁₄ C ₄₅₇ H ₉₁₆ C ₄₅₈ H ₉₁₈ C ₄₅₉ H ₉₂₀ C ₄₆₀ H ₉₂₂ C ₄₆₁ H ₉₂₄ C ₄₆₂ H ₉₂₆ C ₄₆₃ H ₉₂₈ C ₄₆₄ H ₉₃₀ C ₄₆₅ H ₉₃₂ C ₄₆₆ H ₉₃₄ C ₄₆₇ H ₉₃₆ C ₄₆₈ H ₉₃₈ C ₄₆₉ H ₉₄₀ C ₄₇₀ H ₉₄₂ C ₄₇₁ H ₉₄₄ C ₄₇₂ H ₉₄₆ C ₄₇₃ H ₉₄₈ C ₄₇₄ H ₉₅₀ C ₄₇₅ H ₉₅₂ C ₄₇₆ H ₉₅₄ C ₄₇₇ H ₉₅₆ C ₄₇₈ H ₉₅₈ C ₄₇₉ H ₉₆₀ C ₄₈₀ H ₉₆₂ C ₄₈₁ H ₉₆₄ C ₄₈₂ H ₉₆₆ C ₄₈₃ H ₉₆₈ C ₄₈₄ H ₉₇₀ C ₄₈₅ H ₉₇₂ C ₄₈₆ H ₉₇₄ C ₄₈₇ H ₉₇₆ C ₄₈₈ H ₉₇₈ C ₄₈₉ H ₉₈₀ C ₄₉₀ H ₉₈₂ C ₄₉₁ H ₉₈₄ C ₄₉₂ H ₉₈₆ C ₄₉₃ H ₉₈₈ C ₄₉₄ H ₉₉₀ C ₄₉₅ H ₉₉₂ C ₄₉₆ H ₉₉₄ C ₄₉₇ H ₉₉₆ C ₄₉₈ H ₉₉₈ C ₄₉₉ H<																									

$$\text{cc/M3} = 141.3 \times \text{gal/MCF.}$$

GAS ANALYSES					GENERATOR BALANCE												WEIGHT BALANCE				
HOUR					AVERAGE	M/HR	C	H	O	Mol %		M/Hr	C	H	O	#/hr Measured	At Wt. Balance				
	FRESH FEED																				
CO 18.210	36.60	37.54	36.76	36.966	7.135	7.133			7.135	CO 44.210	0.48	5.032			10.066	WET GAS	112.56	145.21			
H ₂ 8.204	58.75	58.01	58.40	58.380	11.266		22.838			H ₂ 12.210		5.003				OIL	31.58	31.58			
CO ₂ 44.210	2.66	2.76	2.07	2.497	0.482	0.482			0.964	CO ₂ 44.210	1.97	0.133	0.133		0.266	WATER	75.41	75.41			
N ₂ 58.210	0.77	0.75	0.84	0.780	0.161					N ₂ 58.210	2.38	0.161				TOTAL	219.84	262.20			
CH ₄ 10.210	1.24	0.96	1.93	1.377	0.286	0.286	1.064			CH ₄ 10.210	84.10	5.685	5.685	22.780		FRESH FEED	262.20				
	M. Wt. 10.9947															WEIGHT BALANCE	87.05				
	H ₂ O 18.210						4.298	2.146		CH ₄ 10.210	8.05	0.546	1.092	5.276		WET GAS FACTOR	1.290182				
						7.681	27.688	10.243		CH ₄ 10.210	0.10	0.007	0.088	0.070		INDICATED LOSS--S C F H	2315				
	BALANCE					104.48	100.64	99.14		TOTAL											
WET GAS					GAS FLOW RATES										LIQUID PRODUCT RATES						
CO 18.210	6.84	6.94	6.68	6.787		V R	PRESSURE	TEMP.	S. C. F. H.	M. W.	M/HR	HOUR	GAGE	GAL.	°F	FACTOR	GAL AT 64	API S/GAL	#	#/HR GAL/HR	
H ₂ 8.210	35.94	34.88	34.98	35.268			418.5	79					OIL	4.113	265.29	57	1.0016	265.69	50.3	31.68	
CO ₂ 44.210	31.00	34.84	30.89	32.043	6.22		20.81	0.9882	7314	1.488	19.297			3.24	178.54	48	1.0059	173.56	6.490	4.873	
N ₂ 58.210	2.47	2.84	2.89	2.433			1.60	66										92.13			
CH ₄ 10.210	15.26	10.75	14.54	12.777	79.31	5.12	4.025	0.9058	1794	1.105	4.754							0.46	+ 3.0		
C ₂ H ₆ 30.210	2.48	2.49	2.61	2.472			421.5	180										92.59			
C ₂ H ₄ 30.210	2.04	2.84	2.18	2.153	60.54	6.72	80.59	0.9469	7610	1.108	10.858										
C ₂ H ₂ 26.277	2.97	3.88	3.03	3.093			421.5	180													
C ₂ H ₂ 26.277	0.66	0.77	0.74	0.783	5.08	8.5	20.89	0.9469	931	1.103	9.456										
C ₂ H ₂ 26.277	1.87	1.41	1.81	1.855			488.8	187	8341		88.008										
C ₂ H ₂ 26.277	0.36	0.85	0.28	0.877	19.79	5.56	21.05	0.8055	2866	1.256	6.772										
C ₂ H ₂ 26.277	0.44	0.41	0.41	0.480			487.5	80													
C ₂ H ₂ 26.277	0.18	0.07	0.11	0.100	18.88	4.88	81.08	0.9813	1896		5.001										
C ₂ H ₂ 26.277	0.11	0.05	0.11	0.080			88.8	33.5													
	M. Wt. 23.77497					212.7	5.49	0.8870	2359.6	4.47											

