

Table 1
Gas Phase Tests

CONTAINS PRELIMINARY
PATENTABLE DATA
NOT FOR PUBLICATION

Catalyst (on Al ₂ O ₃)	Batch #	Composition (wt%)		Gas Phase Run #	Pressure (Psig)	Temp. (°C)	GHSV (h ⁻¹)	CO/H ₂	Usage (ΔCO/ΔH ₂)	X _{CO/H₂}	X _{CO}	X _{H₂}	Bulk Activity mol syngas/ kg cat/hr.	Specific Activity mol CO/ mol metal/min
		Co	Zr											
Co(NO ₃) ₂ /Zr	8466-2	4.2	7.1	7977-52-2 (syngas activation)	300	260	1110	0.98	0.60	35%	26	43	23.2	0.20
					300	280	1110	0.98	0.59	59%	44	73	39.5	0.33
Co(NO ₃) ₂ /Zr	8466-2	4.2	7.1	8413-1-2 (H ₂ activation)	300	220	1100	1.0	0.47	13%	8	17	8.7	0.064
					300	240	1100	1.0	0.50	38%	26	51	26.2	0.20
Co/Zr	8466-4	4.0	6.4	8413-12-4 (syngas activation)	300	220	1002	1.1	0.48	14%	9	18	6.1	0.040
					300	240	1002	1.1	0.57	40%	35	62	21.5	0.16
					300	260	1002	1.1	0.56	73%	52	94	32.4	0.29
Co/Zr	8466-4	4.0	6.4	8413-20-4 (H ₂ activation)	300	220	1157	1.1	0.48	26%	16	37	12.9	0.10
					300	240	1157	1.1	0.47	53%	33	76	26.4	0.21
					300	260	1157	1.1	0.53	69%	46	94	34.1	0.29

Table 1 (Cont'd)
Gas Phase Tests

CONTAINS POTENTIALLY
 PATENTABLE DATA -
 NOT FOR PUBLICATION

Catalyst (on Al ₂ O ₃)	Batch #	Gas Phase Run #	Selectivity, Wt%						
			C ₁ -	C ₂₋₄ -	C ₅₋₁₁ -	C ₁₂₋₁₈ -	C ₁₉₋₂₃ -	C ₂₄ ¹ -	C ₅₋₁₈ -
Co(NO ₃) ₂ /Zr	8466-2	7977-52-2 (syngas act.)	13.3	9.5	25.8	25.8	10.9	14.7	51.6
			12.7	8.4	26.1	25.7	11.1	16.0	51.8
Co(NO ₃) ₂ /Zr	8466-2	8413-1-2 (H ₂ act.)	8.8	8.3	8.3	32.5	17.9	24.2	40.8
			8.6	8.0	24.5	24.2	14.2	20.5	48.7
Co/Zr	8466-4	8413-12-4 (syngas act.)	13.5	19.3	34.3	19.0	9.5	4.4	53.3
			11.7	14.3	27.8	20.3	11.3	14.6	48.1
			17.8	15.3	28.0	19.0	9.7	9.4	47.8
Co/Zr	8466-4	8413-20-4 (H ₂ act.)	16.3	30.6	32.2	7.7	6.9	6.3	39.9
			11.2	15.6	29.2	21.8	9.6	12.6	51.0
			14.1	13.1	25.0	22.6	11.7	13.5	47.6