*Included in Reactor Effluent Total
$$g/M3 = 16.91 \times \# / MCF,$$

FRESH FEED				WET GAS				RECYCLE		COMBINED FEED		EFFLUENT				NET CHANGE		YIELD BASIS H ₂ + CO FED													
	%	m/hr	#/hr	%	At Wt. Balance													CONDENSATE				POLYMER									
					m/hr	#/hr	m/hr	m/hr	m/hr	m/hr	m/hr	m/hr	m/hr	m/hr	m/hr	m/hr	m/hr	#/MCF	#/gal	gal/hr	gal/MCF	#/hr	#/MCF	#/gal	gal/hr	gal/MCF	% Unsat.				
CO	56.880	10.096	282.28	8.213	0.690	19.33	2.564	12.640	3.254	-9.386	-268.90																				
H ₂	59.979	16.090	38.44	38.247	3.223	6.50	11.972	28.062	15.185	-12.867	-25.94																				
CO ₂	2.567	0.708	30.90	80.170	2.835	111.56	9.419	10.121	11.954	1.833	80.66	8.124																			
N ₂	0.593	0.168	4.54	2.713	0.228	6.39	0.847	1.009	1.075																						
CH ₄	1.223	0.335	5.37	10.800	0.857	13.75	3.184	3.519	4.041	0.522	8.38	0.845																			
C ₂ H ₆					2.457	0.206	5.78	0.787	0.787	0.973	0.206	5.78	0.583																		
C ₃ H ₈					1.640	0.138	4.16	0.512	0.512	0.650	0.138	4.16	0.418																		
C ₄ +C ₅																															
C ₆ H ₁₄					3.063	0.287	10.81	0.956	0.956	1.213	0.287	10.81	1.090																		
C ₇ H ₁₆					0.547	0.046	2.03	0.171	0.171	0.217	0.046	2.03	0.205																		
C ₈ H ₁₈					1.887	0.132	7.41	0.489	0.489	0.651	0.132	7.41	0.747																		
C ₉ H ₂₀					0.380	0.030	1.74	0.112	0.112	0.142	0.030	1.74	0.175																		
C ₁₀ H ₂₂					0.580	0.044	3.08	0.182	0.182	0.206	0.044	3.08	0.311																		
C ₁₁ H ₂₄					0.093	0.008	0.58	0.029	0.029	0.037	0.008	0.58	0.058																		
C ₁₂ H ₂₆					0.110	0.009	0.76	0.034	0.034	0.043	0.009	0.76	0.077																		
C ₁₃ +C ₁₄																															
TOTAL		27.365	355.48		8.404	193.87	31.219	58.594	45.595																						
H ₂ +CO	95.799	26.166	9916.81		3.913		14.536	40.702	16.449		22.253																				
H ₂ /CO		1.60	100837821		4.67		2.22				1.37																				
CUMULATIVE TOTALS																															
H ₂ +CO/MCF Catalyst # C ₂ +C ₃ gal/MCF gal/#														EFFLUENT RECOVERED OIL																	
Previous Total														SHIFT RATIO		TOTAL LIQUID SOLUBLE OILS															
Current Period														(H ₂)(CO) ₂ 10.6		TOTAL LIQUID OILS															
New Total														(H ₂ O)(CO)		TOTAL LIQUID PRODUCTS C ₂ +															
FRESH FEED CONVERSION - %														TOTAL FEED CONVERSION - % SELECTIVITY																	
Conversion		CO	H ₂	H ₂ +CO	CO	H ₂	CO+H ₂	C ₂ +/C ₁ +		NET WATER																					
														GROSS WATER																	
														HYDROCARBON TOTAL - C ₂ +																	
		89.29	92.15	79.97	85.05	74.26	45.85	54.67	82.51	110.74/117.167		11.51/11.161																			
																13.591/13.550															

FRESH FEED				WET GAS		RECYCL	COMBINED FEED	EFFLUENT	NET CHANGE		YIELD BASIS H ₂ +CO FED										
	%	m/hr	#/hr	%	At. Wt. Balance	m/hr	m/hr	m/hr	m/hr	#/hr	#/MCF	CONDENSATE	gal/MCF	#/hr	#/MCF	gal/MCF	gal/MCF	Units			
					m/hr																
CO	37.887	10.192	285.48	8.660	0.925	25.91	2.834	13.026	3.789	-9.267	-659.57										
H ₂	58.716	15.947	32.15	45.070	4.514	9.71	14.747	30.594	19.561	-11.135	-28.44							Distribution of			
CO ₂	2.667	0.724	31.86	28.300	3.025	135.04	9.960	9.984	12.283	2.899	101.120	0.213						Recovered oil			
N ₂	0.790	0.214	6.00	2.280	0.241	6.75	0.739	0.953	0.980									400 BP			
CH ₄	0.300	0.081	1.30	7.885	0.778	12.48	2.383	2.464	3.161	0.697	11.12	1.128						400-550			
C ₂ H ₆				2.103	0.225	6.51	0.688	0.225	0.913	0.225	6.51	0.657						550+			
C ₃ H ₈				1.287	0.137	4.12	0.421	0.137	0.558	0.137	4.12	0.416									
C ₄ +C ₅		H ₂ O	H ₂ O					H ₂ O													
C ₂ H ₄		1.710	39.80	2.463	0.263	11.07	0.806	0.263	1.069	0.263	11.07	1.117	4.32	2.563	0.259	9.96	0.259	8.25			
C ₂ H ₂				0.377	0.040	1.76	0.123	0.040	0.163	0.040	1.76	0.178	4.24	0.415	0.042			1.594			
C ₂ H ₂				1.257	0.134	7.52	0.411	0.134	0.545	0.134	7.52	0.759	5.00	1.504	0.152	7.14	0.721	6.10			
C ₂ H ₂				0.307	0.033	1.92	0.100	0.033	0.133	0.033	1.92	0.184	4.86	0.395	0.040	1.92	0.184	4.86			
C ₂ H ₂				0.447	0.048	3.37	0.146	0.048	0.194	0.048	3.37	0.340	5.45	0.618	0.062	3.37	0.340	5.45			
C ₂ H ₂				0.063	0.009	0.65	0.027	0.009	0.036	0.009	0.65	0.066	5.25	0.124	0.012	0.65	0.066	5.25			
C ₂ H ₂				0.103	0.011	0.93	0.034	0.011	0.045	0.011	0.93	0.094	5.84	0.168	0.017	0.93	0.094	5.84			
C ₂ H ₂																					
TOTAL		28.969	397.59			10.691	225.54	32.721	61.590	49.888											
H ₂ +CO	96.243	26.139	SCFH		5.739		17.581	43.720	23.320		20.400										
H ₂ /CO		1.57	100941		5.20			2.35		1.20											
CUMULATIVE TOTALS																					
H ₂ +CO/MCF Catalyst # C ₂ + gal gal/MCF gal/#											0.291556		6.149	0.620	39.48	3.986		6.148	0.620		
Previous Total											SHIFT RATIO	TOTAL OIL	66.73	6.734	11.935	1.205	63.46	6.406	10.218	1.031	
Current Period											(H ₂)(CO) ₂ + 0.8 (H ₂ O)(CO)	0.310*	16.43	1.658	7.91	2.076	0.210	16.43	1.658	2.076	0.210
New Total											TOTAL LIQUID PRODUCTS, gal		83.14	8.392	24.011	1.414	79.89	8.064	12.294	1.281	
FRESH FEED CONVERSION - %																					
TOTAL FEED CONVERSION - %																					
SELECTIVITY																					
Construction	CO	H ₂	H ₂ +CO	CO	H ₂	CO+H ₂	C ₂ +C ₃ +C ₄	GROSS WATER		122.61	12.376	14.826	1.497								
HYDROCARBON																					
TOTAL C ₂ +C ₃ +C ₄																					
Water Fed																					
Therm.-Free Water Produced																					
g/M3 = 16.91 # % M																					

*Included in Reactor Effluent Total

Water Fed	30.75	
Chem.-Free Water Produced	70.41	7.176

$$\bar{c}_c/M3 = 141.3 \times \text{gal/MCF}$$

GAS ANALYSIS					GENERATOR BALANCE										WEIGHT BALANCE				
HOUR					AVERAGE	M/HR	C	H	O	Mol %		M/Hr	C	H	O	#/hr Measured	At. Wt. Balance		
FRESH FEED																			
CO 24.010	37.58	37.03	37.43	37.347	10.071	10.071			10.071	O ₂ 14.000	0.61	7.424	0.060		14.988	WET GAS	212.32	235.06	
H ₂ 2.814	58.64	59.08	58.51	58.656	15.817		31.634			CO 14.000		7.484				OIL	34.57	34.57	
CO ₂ 44.010	2.47	2.74	3.24	2.917	0.780	0.780		1.520	CO ₂ 44.010	1.21	0.120	0.180	0.840			WATER	116.64	116.64	
N ₂ 24.010	0.81	1.00	0.98	0.930	0.261				N ₂ 24.010	2.86	0.283					FRESH FEED	365.62	365.62	
CH ₄ 16.010	0.50	0.21	0.04	0.850	0.067	0.067	0.268		CH ₄ 16.010	83.77	8.287	8.287	35.148			WEIGHT BALANCE	30.75	94.11	
				M. Wt. 1058168					C ₂ H ₆ 30.044	8.38	0.829	1.658	4.974				386.27		
							7.998	3.999	C ₂ H ₆ 30.044	3.06	0.303	0.909	2.494			WET GAS FACTOR	1.107109		
					26.966	10.898	39.900	15.690	CH ₂ 14.012	0.07	0.007	0.028	0.070			INDICATED LOSS—SCPH	4318		
									CH ₂ 14.012	0.04	0.004	0.020	0.048						
									TOTAL					11.028	40.684	18.208	418		
WET GAS	1400	2200	0500						GAS FLOW RATES	19.90879			O/C = 1.58			LIQUID PRODUCT RATES			
CO 24.010	10.47	8.99	9.13	9.530		V/R	PRESSURE	TEMP.	S. C. F. H.	M. W.	M/HR	HOUR	GAGE	GAL	"F	FACTOR	GAL AT 6"	APR #/GAL	
H ₂ 2.814	46.72	46.31	45.30	46.109			419.5	76					OIL	6.113	366.77	60	1.0000	366.77	
CO ₂ 44.010	24.90	27.69	28.76	27.116	28.66	8.69	20.84	0.9850	10280	1.482	26.966		4.5"	235.83	55	1.0025	236.49	6.437	
N ₂ 24.010	1.91	2.70	2.82	2.877			1.58	88											
CH ₄ 16.010	7.66	6.51	6.19	6.783	115.14	7.10	4.038	0.9981	3898	1.184	10.286								
C ₂ H ₆ 30.044	2.22	2.05	2.05	2.107			481.3	184											
C ₂ H ₆ 30.044	1.51	1.25	1.85	1.263	80.54	9.56	80.86	0.9456	11625	1.184	30.878								
C ₂ H ₆ 30.044	2.26	2.12	2.27	2.237			481.3	184											
C ₂ H ₆ 30.044	0.48	0.38	0.53	0.367	5.08	9.4	20.88	0.9456	1101	1.184	8.904								
C ₂ H ₆ 30.044	1.90	1.08	1.15	1.137			451.9	198	18788		35.977								
C ₂ H ₆ 30.044	0.26	0.26	0.31	0.278	19.79	8.18	21.12	0.9890	3749	1.3976	0.293								
C ₂ H ₆ 30.044	0.47	0.41	0.40	0.467			450.8	76											
C ₂ H ₆ 30.044	0.07	0.09	0.10	0.087	18.88	7.19	21.11	0.9980	2814	7.484									
C ₂ H ₆ 30.044	0.15	0.13	0.10	0.187															
				M. Wt. 6431319															
					215.7	6.55	0.5095	8.497.0	#/hr.										

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA						
PRESSURES PSIG		RATES C.F.H.	H ₂ O	642	OIL	WATER	INVENTORY DATA		PARTICLE SIZE				
Oxygen	430	Fresh Feed	10159	*API	52.2	11.2	In Reactor at Start of Period		Screen Analysis Sedimentation				
Natural Gas	430	Recycle	12608	Neut. No.	47.2	38.4	Fresh Catalyst Added 50 ±		76	Mesh	Micros	%	Micros
Generator Outlet	424	Combined Feed	23409	Sap. No.	57.8	41.3	Total			On 40	419+	9.7	80+
Reactor Inlet	418	Wet Gas—Measured	4016	Hydrox. No.			Catalyst Recovered		88	100	150	49.4	40—80
Condenser Inlet		Adjusted	4294	Bromine No.	85.9		In Reactor at End of Period			150	105	16.4	20—40
Product Accumulator	387	Loss	278	Pour °F.						200	74	10.9	10—20
				Chemicals, % by K ₂ CO ₃	14.0		REACTOR d-p. Inches H ₂ O			250	62	2.9	0—20
							No. Height			325	44	4.1	
TEMPERATURES—°F.		Recycle/Fresh Feed	1.24				1 12-45.2		61	435		6.6	
Oxygen	341	Inlet Velocity—ft./sec.					2 43.2-74.4		63	CATALYST			
Natural Gas	674	Fresh Feed Rates C.F.H.	9776	HEMPEL DIST. %		0 API	3 74.4-105.6		76	Bulk Density, Lbs./Cu.Ft.			
Generator	2345	per Cu.Ft. Dense Bed	606	205 °F.			4 105.6-342.0		360	Aerated			
Quench Accumulator		per Lb. Catalyst	4.89	400	75.0	57.0	0 0-12		23	Settled			
Reactor Inlet	830	per sq. ft.	14912	400-550	11.3	38.4			585	Compacted			
Condenser Inlet				550+	13.7					Particle Density, gm./cc.			
Product Accumulator	62	Heat Transfer Calculations					CALCULATED FROM dp			NH ₃ Value, ml./gm.			
Catalyst No.	Height "	Steam Rate = 450.3 #/hr.		A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.		124	N ₂ Surface, m ² /gm.			
1	12.0	@ 764 psia & 512°P		Naphtha °F.			Inventory, Lbs.		2001				
2	43.2	= 1198 BTU/#		IBP	99		Bed Depth, Ft.		24.46	CHEMICAL ANALYSIS			
3	74.4	Water in @ 110°P = 77 BTU/#		10%	134		Volume, Cu. Ft.		16.14	Fe			
5	136.8	Heat Transferred/# steam		50%	224					C			
7	199.2	= 1119 BTU		90%	342					O			
8	230.4	(1119)(450.3) = 503886 BTU/hr.		EP	400					H			
9	261.6	Ave. Bed Temp. = 618°P		Rec.	99.0					K ₂ O, W+, % basis Fe			
10	292.8	ΔT = 618-512 = 106°P								X-Ray Analysis—			
11	311.0	Tube Area = 33.6 ft. ²								Fe ₂ O ₃			
12	342.0	K = (33.6)(106) = 141.5								Fe ₂ O ₃			
										Fe			