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Table 2

Comparative Catalyst Test Data

CONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

Catalyst/ Run No.	Composition, Wt. %		P, psig	T, °C	SV, L/g/hr	Feed CO/H ₂	Usage CO/H ₂	z Conv. H ₂ /CO	z Conv. H ₂	x Conv. CO	Bulk Activity mol syngas/ kg cat/hr	Specific Activity mol CO/ mol metal/min	Hydrocarbon Selectivity, Wt. %						Fuels	
	C ₁	C ₂ -C ₄											C ₅ -C ₁₁	C ₁₂ -C ₁₈	C ₁₉ -C ₂₃	C ₂₄ ¹	C ₅ -23			
¹ Co ₂ (CO) ₈ / Zr(OPr) ₄ /Al ₂ O ₃ 7595-60-648.4	Co 3.81	Zr 6.04	309	220.9	1.65	1.05	0.57	17.8	23.2	12.6	13.1	0.12	13.6	24.9	33.2	14.3	7.6	6.4	55.1	
			305	250.8	1.64	1.57	0.57	25.3	38.9	16.6	18.5	0.19	11.5	10.4	29.2	15.3	12.5	21.1	57.0	
			305	281.0	1.64	1.57	0.59	31.7	51.2	19.4	23.2	0.22	28.6	20.2	30.4	12.1	3.9	4.8	46.4	
¹ Ru ₂ (CO) ₁₂ / Zr(OPr) ₄ /Al ₂ O ₃ 7887-36-478	Ru 2.76	Zr 4.93	316	241.1	2.04	1.87	0.95	7.5	10.6	5.7	6.8	0.20	9.7	11.5	12.2	20.5	18.5	27.6	51.2	
			607	281.6	2.04	1.77	0.57	25.4	45.4	14.2	23.2	0.51	14.6	13.6	37.1	20.1	9.3	5.3	66.5	
			600	276.7	0.97	1.33	0.51	39.9	61.6	23.6	17.3	0.36	9.3	10.2	36.7	27.5	8.7	7.6	72.9	
¹ Co ₂ (CO) ₈ /Al ₂ O ₃ 7887-67-445	Co 4.71		300	239.4	2.06	1.50	0.67	16.7	25.1	11.1	16.4	0.13	9.6	11.5	23.7	22.7	15.3	17.2	61.7	
		300	240.9	1.07	1.84	0.79	21.6	34.3	14.7	10.3	0.09	7.6	9.8	24.9	22.1	14.9	20.7	61.9		
		300	238.7	2.07	2.00	0.88	14.7	23.4	10.3	13.6	0.13	7.9	9.4	20.6	25.0	18.4	18.7	64.0		
¹ FeCo ₃ (CO) ₁₂ / Al ₂ O ₃ 6385-22-677	Fe 0.85	Co 2.60	315	242.6	1.86	1.02	0.42	20.2	28.7	11.9	16.8	0.14	10.1	11.0	26.0	20.4	16.7	15.8	63.1	
			320	261.1	1.09	2.14	0.40	17.5	39.0	7.4	8.5	0.07	13.8	15.7	33.5	21.2	10.0	5.8	64.7	
			308	281.0	1.92	2.02	0.60	24.5	46.2	13.8	21.0	0.22	16.9	15.8	35.6	19.3	7.9	4.5	62.8	
¹ Co ₂ (CO) ₈ / Ti(OPr) ₄ /Al ₂ O ₃ 7088-1-589	Co 3.49	Ti 8.55	300	239	0.90	2.02	0.60	24.0	46.0	13.1	9.6	0.10	7.1	12.3	30.4	22.8	12.6	14.8	65.8	
			600	258	1.07	1.57	0.46	26.2	42.5	14.4	21.9	0.20	15.4	15.5	34.3	18.8	7.9	8.1	61.0	
			310	282	1.82	1.51	0.56	20.7	34.3	11.7	16.8	0.16	24.8	15.6	30.3	16.9	9.3	3.1	56.5	
¹ Co ₂ (CO) ₈ / Zr(OPr) ₄ /Al ₂ O ₃ 7888-33-731	Co 5.07	Zr 4.39	300	239	0.86	1.95	0.41	19.4	40.7	8.5	7.5	0.04	8.0	11.3	32.9	22.5	12.2	13.1	67.6	
			305	262	0.86	1.95	0.51	32.3	63.0	16.5	12.4	0.08	7.7	9.6	29.2	24.1	12.9	16.5	66.2	
			300	259	1.73	0.98	0.41	35.8	50.3	21.0	27.6	0.16	14.1	12.0	34.4	19.8	9.2	10.5	63.4	
¹ FeCo ₃ (CO) ₁₂ / K/Al ₂ O ₃ 6385-60-707	Fe 0.78	Co 2.48	K 0.02	320	240	1.6	2.01	0.64	11.9	21.9	6.9	8.4	0.10	9.8	11.7	31.0	22.1	14.6	10.8	67.7
				320	260	1.6	2.03	0.68	20.6	37.2	12.6	14.5	0.18	10.0	11.6	34.1	24.9	12.3	7.1	71.3
				298	282	1.5	1.01	0.50	41.0	55.0	27.3	27.3	0.27	19.1	15.7	35.4	17.4	7.5	4.9	60.3
² Co ₂ (CO) ₈ / Zr(OPr) ₄ /Al ₂ O ₃ 6523-1-4	Co 5.07	Zr 7.82	302	241	2.0	0.99	0.51	42.8	66.0	29.0	35.3	0.29	7.9	13.7	37.0	23.4	8.9	9.1	69.3	
			307	258	2.0	1.48	0.53	34.5	66.0	19.9	28.7	0.24	7.2	10.8	34.1	27.9	8.6	11.4	70.6	
			302	260	1.0	1.87	0.58	37.6	68.3	21.2	15.8	0.14	4.9	7.1	26.2	26.2	17.2	18.4	69.6	

¹Synthesis Gas Activation²H₂ Activation

Table 3

Slurry Screening Summary
7800-1-58922.3 wt% (91.10 mol) $\text{CO}_2(\text{CO})_8/\text{Ti}(\text{OPr})_4/\text{Al}_2\text{O}_3$ CONTAINS ESSENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

Sample No.	Time on Stream, h	P, psig	T, °C	SV, NL/g cat/hr	XXCO+H ₂	XXCO	XXH ₂	Feed CO/H ₂	Usage ΔCO/ΔH ₂	Bulk Activity mol syngas/kg cat/h	Specific Activity mol CO/mol Co/min	Selectivity Wt%						
												C ₁	C ₂ -C ₄	C ₅ -C ₁₁	C ₁₂ -C ₁₈	C ₁₉ -C ₂₃	C ₇ -C ₉	C ₅ -C ₂₃
4	21.2	310	239.5	1.80	31.0	20.1	41.8	0.90	0.47	24.9	0.22	11.4	19.1	38.7	18.8	6.3	5.7	63.8
6	45.8	300	239.6	1.80	22.0	11.4	37.7	1.40	0.45	17.7	0.15	9.4	14.8	33.6	24.6	9.9	7.7	68.1
9	69.8	300	239.3	1.82	16.0	9.2	32.4	2.05	0.58	13.7	0.14	8.4	13.2	31.8	20.9	13.1	12.6	65.8
12	94.8	300	239.4	0.90	24.0	13.1	46.0	2.02	0.57	9.6	0.10	7.1	12.3	30.4	22.8	12.6	14.8	65.8
15	166.8	600	238.2	0.96	19.5	10.4	34.5	1.63	0.49	8.4	0.08	11.3	15.7	29.2	18.6	11.7	13.5	59.5
17	191.1	310	260.3	0.90	27.7	15.0	53.4	2.01	0.56	11.1	0.11	12.3	13.4	34.5	22.0	8.2	9.6	64.7
20	214.6	312	262.6	1.81	19.9	9.8	40.2	2.01	0.49	16.0	0.15	13.0	11.9	30.3	24.1	11.0	9.7	65.4
22	238.6	310	260.0	1.81	22.0	11.2	38.3	1.50	0.44	17.8	0.15	14.5	12.2	33.4	21.9	9.4	8.6	64.7
24	262.2	600	258.3	1.87	26.2	14.4	42.5	1.37	0.46	21.9	0.20	15.4	15.5	34.3	18.8	7.9	8.1	61.0
26	335.5	600	259.0	0.96	23.2	13.0	36.0	1.28	0.45	9.9	0.09	20.9	17.8	32.3	16.7	6.0	6.3	55.0
31	383.3	310	281.4	0.90	28.6	15.8	47.8	1.50	0.50	11.4	0.11	26.8	17.5	32.3	14.7	4.3	4.4	51.3
33	407.1	310	281.6	1.82	20.7	11.7	34.3	1.51	0.62	16.8	0.16	24.8	15.6	30.3	16.9	9.3	3.1	56.5
35	431.1	310	281.0	1.81	18.0	10.2	33.6	2.01	0.61	14.6	0.16	23.3	14.2	28.8	18.4	11.2	4.1	58.4
37	503.6	310	259.2	1.81	13.2	10.7	18.3	2.01	1.17	10.7	0.16	16.1	10.4	19.8	20.9	21.6	11.2	62.3
41	526.8	310	238.5	1.82	7.8	5.1	13.1	2.01	0.78	6.3	0.08	21.9	14.3	21.4	11.8	17.0	13.6	58.2