[illegible]

$$g/M3 = 16.91 \times \# / MCF.$$
CHEMICAL ANALYSIS[illegible]

$$g/M3 = 16.91 \times \pm/MCF.$$
[illegible]

GAS ANALYSES					GENERATOR BALANCE										WEIGHT BALANCE				
HOUR	0800	1400	2800	AVERAGE	M/HR	C	H	O		Mol %	M/Hr	C	H	O		#/hr	At. Wt. Balance		
FRESH FEED																Measured			
CO _{28.00}	37.61	38.40	37.75	37.913	10.298			10.298		O _{238.000}	7.407 0.047			14.908		WET GAS	221.92		
H _{28.00}	58.74	58.19	58.58	58.504	15.889		31.780			CO _{34.000}	7.454					Oil	34.20		
CO _{44.00}	2.92	2.65	2.92	2.830	0.769			1.538		H _{28.000}						Water	118.50		
N _{220.00}	0.67	0.55	0.71	0.643	0.175					CO _{44.000}	1.45	0.143	0.143	0.286		TOTAL	368.68		
CH _{416.00}	0.06	0.21	0.06	0.110	0.030	0.030	0.120			H _{24.000}	2.72	0.269				FRESH FEED	30.17		
										CH _{416.000}	85.71	8.267	8.267	33.068		WEIGHT BALANCE	389.84		
										C ₂ H _{632.000}	8.58	0.047	1.694	5.082			94.56		
										CH _{424.000}	2.91	0.287	0.861	2.296		WET GAS FACTOR	1.0953		
										C ₂ H _{632.000}	0.11	0.011	0.044	0.110		INDICATED LOSS—S.C.F.H	378		
										CH _{416.000}	0.04	0.004	0.020	0.048					
										TOTAL									
WET GAS	0600	1400	2800																
CO _{28.00}	9.54	8.84	9.54	9.307		V.R													
H _{28.00}	46.37	44.99	46.40	45.918															
CO _{28.00}	28.13	28.41	28.41	28.317	38.66	8.713	20.269	0.9859	10297	1.4786	27.161								
N _{220.00}	2.19	2.07	2.18	2.147			16.2	61.7											
CH _{416.00}	5.89	5.76	5.83	5.823	115.14	7.344	4.028	0.9981	3970	1.1687	10.472								
C ₂ H _{632.00}	1.97	1.95	1.96	1.960				184.8											
C ₂ H _{632.00}	1.17	1.17	1.14	1.160	50.54	9.70	20.97	0.9428	11327	1.1687	29.878								
C ₂ H _{632.00}	8.33	8.77	8.24	8.447															
C ₂ H _{632.00}	0.36	0.43	0.31	0.367	5.02	9.20	20.97	0.9428	1067	1.1687	2.816								
C ₂ H _{632.00}	1.19	1.92	1.17	1.427				442.8	197.8										
C ₂ H _{632.00}	0.86	0.48	0.28	0.540	19.79	8.180	21.043	0.8890	3744	1.2304	9.876								
C ₂ H _{632.00}	0.40	0.85	0.40	0.543				442.1	77.5										
					</														

OPERATING CONDITIONS				PRODUCT TESTS			CATALYST DATA							
PRESSURES PSIG		RATES S.C.F.H.			OIL	WATER	INVENTORY DATA			PARTICLE SIZE				
Oxygen	428	Fresh Feed	10149	* API	51.8	11.2	In Reactor at Start of Period			Screen Analysis		Sedimentation		
Natural Gas	429	Recycle	12395	Neut. No.	44.0	38.8	Fresh Catalyst Added	55 #	83	Mesh	Microns	%	Microns	%
Generator Outlet	418	Combined Feed	22544	Sap. No.	82.9	41.5	Total			On 40	419+	5.9	80+	
Reactor Inlet	418	Wet Gas—Measured	4010	Hydrox. No.			Catalyst Recovered		87	100	150	25.6	40—80	
Condenser Inlet		Adjusted	4184	Bromine No.	76.1		In Reactor at End of Period			150	165	7.5	20—40	
Product Accumulator	387.5	Loss	174	Four "F.						200	74	5.2	10—20	
				Chemicals, % by K_2CO_3		14.0	REACTOR d-p. Inches H_2O			250	62	1.1	0—20	
							No.	Height		325	44	1.7		
TEMPERATURES—°F.		Recycle/Fresh Feed	1.22				1	12-43.2	65	<325		2.6		
Oxygen	379	Inlet Velocity—ft./sec.					2	43.2-74.4	66	CATALYST				
Natural Gas	709	Fresh Feed Rate—S.C.F.H. $H_2O \pm CO$	9758	HEMPEL DIST. %		° API	3	74.4-105.6	80	Bulk Density, Lbs./Cu.Ft.				
Generator	2540	per Cu. Ft. Dense Bed	634	205 °F.			4	105.6-342.0	350		Aerated		155	
Quench Accumulator	116	per Lb. Catalyst	4.94	400	78.0	56.8	0	0-12	27		Settled		158	
Reactor Inlet	942	per sq. ft.	14785	400-550	10.3	38.0			588		Compacted		173	
Condenser Inlet				550+		11.7					Particle Density, gm./cc.		4.5	
Product Accumulator	65	Heat Transfer Calculations						CALCULATED FROM dp			NH_3 Value, ml./gm.		8.5	
Catalyst No.	Height*	Steam Rate = 448.7 #/hr.		A. S. T. M. DIST. ON				Density, Lbs./Cu.Ft.	131		N_2 Surface, m ² /gm.			
1	12.0	@ 765 psia & 513°F		Naphtha °F.				Inventory, Lbs.	2018					
2	43.2	= 1198 BTU		IBP	100			Bed Depth, Ft.	23.53	CHEMICAL ANALYSIS				
3	74.4	Water in @ 114°F = 80 BTU/#		10%	136			Volume, Cu. Ft.	15.40		Fe			
4	136.8	Heat Transferred/# Steam		50%	230						C			
5	199.2	= 1118 BTU		90%	356						O			
6	230.4	(448.7)(1118) = 501446 BTU/hr.		EP	402						H			
9	261.6	Ave. Bed Temp. = 608°F									K_2O , Wt.-% basis Fe			
10	292.8	dT = 608-513 = 95°F									X-Ray Analysis—			
11	311.0	Tube Area = 32.9 ft. ²									Fe ₂ O ₃			
12	342.0	86164 K = (95/32.9) = 161									Fe ₂ O ₃			
											Fe			