TABLE 4

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co/Ti/Al₂O₃
SAMPLE NO: 7888+1+589+4

REACTOR LOADING, MLS :	408.0	T, C :	239.5	FEED RATIO,	
CATALYST LOADING, WT% :	22.3	P, PSIG :	310	CU/H ₂ :	0.98
TIME ON STREAM, HRS :	21.2	GHSV, 1/HR:	401.1		

USAGE RATIO, CO/H ₂ :	0.47	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	31.04	MOL SYNGAS/KG CAT/HR:	24.89
%CO CONV.	20.05	SPECIFIC ACTIVITY,	
%H ₂ CONV.	41.81	MOL CO/MOL METAL/MIN:	0.22

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	7.49	H ₂ O:	11.41
OXYGENATES :	0.10	CO :	76.41
CO ₂ :	0.54	H ₂ :	4.05

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	11.36	C ₄ +ENE :	5.59
C ₂ TANE :	2.16	C ₅ +C ₁₁ :	38.65
C ₂ +ENE :	0.64	C ₁₂ +C ₁₈ :	18.81
C ₃ TANE :	1.69	C ₁₉ +C ₂₃ :	6.30
C ₃ +ENE :	6.63	C ₂₄ + ₃₄ :	4.64
C ₄ ISO+ANE:	2.51	C ₃₅ +	1.02

FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	38.65
DIESEL (C ₉ +C ₂₅) :	39.55

% ELEMENTAL RECOVERY:	CARBON :	95.72
	HYDROGEN:	94.19
	OXYGEN :	99.29

Table 5

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 4

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	11.36	42.68	0.00	0.00	0.00	0.00
2	2.16	4.33	0.64	1.37	0.00	0.00
3	1.69	2.31	6.63	9.48	0.00	0.00
4	2.45	2.53	5.59	6.00	0.07	0.07
5	2.66	2.22	5.75	4.94	0.20	0.17
6	6.82	4.77	0.00	0.00	0.22	0.16
7	2.88	1.73	1.98	1.21	0.24	0.14
8	2.49	1.31	1.68	0.90	0.64	0.34
9	2.40	1.13	2.09	1.00	0.57	0.27
10	2.25	0.95	1.68	0.72	0.63	0.27
11	1.95	0.75	1.00	0.39	0.54	0.21
12	1.94	0.68	0.86	0.31	0.23	0.08
13	1.97	0.64	0.72	0.24	0.23	0.08
14	2.08	0.63	0.52	0.16	0.24	0.07
15	2.44	0.69	0.00	0.00	0.26	0.07
16	2.35	0.63	0.00	0.00	0.27	0.07
17	2.21	0.55	0.00	0.00	0.30	0.07
18	1.93	0.46	0.00	0.00	0.26	0.06
19	1.73	0.39	0.00	0.00	0.22	0.05
20	1.34	0.29	0.00	0.00	0.16	0.03
21	1.06	0.21	0.00	0.00	0.04	0.01
22	0.91	0.18	0.00	0.00	0.02	0.00

Table 5 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 4

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.80	0.15	0.00	0.00	0.02	0.00
24	0.69	0.12	0.00	0.00	0.01	0.00
25	0.64	0.11	0.00	0.00	0.00	0.00
26	0.59	0.10	0.00	0.00	0.00	0.00
27	0.52	0.08	0.00	0.00	0.00	0.00
28	0.33	0.05	0.00	0.00	0.05	0.01
29	0.21	0.03	0.00	0.00	0.02	0.00
30	0.26	0.04	0.00	0.00	0.07	0.01
31	0.29	0.04	0.00	0.00	0.06	0.01
32	0.16	0.02	0.00	0.00	0.07	0.01
33	0.20	0.03	0.00	0.00	0.06	0.01
34	0.31	0.04	0.00	0.00	0.09	0.01
35	0.33	0.04	0.00	0.00	0.00	0.00
36	0.24	0.03	0.00	0.00	0.00	0.00
37	0.18	0.02	0.00	0.00	0.00	0.00
38	0.12	0.01	0.00	0.00	0.00	0.00
39	0.10	0.01	0.00	0.00	0.00	0.00
40	0.06	0.01	0.00	0.00	0.00	0.00