GAS ANALYSES				GENERATOR BALANCE										WEIGHT BALANCE			
HOUR			AVERAGE	M/HR	C	H	O		Mol %	M/Hr	C	H	O		#/hr Measured	At Wt. Balance	
FRESH FEED								O ₂ 32.000	0.44	7.288 0.044			14.664	WET GAS	221.25	230.86	
CO 28.010	37.54	38.10	37.36	37.833	10.128	10.128	10.128	CO 44.010		7.332				OIL	38.00	38.00	
H ₂ 2.09	57.68	58.37	58.70	58.317	15.612		31.284	H ₂ 2.09						WATER	114.23	114.23	
CO ₂ 44.010	2.68	2.85	2.72	2.750	0.736		1.472	CO ₂ 44.010	2.09	0.207	0.207		0.414	TOTAL	373.48	383.09	
N ₂ 78.014	0.54	0.56	0.55	0.550	0.147			N ₂ 78.014	2.42	0.239				FRESH FEED	383.09		
CH ₄ 16.043	1.36	0.12	0.17	0.550	0.147	0.147	0.588	CH ₄ 16.043	84.27	8.336	8.336	33.344		WEIGHT BALANCE	97.49		
								C ₂ H ₆ 30.044	7.80	0.772	1.544	4.632					
								C ₂ H ₆ 30.044	2.90	0.287	0.861	2.295		WET GAS FACTOR	1.04343		
								C ₂ H ₆ 30.044	0.04	0.004	0.018	0.040		INDICATED LOSS—S.C.F.H	174		
								TOTAL									
					100.2	98.0	102.6		18.933		10.984	40.360	15.078				
WET GAS																	
CO 28.010	10.34	7.42	9.23	8.997		VTR	PRESSURE	TEMP.	S. C. F. H.	M. W.	M/HR	HOUR	GAGE	GAL	*F	FACTOR	
H ₂ 2.09	46.49	44.11	47.08	45.980		FRESH FEED	416.3	77.5									
CO ₂ 44.010	26.76	30.29	28.04	28.363	39.66	8.590	20.74	0.9836	10149	1.4795	26.771						
N ₂ 78.014	1.40	2.33	1.90	1.877		WET GAS	1.6										
CH ₄ 16.043	6.74	7.50	6.19	6.810	115.14	7.591	4.028	0.9958	4010	1.1765	10.578						
C ₂ H ₆ 30.044	2.80	2.31	1.94	2.150		ARCYLE	432.7	126.5									
C ₂ H ₆ 30.044	1.16	1.28	1.16	1.200	50.54	9.70	20.80	0.9416	11896	1.1766	29.797						
C ₂ H ₆ 30.044	2.14	2.43	2.22	2.263		BLEED	432.7	126.5									
C ₂ H ₆ 30.044	0.27	0.31	0.27	0.283	5.02	9.50	20.80	0.9416	1029	1.1765	2.899						
C ₂ H ₆ 30.044	1.40	1.15	1.16	1.237		NATURAL GAS	429.3	198									
C ₂ H ₆ 30.044	0.32	0.31	0.27	0.300	19.79	8.180	21.07	0.8890	3750	1.2366	9.892						
C ₂ H ₆ 30.044	0.53	0.40	0.58	0.437		OXYGEN	428.3	79.5									
C ₂ H ₆ 30.044	0.11	0.08	0.08	0.090	18.82	7.104	21.05	0.9818	2753		7.888						
C ₂ H ₆ 30.044	0.16	0.08	0.103	0.103		STEAM	46.3										

*Included in Reactor Effluent Total

$$\text{cc/M3} = 141.3 \times \text{gal/MCF}$$

GAS ANALYSES				GENERATOR BALANCE										WEIGHT BALANCE										
HR				AVERAGE	M/HR	C	H	O		MoL %	M/HR	C	H	O	#/hr Measured	At. Wt. Balance								
FRESH FEED									O ₂ 28.000	0.42	7.341			14.564	WET GAS	198.77	207.66							
CO 28.010	37.69	37.59	37.68	37.653	10.038	10.038		10.038	CO 28.010						OIL	45.68	45.68							
H ₂ 2.04	58.94	58.80	58.86	58.740	15.658		31.316		H ₂ 2.04						WATER	97.77	97.77							
CO ₂ 24.010	2.58	3.10	2.86	2.847	0.759	0.759		1.518	CO ₂ 24.010	1.96	0.193	0.193		0.586	TOTAL	342.22	351.11							
N ₂ 28.016	0.35	0.67	0.62	0.547	0.146				N ₂ 28.016	2.87	0.288				FRESH FEED	351.11								
CH ₄ 16.042	0.44	0.04	0.16	0.213	0.057	0.057	0.288		CH ₄ 16.042	83.83	8.240	8.240	32.980		WEIGHT BALANCE	97.47								
									C ₂ H ₆ 30.048	8.17	0.905	1.606	4.618											
			M. W. 16.04	13.171					C ₂ H ₄ 28.024	3.28	0.316	0.948	2.588		WET GAS FACTOR	1044726								
						7.843	3.922		O ₂ 28.010	0.10	0.010	0.048	0.100		INDICATED LOSS-S C F H	146								
					26.658	10.854	39.387	15.478	CO ₂ 28.010	0.03	0.003	0.015	0.056											
									TOTAL															
									72.136	19.037														
												11.042	40.442	14.950										
BALANCE					89.30	97.39	105.63																	
WET GAS																								
					GAS FLOW RATES										LIQUID PRODUCT RATES									
CO 28.010	9.06	9.24	8.69	8.997		V/R			PRESSURE	TEMP.	S. C. F. H.	M. W.	M/HR	HR	GAGE	GAL.	" F	FACTOR	GAL. AT 6"	AP ¹ #/GAL	#	#/HR GAL/HR		
H ₂ 2.04	41.16	37.89	39.80	39.616	FRESH FEED				415.9	76					OIL	6.17"	349.31	80	1.0000	349.31	51.8	2945.0		
CO ₂ 28.010	29.03	32.44	30.21	30.793	38.66	8.627			20.76	0.2850	10106	1.4825	26.658				3.4"	179.09	64	0.9990	178.73	6.427	1149.7	45.68
N ₂ 28.016	2.02	2.87	2.54	2.410	WET GAS				1.85	61														
CH ₄ 16.042	8.01	7.36	8.14	8.037	115.14	6.279			4.03	0.9990	3256	1.1185	8.899									1096.3	7.108	
C ₂ H ₆ 30.048	2.36	2.37	2.36	2.365					418.5	188														
C ₂ H ₄ 28.024	1.48	1.55	1.54	1.507	50.54	9.789			20.81	0.9404	10765	1.1185	28.591											
C ₂ H ₂ 28.014	2.95	3.05	2.84	2.947					418.5	188														
	0.52	0.55	0.50	0.517	5.06	9.079			20.81	0.9404	996	1.1185	2.635	WATER	7.6"	592.96	80	0.9976	592.08	11.1	8.264	3239.7		
CH ₄ 16.042	1.56	1.67	1.50	1.610	NATURAL GAS				489.5	500							4.83"	223.85	60	1.0000	223.83	11.5	8.558	1848.4
C ₂ H ₆ 30.048	0.34	0.41	0.39	0.380	19.79	8.180			21.05	0.8976	3788	1.8580	9.689											
C ₂ H ₄ 28.024	0.61	0.61	0.58	0.580	OXYGEN				489.5	76							2.8"	188.89	68	0.9988	188.86	11.1	1064.9	
C ₂ H ₂ 28.014	0.09	0.09	0.13	0.103	19.88	7.056			21.05	0.9851	2745		7.841				0.18"	13.88	60	1.0000	13.88	8.864	109.7	97.77
	0.14	0.14	0.14	0.140	STREAM				45.3															
			M. W.	23.142	215.7	6.80	0.3460	507.5 #/hr.																