TABLE 6

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co/Ti/AL2O3
SAMPLE No: 7888+1+589+6

REACTOR LOADING, MLS :	408.0	T, C :	239.6	FEED RATIO,	
CATALYST LOADING, WT%:	22.3	P, PSIG :	308	CO/H2:	1.48
TIME ON STREAM, HRS :	45.8	GHSV, L/HR:	401.6		

USAGE RATIO, CO/H2 :	0.45	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	22.04	MOL SYNGAS/KG CAT/HR:	17.69
%CO CONV. :	11.43	SPECIFIC ACTIVITY,	
%H2 CONV. :	37.69	MOL CO/MOL METAL/MIN:	0.15

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	4.59	H2O:	6.81
OXYGENATES :	0.06	CO :	85.33
CO2 :	0.31	H2 :	2.91

HYDROCARBON SELECTIVITY, WT%:

C1 :	9.35	C4+ENE :	4.74
C2+ANE :	1.15	C5+C11 :	33.64
C2+ENE :	0.80	C12+C18:	24.64
C3+ANE :	1.05	C19+C23:	9.86
C3+ENE :	5.44	C24+34 :	6.34
C4 ISO+ANE:	1.61	C35+ :	1.39

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	33.64
DIESEL (C9+C25) :	48.05

% ELEMENTAL RECOVERY:	CARBON :	98.18
	HYDROGEN:	94.48
	OXYGEN :	100.01

Table 7

HYDROCARBON PRODUCT DISTRIBUTION

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 6

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	9.35	40.86	0.00	0.00	0.00	0.00
2	1.15	2.69	0.80	2.00	0.00	0.00
3	1.05	1.66	5.44	9.06	0.00	0.00
4	1.61	1.94	4.74	5.92	0.00	0.00
5	1.83	1.78	5.41	5.41	0.17	0.17
6	6.31	5.13	0.00	0.00	0.20	0.16
7	2.18	1.52	1.96	1.40	0.15	0.10
8	1.81	1.11	1.63	1.52	0.26	0.16
9	1.84	1.01	2.03	1.12	0.43	0.23
10	1.80	0.89	1.88	0.94	0.48	0.24
11	1.56	0.70	1.29	0.59	0.41	0.18
12	1.92	0.79	1.21	0.50	0.41	0.17
13	2.07	0.79	1.14	0.44	0.20	0.08
14	2.35	0.83	0.95	0.34	0.23	0.08
15	3.26	1.07	0.00	0.00	0.24	0.08
16	3.37	1.04	0.00	0.00	0.27	0.08
17	3.31	0.96	0.00	0.00	0.31	0.09
18	3.07	0.85	0.00	0.00	0.32	0.09
19	2.86	0.75	0.00	0.00	0.29	0.08
20	2.25	0.56	0.00	0.00	0.24	0.06
21	1.66	0.39	0.00	0.00	0.11	0.03
22	1.29	0.29	0.00	0.00	0.03	0.01

Table 7 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 6

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.10	0.24	0.00	0.00	0.03	0.01
24	0.94	0.19	0.00	0.00	0.02	0.00
25	0.88	0.17	0.00	0.00	0.00	0.00
26	0.81	0.15	0.00	0.00	0.00	0.00
27	0.71	0.13	0.00	0.00	0.00	0.00
28	0.44	0.08	0.00	0.00	0.07	0.01
29	0.29	0.05	0.00	0.00	0.03	0.01
30	0.35	0.06	0.00	0.00	0.10	0.02
31	0.40	0.06	0.00	0.00	0.08	0.01
32	0.22	0.03	0.00	0.00	0.10	0.01
33	0.27	0.04	0.00	0.00	0.08	0.01
34	0.43	0.06	0.00	0.00	0.13	0.02
35	0.45	0.06	0.00	0.00	0.00	0.00
36	0.32	0.04	0.00	0.00	0.00	0.00
37	0.24	0.03	0.00	0.00	0.00	0.00
38	0.16	0.02	0.00	0.00	0.00	0.00
39	0.13	0.02	0.00	0.00	0.00	0.00
40	0.08	0.01	0.00	0.00	0.00	0.00

TABLE 8

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co/Ti/AL₂O₃
SAMPLE No: 7888+1+589+9

REACTOR LOADING, MLS : 408.0 T, C : 239.3 FEED RATIO,
CATALYST LOADING, WT%: 22.3 F, PSIG : 300 CO/H₂: 2.05
TIME ON STREAM, HRS : 69.8 GHSV, 1/HR: 407.2

USAGE RATIO, CO/H₂ : 0.58 BULK ACTIVITY,
%OVERALL CONV., CO+H₂: 16.77 MOL SYNGAS/KG CAT/HR: 13.66
%CO CONV. : 9.19 SPECIFIC ACTIVITY,
%H₂ CONV. : 32.35 MOL CO/MOL METAL/MIN: 0.14

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 3.03 H₂O: 4.42
OXYGENATES : 0.04 CO : 89.95
CO₂ : 0.23 H₂ : 2.33

HYDROCARBON SELECTIVITY, WT%:

C₁ : 8.37 C₄+ENE : 4.51
C₂TANE : 0.78 C₅+C₁₁ : 31.75
C₂TENE : 0.93 C₁₂+C₁₈: 20.85
C₃TANE : 0.76 C₁₉+C₂₃: 13.14
C₃TENE : 5.01 C₂₄+₃₄ : 10.24
C₄ ISOANE: 1.26 C₃₅+ : 2.38

FUEL FRACTIONS, WT%:

GASOLINE (C₅+C₁₁): 31.75
DIESEL (C₉+C₂₅) : 46.72

% ELEMENTAL RECOVERY: CARBON : 97.02
HYDROGEN: 95.98
OXYGEN : 98.07

Table 9

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 9

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	8.37	39.49	0.00	0.00	0.00	0.00
2	0.78	1.96	0.93	2.52	0.00	0.00
3	0.76	1.30	5.01	9.00	0.00	0.00
4	1.26	1.65	4.51	6.08	0.00	0.00
5	1.44	1.51	5.42	5.85	0.14	0.14
6	6.60	5.79	0.18	0.16	0.00	0.00
7	1.82	1.38	2.66	2.05	0.13	0.09
8	1.54	1.02	1.86	1.25	0.22	0.14
9	1.41	0.83	1.94	1.16	0.30	0.18
10	1.36	0.72	1.78	0.96	0.43	0.23
11	1.08	0.52	1.15	0.56	0.30	0.14
12	1.45	0.64	1.15	0.52	0.38	0.17
13	1.59	0.65	1.12	0.46	0.21	0.09
14	1.72	0.65	0.95	0.37	0.27	0.10
15	1.92	0.68	0.72	0.26	0.28	0.10
16	2.79	0.93	0.00	0.00	0.14	0.05
17	2.84	0.89	0.00	0.00	0.16	0.05
18	2.98	0.88	0.00	0.00	0.18	0.05
19	3.12	0.88	0.00	0.00	0.17	0.05
20	2.94	0.79	0.00	0.00	0.20	0.05
21	2.60	0.66	0.00	0.00	0.16	0.04
22	2.04	0.50	0.00	0.00	0.11	0.03

Table 9 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 9

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.74	0.40	0.00	0.00	0.05	0.01
24	1.51	0.34	0.00	0.00	0.04	0.01
25	1.43	0.31	0.00	0.00	0.00	0.00
26	1.30	0.27	0.00	0.00	0.00	0.00
27	1.13	0.22	0.00	0.00	0.00	0.00
28	0.81	0.15	0.00	0.00	0.09	0.02
29	0.62	0.11	0.00	0.00	0.06	0.01
30	0.61	0.11	0.00	0.00	0.11	0.02
31	0.64	0.11	0.00	0.00	0.09	0.02
32	0.42	0.07	0.00	0.00	0.07	0.01
33	0.48	0.08	0.00	0.00	0.07	0.01
34	0.64	0.10	0.00	0.00	0.12	0.02
35	0.63	0.10	0.00	0.00	0.00	0.00
36	0.52	0.08	0.00	0.00	0.00	0.00
37	0.41	0.06	0.00	0.00	0.00	0.00
38	0.31	0.04	0.00	0.00	0.00	0.00
39	0.29	0.04	0.00	0.00	0.00	0.00
40	0.24	0.03	0.00	0.00	0.00	0.00

TABLE 10
 MASS BALANCE
 PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
 PATENTABLE DATA-
 NOT FOR PUBLICATION

 CATALYST : Co/Ti/Al₂O₃
 SAMPLE NO: 7888+1+589+12

REACTOR LOADING, MLS :	408.0	T, C :	239.4	FEED RATIO,	
CATALYST LOADING, WT%:	22.2	P, PSIG :	300	CU/H ₂ :	2.02
TIME ON STREAM, HRS :	94.8	GHSV, L/HR:	200.3		

USAGE RATIO, CO/H ₂ :	0.57	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	23.99	MOL SYNGAS/KG CAT/HR:	9.61
%CO CONV. :	13.09	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	46.00	MOL CO/MOL METAL/MIN:	0.10

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	4.93	H ₂ O:	6.71
OXYGENATES :	0.06	CO :	85.91
CO ₂ :	0.49	H ₂ :	1.89

HYDROCARBON SELECTIVITY, WT%:

C1 :	7.12	C4+ENE :	3.83
C2+ANE :	0.70	C5+C11 :	30.41
C2+ENE :	0.68	C12+C18:	22.82
C3+ANE :	0.68	C19+C23:	12.63
C3+ENE :	4.29	C24+34 :	12.79
C4 ISO+ANE:	1.07	C35+ :	2.99

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	30.41
DIESEL (C9+C25) :	51.34

% ELEMENTAL RECOVERY:	CARBON :	97.12
	HYDROGEN:	97.68
	OXYGEN :	98.15

Table 11

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 12

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	7.12	37.43	0.00	0.00	0.00	0.00
2	0.70	1.96	0.68	2.03	0.00	0.00
3	0.68	1.31	4.29	8.61	0.00	0.00
4	1.07	1.55	3.83	5.75	0.00	0.00
5	1.30	1.52	4.46	5.36	0.12	0.14
6	2.70	2.65	2.18	2.18	0.00	0.00
7	2.32	1.95	1.35	1.16	0.11	0.09
8	1.71	1.26	1.81	1.36	0.17	0.13
9	1.77	1.16	2.22	1.48	0.36	0.24
10	1.76	1.04	2.07	1.24	0.59	0.35
11	1.43	0.77	1.37	0.75	0.61	0.33
12	1.57	0.78	1.20	0.60	0.65	0.32
13	2.09	0.96	1.01	0.47	0.65	0.30
14	2.14	0.91	0.90	0.39	0.29	0.12
15	2.24	0.89	0.71	0.29	0.27	0.11
16	2.86	1.06	0.09	0.03	0.14	0.05
17	2.82	0.99	0.07	0.02	0.13	0.05
18	2.88	0.95	0.00	0.00	0.11	0.04
19	2.83	0.89	0.00	0.00	0.08	0.03
20	2.56	0.76	0.00	0.00	0.09	0.03
21	2.46	0.70	0.00	0.00	0.05	0.01
22	2.32	0.63	0.00	0.00	0.05	0.01