*Included in Reactor Effluent Total

$$g/M3 = 16.91 \times \pm/MCF$$
[illegible]

*Included in Reactor Effluent Total
$$q_i/M3 = 16.91 \times \#/MCF$$
$$cc/M3 = 141,3 \times gal/MCI$$
[illegible]

*Included in Reactor Effluent Total

$$g/M3 = 16.91 \times \# / MCF$$

GAS ANALYSES				GENERATOR BALANCE												WEIGHT BALANCE				
HOUR				AVERAGE	M/HR	C	H	O	Mol %		M/HR	C	H	O	#/hr Measured	At. Wt. Balance				
FRESH FEED									O ₂ 22.000	0.56	7.341									
CO 18.010	37.81	38.18	37.995	10.072	10.072			10.072	CO 22.000		0.655			14.758	WET GAS	218.46				
H ₂ 2.04									H ₂ 2.04						OIL	40.91				
H ₂ 2.04	59.01	57.13	58.070	15.395		30.790			H ₂ 2.04						WATER	83.80				
CO ₂ 44.010	2.83	2.89	2.860	0.758	0.758		1.516		CO ₂ 44.010	1.84	0.180	0.180		0.360	TOTAL	337.17				
N ₂ 88.016	0.26	0.43	0.345	0.091					N ₂ 88.016	1.85	0.181				FRESH FEED	358.21				
CH ₄ 18.042	0.09	1.37	0.750	0.194	0.194	0.776			CH ₄ 18.042	83.84	8.219	8.219	32.876		WEIGHT BALANCE	95.73				
									C ₂ H ₆ 20.044	8.13	0.797	1.594	4.782							
			M. W.	15.286					C ₂ H ₆ 20.044											
			H ₂ O 18.016			8.145	4.075		C ₂ H ₆ 20.044	3.87	0.379	1.137	3.032		WET GAS FACTOR	1070789				
					26.510	11.024	39.711	15.661	C ₂ H ₆ 20.044	0.07	0.007	0.088	0.070		INDICATED LOSS-S C F H	277				
									C ₂ H ₆ 20.044	0.04	0.004	0.080	0.048							
			BALANCE		98.62	27.31	103.62		TOTAL	19.113		11.178	40.808	16.112		4187				
WET GAS				GAS FLOW RATES								LIQUID PRODUCT RATES								
CO 18.010	9.94	15.95	12.946		✓R	PRESSURE	TEMP.	S. C. F. H.	M. W.	M/HR	HOUR	GAGE	GAL	°F	FACTOR	GAL AT 60				
H ₂ 2.04	42.54	49.00	45.772			408.9	76				O/C = 1.35									
H ₂ 2.04				FRESH FEED																
H ₂ 2.04	28.92	22.57	25.782	38.66	8.688	80.58	0.9850	10080	1.4781	26.510	1800	7.153	387.50	65	0.9975	388.53				
N ₂ 88.016	2.06	1.49	1.770			1.5	66				0800	8.10"	318.21	56	1.0020	318.65				
CH ₄ 18.042	7.28	4.71	5.995	115.14	7.188	4.025	0.9045	3910	1.1855	10.314						8012.7				
C ₂ H ₆ 20.044	2.38	1.65	2.005			418.3	121									483.9				
C ₂ H ₆ 20.044	1.40	0.82	1.110	50.54	9.770	80.58	0.9460	10841	1.1855	28.597						710				
C ₂ H ₆ 20.044	0.69	1.79	2.235			412.3	121									390.9				
C ₂ H ₆ 20.044	0.41	0.21	0.310	5.02	9.258	20.65	0.9460	1077	1.1855	8.841										
C ₂ H ₆ 20.044	1.35	1.02	1.185			422.6	121													
C ₂ H ₆ 20.044	0.32	0.23	0.275	12.79	8.178	20.91	0.8924	3716	1.2307	9.808	0800	5.8"	303.48	60	1.0000	303.48				
C ₂ H ₆ 20.044	0.47	0.40	0.435			425.1	76				1800	1.8"	87.01	68	0.9988	86.99				
C ₂ H ₆ 20.044	0.07	0.07	0.070	16.82	7.176	80.90	0.9885	2785		7.341	0.1"	17.70	76	0.9985	17.67	8.276				
C ₂ H ₆ 20.044	0.11	0.11	0.110	STREAM		31.6									121.59	1005.6				
			M. W.	20.599	815.7															

THE TEXAS COMPANY — MONTEBELLO LABORATORY
YIELD CALCULATIONS

RUN NO. 51-00-2
HOURS 866-878

FRESH FEED				WET GAS				RECYCLE COMBINED FEED				EFFLUENT				NET CHANGE				YIELD BASIS H ₂ + CO FED																																																											
	%	m/hr	#/hr	%	At. Wt. Balance		m/hr	m/hr	m/hr	m/hr	m/hr	m/hr	m/hr	m/hr	#/MCF	CONDENSATE				POLYMER				% Unsat.																																																							
					m/hr	#/hr										#/gal	gal/hr	gal/MCF	#/hr	#/MCF	gal/hr	gal/MCF																																																									
CO 28.00	37.920	9.908	277.51	16.405	2.229	62.43	5.598	16.606	7.927	-7.679	-215.08																																																																				
H ₂ 2.04	58.390	16.267	30.76	51.565	7.008	14.13	17.911	33.168	24.919	-8.249	-16.63																																																																				
CO 42.00																																																																															
CO 28.00	3.110	0.813	35.78	21.105	2.867	126.14	7.331	8.144	10.198	2.054	90.38	9.474																																																																			
N ₂ 28.00	0.490	0.128	3.59	1.495	0.203	5.59	0.519	0.647	0.722																																																																						
CH ₄ 14.00	0.090	0.024	0.39	4.140	0.553	9.03	1.438	1.462	2.001	0.539	8.54	0.906																																																																			
C ₂ H ₆ 36.00				1.415	0.192	5.39	0.491	0.491	0.683	0.192	8.39	0.555																																																																			
C ₃ H ₈ 36.00				0.675	0.092	2.77	0.234	0.234	0.326	0.092	2.77	0.290																																																																			
C ₄ + C ₅																																																																															
C ₂ H ₄ 42.00				1.520	0.207	8.71	0.528	0.528	0.735	0.207	8.71	0.913	4.32	2.016	0.211	7.84	0.822	5.23	1.254	0.131	92.0																																																										
C ₂ H ₂ 42.00				0.135	0.018	0.79	0.047	0.047	0.065	0.018	0.79	0.083	4.24	0.186	0.020																																																																
C ₂ H ₂ 24.00				0.865	0.118	6.62	0.300	0.300	0.418	0.118	6.62	0.694	5.00	1.324	0.139	6.29	0.656	6.10	1.031	0.108	80.3																																																										
C ₂ H ₂ 76.00				0.215	0.029	1.69	0.075	0.075	0.104	0.029	1.69	0.177	4.86	0.348	0.037	1.69	0.177	4.86	0.348	0.036																																																											
C ₂ H ₂ 76.00				0.325	0.044	3.09	0.113	0.113	0.157	0.044	3.09	0.324	5.45	0.567	0.059	3.09	0.324	5.45	0.567	0.059																																																											
C ₂ H ₂ 76.00				0.070	0.010	0.72	0.024	0.024	0.034	0.010	0.72	0.075	5.28	0.137	0.014	0.72	0.075	5.28	0.137	0.014	81.5																																																										
C ₂ H ₂ 24.00				0.070	0.010	0.84	0.024	0.024	0.034	0.010	0.84	0.088	5.54	0.152	0.016	0.84	0.088	5.54	0.152	0.016																																																											
C ₃ + C ₄																																																																															
TOTAL		26.130	348.03		13.590	248.04	34.734	60.864	51.925																																																																						
H ₂ + CO	96.310	25.165	9540	S.C.F.H.	9.237		23.609	49.774		-15.928																																																																					
H ₂ /CO	1.54		104821		3.14			2.13		1.07																																																																					
CUMULATIVE TOTALS																EFFLUENT												MICROFILM OIL																																																			
H ₂ + CO, MCF																Gals/hr																C ₃ + C ₄ , gal				gal/MCF				gal/#																																							
Previous Total																SHIFT RATIO																TOTAL OIL				55.97				5.867																																							
Current Period																(H ₂)(CO) ₂ 10.0																0.1686				8.94				0.937																																							
New Total																(H ₂ O)(CO)																64.91				9.804				10.998				1.153				62.92				6.595				9.757				1.023																			
FRESH FEED CONVERSION — %																TOTAL FEED CONVERSION — %																SELECTIVITY				NET WATER				3.1944				57.54				6.031				6.908				0.724																							
Contraction																CO																H ₂				H ₂ + CO				CO				H ₂				CO + H ₂				C ₃ + C ₄				GROSS WATER				66.48				6.968				8.035				0.842							
47.99																77.50																54.07				63.29				49.21				24.87				32.66				79.44				81.71				8.565																			

*Included in Reactor Effluent Total

g/M3 = 16.91 × g/MCF.
cc/M3 = 141.3 × gal/MCF.

OPERATING CONDITIONS				PRODUCT TESTS				CATALYST DATA											
PRESSURES PSIG				RATES S.C.F.H.				OIL				WATER				INVENTORY DATA			
Oxygen		416		Fresh Feed	9906	* API		49.8	10.9			In Reactor at Start of Period				Screen Analysis			
Natural Gas		417		Recycle	13168	Neut. No.		45.9	47.7			Fresh Catalyst Added	0			Mesh	Microns	%	Microns
Generator Outlet		411		Combined Feed	25074	Sap. No.		56.5	49.7			Total				On 40	419+	11.5	80+
Reactor Inlet		404		Wet Gas — Measured	4925	Hydrox. No.						Catalyst Recovered	15			100	150	51.1	40—80
Condenser Inlet				Adjusted	5152	Bromine No.		70.6				In Reactor at End of Period				150	105	16.1	20—40
Product Accumulator		589		Loss	327	Pour °F.										200	74	11.3	10—20
						Chemicals, % by K ₂ CO ₃						REACTOR d-p. Inches H ₂ O				250	62	1.0	0—20
						*API-51-00-2		48.9	10.9			No. Height				325	44	3.6	
TEMPERATURES — °F.				Recycle/Fresh Feed	1.33							1	12-43.2	69					
Oxygen		357		Inlet Velocity — ft./sec.	0.7							2	43.2-74.4	65					
Natural Gas		694		Fresh Feed Rate — S.C.F.H.	9540	HEMPEL DIST. %		*API				3	74.4-105.6	75					
Generator				per Cu.Ft. Dense Bed	1461	205 °F.						4	105.6-342.0	20					
Quench Accumulator				per Lb. Catalyst	10.90	400		74.0	54.8			0	0-12	26					
Reactor Inlet		501		per sq. ft.	14455	400-550		12.6	37.2			Total	255						
Condenser Inlet						550+		13.4											
Product Accumulator		57																	
Catalyst No.		Height*				A. S. T. M. DIST. ON													
1	12.0	519				Naphtha °F.													
2	43.2	655				IBP		106											
3	74.4	689				10%		142											
5	136.8	631				50%		230											
7	199.2	611				90%		348											
8	220.4	615				EP		400											
9	261.6	612				Rec.		98.0											
10	292.8	599																	
11	311.0	576																	
12	342.0	561																	