Table 11 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 12

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.12	0.55	0.00	0.00	0.06	0.02
24	1.88	0.47	0.00	0.00	0.04	0.01
25	1.78	0.43	0.00	0.00	0.00	0.00
26	1.62	0.37	0.00	0.00	0.00	0.00
27	1.41	0.31	0.00	0.00	0.00	0.00
28	1.01	0.22	0.00	0.00	0.11	0.02
29	0.78	0.16	0.00	0.00	0.07	0.01
30	0.77	0.15	0.00	0.00	0.13	0.03
31	0.80	0.15	0.00	0.00	0.12	0.02
32	0.53	0.10	0.00	0.00	0.09	0.02
33	0.61	0.11	0.00	0.00	0.09	0.02
34	0.80	0.14	0.00	0.00	0.15	0.03
35	0.78	0.13	0.00	0.00	0.00	0.00
36	0.65	0.11	0.00	0.00	0.00	0.00
37	0.51	0.08	0.00	0.00	0.00	0.00
38	0.39	0.06	0.00	0.00	0.00	0.00
39	0.36	0.06	0.00	0.00	0.00	0.00
40	0.30	0.04	0.00	0.00	0.00	0.00

TABLE 12

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA
NET FOR PUBLICATION

CATALYST : Co/Ti/Al₂O₃
SAMPLE No: 7888+1+589+15

REACTOR LOADING, MLS :	408.0	T, C :	238.2	FEED RATIO,	
CATALYST LOADING, WT%:	22.3	P, PSIG :	500	CO/H ₂ :	1.63
TIME ON STREAM, HRS :	166.8	GHSV, L/HR:	214.5		

USAGE RATIO, CO/H ₂ :	0.49	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	19.54	MOL SYNGAS/KG CAT/HR:	8.38
%CO CONV. :	10.36	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	34.47	MOL CO/MOL METAL/MIN:	0.08

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	4.01	H ₂ O:	5.00
OXYGENATES :	0.06	CO :	87.54
CO ₂ :	0.57	H ₂ :	2.81

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	11.28	C ₄ +ENE :	4.48
C ₂ +ANE :	0.96	C ₅ +C ₁₁ :	29.20
C ₂ +ENE :	1.04	C ₁₂ +C ₁₈ :	18.63
C ₃ +ANE :	1.42	C ₁₉ +C ₂₃ :	11.74
C ₃ +ENE :	5.65	C ₂₄ + ₃₄ :	11.15
C ₄ ISO+ANE:	2.10	C ₃₅ + :	2.36

FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	29.20
DIESEL (C ₉ +C ₂₅) :	43.95

% ELEMENTAL RECOVERY:	CARBON :	98.13
	HYDROGEN:	93.82
	OXYGEN :	98.39

Table 13

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 15

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	11.28	46.57	0.00	0.00	0.00	0.00
2	0.96	2.11	1.04	2.46	0.00	0.00
3	1.42	2.13	5.65	8.88	0.00	0.00
4	2.01	2.29	4.48	5.29	0.08	0.09
5	1.91	1.75	4.25	4.01	0.00	0.00
6	5.19	3.99	0.00	0.00	0.00	0.00
7	2.43	1.60	1.45	0.98	0.07	0.05
8	2.00	1.16	1.26	0.74	0.48	0.28
9	1.92	0.99	1.60	0.84	0.25	0.13
10	1.62	0.75	1.84	0.87	0.25	0.12
11	1.22	0.52	1.16	0.50	0.28	0.12
12	1.17	0.45	1.18	0.46	0.07	0.03
13	1.21	0.43	1.18	0.43	0.17	0.06
14	1.28	0.43	1.22	0.41	0.19	0.06
15	1.39	0.43	1.27	0.40	0.09	0.03
16	1.51	0.44	1.11	0.33	0.10	0.03
17	1.78	0.49	0.87	0.24	0.11	0.03
18	2.07	0.54	0.57	0.15	0.10	0.03
19	2.25	0.56	0.26	0.06	0.08	0.02
20	2.43	0.57	0.00	0.00	0.06	0.01
21	2.34	0.52	0.00	0.00	0.06	0.01
22	2.18	0.46	0.00	0.00	0.06	0.01

Table 13 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 15

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.97	0.40	0.00	0.00	0.06	0.01
24	1.75	0.34	0.00	0.00	0.05	0.01
25	1.60	0.30	0.00	0.00	0.04	0.01
26	1.46	0.26	0.00	0.00	0.00	0.00
27	1.26	0.22	0.00	0.00	0.00	0.00
28	0.90	0.15	0.00	0.00	0.04	0.01
29	0.72	0.12	0.00	0.00	0.03	0.00
30	0.71	0.11	0.00	0.00	0.00	0.00
31	0.70	0.11	0.00	0.00	0.06	0.01
32	0.75	0.11	0.00	0.00	0.00	0.00
33	0.52	0.07	0.00	0.00	0.02	0.00
34	0.52	0.07	0.00	0.00	0.05	0.01
35	0.57	0.08	0.00	0.00	0.00	0.00
36	0.52	0.07	0.00	0.00	0.00	0.00
37	0.38	0.05	0.00	0.00	0.00	0.00
38	0.33	0.04	0.00	0.00	0.00	0.00
39	0.30	0.04	0.00	0.00	0.00	0.00
40	0.25	0.03	0.00	0.00	0.00	0.00