GAS ANALYSES				GENERATOR BALANCE												WEIGHT BALANCE					
HOUR			AVERAGE	M/HR	C	H	O		Mol %	M/HR	C	H	O			#/hr	Measured	At. Wt. Balance			
FRESH FEED								CO 28.000	0.36	7.222				14.514		WET GAS	232.31	249.04			
CO 28.000	37.59	38.26	37.920	9.908	9.908		9.908	CO 28.000								OIL	33.51	33.51			
H ₂ 2.04	58.62	58.16	58.390	15.257		30.514		CO 28.000								WATER	66.48	66.48			
CO ₂ 42.00	3.15	3.07	3.110	0.813	0.813		1.626	CO 44.000	1.84	0.180	0.180			0.560		TOTAL	332.30	348.03			
N ₂ 28.00	0.58	0.40	0.490	0.128				N 28.00	1.85	0.181						FRESH FEED	348.03				
CH ₄ 14.00	0.07	0.11	0.090	0.024	0.024	0.096		CH ₄ 16.000	83.84	8.186	8.186	32.744				WEIGHT BALANCE	95.48				
			M. W.	13.519				C ₂ H ₆ 30.000	8.13	0.794	1.888	4.764									
			H ₂ O 18.00			8.261	4.131	C ₂ H ₄ 28.000	3.87	0.378	1.134	3.024				WET GAS FACTOR	1067711				
						26.130	10.745	C ₂ H ₂ 26.000	0.07	0.007	0.028	0.070				INDICATED LOSS--S C F H	287				
								C ₂ H ₂ 26.000	0.04	0.004	0.020	0.048									
			BALANCE	96.49	25.62	106.02		TOTAL	19.113		11.136	40.650	14.775								
WET GAS				GAS FLOW RATES										O/C # 1.33		LIQUID PRODUCT RATES					
CO 28.00	16.71	16.10	16.405		VTR	PRESSURE	TEMP.	S. C. F. H.	M. W.	M/HR	HOUR	GAGE	GAL	'F	FACTOR	GAL AT 6"	APP #/GAL	#	#/HR GAL/HR		
H ₂ 2.04	52.41	50.72	51.565		FRESH FEED	404.3	68														
CO ₂ 42.00	20.22	21.99	21.105	38.66	8.508	20.47	0.9981	9906	1.474	26.130											
N ₂ 28.00	1.43	1.55	1.495		WET GAS	1.6	57				1600	7.61*	399.50	64	0.9980	398.70	50.9	8575.8	33.51		
CH ₄ 16.00	4.16	4.12	4.140	115.14	8.245	4.026	1.0029	4825	1.259	12.728	1600	7.33*	387.50	65	0.9975	386.53	6.459	2496.6	5.143		
H ₂ 2.04	1.33	1.50	1.415		RECYLE	402.2	123				1600	1.24*	62.73	57	1.0015	62.88	48.9		410.2		
C ₂ H ₆ 30.00	0.65	0.70	0.675	50.54	9.812	20.42	0.9444	12040	1.259	31.759		0.3*	13.28	60	1.0000	13.28	6.530	86.7			
C ₂ H ₄ 28.00	1.45	1.61	1.520		BLEED	402.2	123														
C ₂ H ₂ 26.00	0.12	0.15	0.135	5.02	9.253	20.42	0.9444	1128	1.259	2.975											
CH ₄ 16.00	0.87	0.86	0.865		NATURAL GAS	416.8	195	13168		54.754											
C ₂ H ₆ 30.00	0.21	0.22	0.215	19.79	8.213	20.77	0.8910	3702	1.2307	9.755	1800	3.5*	182.44	64	0.9996	182.39	10.9	1517.7	66.48		
C ₂ H ₄ 28.00	0.32	0.33	0.325		OXYGEN	416.2	61				1800	1.8*	87.01	68	0.9998	86.99	8.276	719.9	8.033		
C ₂ H ₂ 26.00	0.07	0.07	0.070	18.82	7.016	20.76	0.9990	8728		7.722											
CH ₄ 16.00	0.07	0.07	0.070		STREAM	30.3															
			M. W.	18.252	215.7																

*Included in Reactor Effluent Total

$$g/M3 = 16.91 \times = MCF$$
[illegible]

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	#/MCF	#/gal	gal/hr	gal/MCF	#/hr	#/MCF	#/gal	gal/MCF	%	Unsat.
CO H ₂ CO ₂ N ₂ CH ₄ C ₂ H ₆ C ₃ H ₈ C ₄ + C ₅ C ₂ H ₄ C ₂ H ₂ <																					

*Included in Reactor Effluent Total

g/M3 = 16.91 × MCF
cc/M3 = 141.3 × gal/MCF

OPERATING CONDITIONS				PRODUCT TESTS				CATALYST DATA			
PRESSURES PSIG		RATES S.C.F.H.		OIL		WATER		INVENTORY DATA		PARTICLE SIZE	
Oxygen	425	Fresh Feed	9966	* API	49.2	10.7	In Reactor at Start of Period		Screen Analysis	Sedimentation	
Natural Gas	427	Recycle	12508	Neut. No.	46.4	44.7	Fresh Catalyst Added 57	86	Mesh	Microns	%
Generator Outlet	421	Combined Feed	22474	Sap. No.	53.1	47.8	Total		On 40	419+	11.0
Reactor Inlet	415	Wet Gas—Measured	4144	Hydrox. No.			Catalyst Recovered	24	100	150	49.2
Condenser Inlet		Adjusted	4369	Bromine No.	74.4		In Reactor at End of Period		150	105	17.4
Product Accumulator	393	Loss	224	Pour "F"			Pour "F"		200	74	11.4
				Chemicals, % by K ₂ CO ₃		12.0	REACTOR 4-p. Inches H ₂ O		250	62	2.2
							No. Height		325	44	3.8
							1	12-43.2	64	325	5.0
TEMPERATURES—°F.		Recycle/Fresh Feed	1.26				2	43.2-74.4	62	CATALYST	
Oxygen	350	Inlet Velocity—ft./sec.	0.7				3	74.4-105.6	76	Bulk Density, Lbs./Cu.Ft.	
Natural Gas	707	Fresh Feed Rate—S.C.F.H. CO ₂ H ₂	9633	HEMPEL DIST. %		*API	4	105.6-342.0	55	Aerated	
Generator		per Cu. Ft. Dense Bed	1259	205 °F.			5	0-12	24	Settled	
Quench Accumulator		per Lb. Catalyst	9.92	400	74.6	54.9	6			150	
Reactor Inlet				400-450			7			Compacted	
Condenser Inlet	822	per sq. ft.	14595	550+	13.3	36.3	Total	281		170	
Product Accumulator					12.1					Particle Density, gm./cc.	
		Heat Transfer Calculations					CALCULATED FROM dp			4.4	
Catalyst No.	Height "	Data Not Available		A. S. T. M. DIST. ON			Density, Lbs./Cu.Ft.	126		NH ₃ Value, ml./gm.	
1	12.0	549		Naphtha °F.			Inventory, Lbs.	964		N ₂ Surface, m ² /gm.	
2	43.2	709		IBP	96		Bed Depth, Ft.	11.59	CHEMICAL ANALYSIS		
3	74.4	742		10%	136		Volume, Cu. Ft.	7.65	Fe		
4	136.8	681		50%	228				C		
5	199.2	660		30%	352				O		
6	230.4	666		EP	401				H		
7	261.6	661		Rec.	98.0				K ₂ O, W+, % basis Fe		
8	292.8	655							X-Ray Analysis—		
9	311.0	631							Fe ₂ O ₃		
10	342.0	618							Fe ₂ O ₃		
									Fe		