TABLE 14

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

CATALYST : Co/Ti/Al 203
SAMPLE NO: 7888+1+589+17

REACTOR LOADING, MLS :	408.0	T, C :	260.3	FEED RATIO,	
CATALYST LOADING, WT%:	22.3	P, PSIG :	310	CO/H2:	2.01
TIME ON STREAM, HRS :	191.1	GHSV, L/HR:	200.1		

USAGE RATIO, CO/H2 :	0.56	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	27.73	MOL SYNGAS/KG CAT/HR:	11.09
%CO CONV.	14.95	SPECIFIC ACTIVITY,	
%H2 CONV.	53.37	MOL CO/MOL METAL/MIN:	0.11

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	5.69	H2O:	7.25
OXYGENATES :	0.06	CO :	83.94
CO2 :	1.42	H2 :	1.64

HYDROCARBON SELECTIVITY, WT%:

C1 :	12.29	C4+ENE :	4.28
C2+ANE :	1.68	C5+C11 :	34.45
C2+ENE :	0.70	C12+C18:	21.97
C3+ANE :	0.76	C19+C23:	8.23
C3+ENE :	4.95	C24+34 :	7.89
C4 ISO+ANE:	1.13	C35+ :	1.67

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 34.45
DIESEL (C9+C25) : 45.75

% ELEMENTAL RECOVERY: CARBON : 97.29
HYDROGEN: 96.23
OXYGEN : 98.35

Table 15

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 17

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	12.29	48.65	0.00	0.00	0.00	0.00
2	1.68	3.55	0.70	1.58	0.00	0.00
3	0.76	1.09	4.95	7.47	0.00	0.00
4	1.13	1.23	4.28	4.84	0.00	0.00
5	1.39	1.22	4.91	4.44	0.13	0.11
6	5.67	4.17	0.24	0.18	0.00	0.00
7	2.18	1.38	2.14	1.38	0.31	0.20
8	2.05	1.14	1.90	1.07	0.42	0.24
9	1.91	0.95	2.31	1.16	0.74	0.37
10	1.80	0.80	2.07	0.94	0.90	0.40
11	1.33	0.54	1.30	0.53	0.76	0.31
12	1.64	0.61	1.18	0.45	0.75	0.28
13	1.69	0.58	1.12	0.39	0.47	0.16
14	1.76	0.56	1.00	0.32	0.54	0.17
15	1.85	0.55	1.06	0.32	0.37	0.11
16	2.86	0.80	0.00	0.00	0.32	0.09
17	2.71	0.72	0.00	0.00	0.22	0.06
18	1.88	0.47	0.00	0.00	0.53	0.13
19	1.83	0.43	0.00	0.00	0.07	0.02
20	1.65	0.37	0.00	0.00	0.04	0.01
21	1.61	0.35	0.00	0.00	0.04	0.01
22	1.52	0.31	0.00	0.00	0.04	0.01

Table 15 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 17

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.39	0.27	0.00	0.00	0.04	0.01
24	1.24	0.23	0.00	0.00	0.03	0.01
25	1.13	0.20	0.00	0.00	0.03	0.00
26	1.04	0.18	0.00	0.00	0.00	0.00
27	0.89	0.15	0.00	0.00	0.00	0.00
28	0.64	0.10	0.00	0.00	0.03	0.00
29	0.51	0.08	0.00	0.00	0.02	0.00
30	0.50	0.08	0.00	0.00	0.00	0.00
31	0.49	0.07	0.00	0.00	0.04	0.01
32	0.53	0.07	0.00	0.00	0.00	0.00
33	0.36	0.05	0.00	0.00	0.01	0.00
34	0.37	0.05	0.00	0.00	0.03	0.00
35	0.40	0.05	0.00	0.00	0.00	0.00
36	0.37	0.05	0.00	0.00	0.00	0.00
37	0.27	0.03	0.00	0.00	0.00	0.00
38	0.23	0.03	0.00	0.00	0.00	0.00
39	0.21	0.02	0.00	0.00	0.00	0.00
40	0.17	0.02	0.00	0.00	0.00	0.00

TABLE 16

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co/Ti/Al₂O₃
SAMPLE No: 7888+1+589+20

REACTOR LOADING, MLS : 408.0 T, C : 262.6 FEED RATIO,
CATALYST LOADING, WT%: 22.3 P, PSIG : 312 CO/H₂: 2.01
TIME ON STREAM, HRS : 214.6 GHSV, L/HR: 403.8

USAGE RATIO, CO/H₂ : 0.49 BULK ACTIVITY,
%OVERALL CONV., CO+H₂: 19.87 MOL SYNGAS/KG CAT/HR: 16.04
%CO CONV. : 9.79 SPECIFIC ACTIVITY,
%H₂ CONV. : 40.15 MOL CU/MOL METAL/MIN: 0.15

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 4.21 H₂O: 5.30
OXYGENATES : 0.04 CO : 87.68
CO₂ : 0.70 H₂ : 2.06

HYDROCARBON SELECTIVITY, WT%:

C₁ : 13.01 C₄+ENE : 3.84
C₂TANE : 1.23 C₅+C₁₁ : 30.34
C₂+ENE : 0.87 C₁₂+C₁₈: 24.06
C₃+ANE : 0.63 C₁₉+C₂₃: 10.96
C₃+ENE : 4.41 C₂₄+₃₄ : 8.28
C₄ ISO+ANE: 0.97 C₃₅+ : 1.41

FUEL FRACTIONS, WT%:

GASOLINE (C₅+C₁₁): 30.34
DIESEL (C₉+C₂₅) : 48.79

% ELEMENTAL RECOVERY: CARBON : 99.17
HYDROGEN: 97.04
OXYGEN : 99.64

Table 17

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 20

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	13.01	51.82	0.00	0.00	0.00	0.00
2	1.23	2.61	0.87	1.97	0.00	0.00
3	0.63	0.91	4.41	6.69	0.00	0.00
4	0.97	1.07	3.84	4.37	0.00	0.00
5	1.25	1.11	4.57	4.16	0.12	0.10
6	5.20	3.85	0.18	0.14	0.00	0.00
7	1.76	1.12	2.14	1.39	0.20	0.13
8	1.61	0.90	1.79	1.02	0.26	0.15
9	1.55	0.77	2.11	1.06	0.36	0.18
10	1.49	0.67	2.01	0.92	0.65	0.29
11	1.13	0.46	1.30	0.54	0.64	0.26
12	1.50	0.56	1.24	0.47	0.72	0.27
13	1.58	0.55	1.21	0.42	0.49	0.17
14	1.67	0.54	1.16	0.38	0.51	0.16
15	1.87	0.56	0.88	0.27	0.57	0.17
16	2.76	0.78	0.00	0.00	0.60	0.17
17	3.19	0.85	0.00	0.00	0.38	0.10
18	3.35	0.84	0.00	0.00	0.37	0.09
19	3.01	0.72	0.00	0.00	0.29	0.07
20	2.34	0.53	0.00	0.00	0.15	0.03
21	1.90	0.41	0.00	0.00	0.07	0.02
22	1.64	0.34	0.00	0.00	0.05	0.01

Table 17

HYDROCARBON PRODUCT DISTRIBUTION

CONTAINS POTENTIALLY
 PROPRIETARY DATA
 NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 20

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.45	0.29	0.00	0.00	0.05	0.01
24	1.29	0.24	0.00	0.00	0.04	0.01
25	1.16	0.21	0.00	0.00	0.03	0.01
26	1.01	0.18	0.00	0.00	0.02	0.00
27	0.88	0.15	0.00	0.00	0.02	0.00
28	0.73	0.12	0.00	0.00	0.03	0.00
29	0.60	0.09	0.00	0.00	0.02	0.00
30	0.53	0.08	0.00	0.00	0.03	0.00
31	0.54	0.08	0.00	0.00	0.01	0.00
32	0.52	0.07	0.00	0.00	0.00	0.00
33	0.40	0.05	0.00	0.00	0.02	0.00
34	0.39	0.05	0.00	0.00	0.01	0.00
35	0.37	0.05	0.00	0.00	0.00	0.00
36	0.34	0.04	0.00	0.00	0.00	0.00
37	0.24	0.03	0.00	0.00	0.00	0.00
38	0.19	0.02	0.00	0.00	0.00	0.00
39	0.15	0.02	0.00	0.00	0.00	0.00
40	0.11	0.01	0.00	0.00	0.00	0.00

TABLE 18

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

CATALYST : Co/Ti/Al₂O₃
SAMPLE No: 7888+1+589+22

REACTOR LOADING, MLS :	408.0	T, C :	260.0	FEED RATIO,	
CATALYST LOADING, WT%:	22.3	P, PSIG :	310	CO/H ₂ :	1.50
TIME ON STREAM, HRS :	238.6	GHSV, L/HR:	403.2		

USAGE RATIO, CO/H ₂ :	0.44	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	22.02	MOL SYNGAS/KG CAT/HR:	17.75
%CO CONV. :	11.18	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	38.31	MOL CO/MOL METAL/MIN:	0.15

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	5.16	H ₂ O:	6.95
OXYGENATES :	0.07	CO :	84.38
CO ₂ :	0.65	H ₂ :	2.78

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	14.48	C ₄ +ENE :	3.84
C ₂ +ANE :	1.36	C ₅ +C ₁₁ :	33.39
C ₂ +ENE :	0.70	C ₁₂ +C ₁₈ :	21.85
C ₃ +ANE :	0.76	C ₁₉ +C ₂₃ :	9.44
C ₃ +ENE :	4.40	C ₂₄ + ₃₄ :	7.36
C ₄ ISO+ANE:	1.17	C ₃₅ + :	1.25

FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	33.39
DIESEL (C ₉ +C ₂₅) :	45.57

% ELEMENTAL RECOVERY:	CARBON :	99.93
	HYDROGEN:	97.92
	OXYGEN :	101.13

Table 19

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 22

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	14.48	53.96	0.00	0.00	0.00	0.00
2	1.36	2.70	0.70	1.48	0.00	0.00
3	0.76	1.03	4.40	6.24	0.00	0.00
4	1.17	1.20	3.84	4.08	0.00	0.00
5	1.46	1.21	4.54	3.85	0.12	0.10
6	6.12	4.24	0.17	0.12	0.00	0.00
7	2.24	1.33	2.34	1.42	0.21	0.12
8	1.93	1.01	1.99	1.56	0.25	0.13
9	1.84	0.86	2.20	1.04	0.35	0.16
10	1.74	0.73	2.00	0.85	0.60	0.25
11	1.51	0.58	1.22	0.47	0.56	0.22
12	1.63	0.57	1.17	0.42	0.41	0.14
13	1.70	0.55	1.13	0.37	0.42	0.14
14	1.77	0.53	1.00	0.30	0.48	0.14
15	1.94	0.54	0.71	0.20	0.52	0.14
16	2.52	0.67	0.00	0.00	0.52	0.14
17	2.46	0.61	0.00	0.00	0.51	0.13
18	2.70	0.63	0.00	0.00	0.27	0.06
19	2.54	0.57	0.00	0.00	0.22	0.05
20	2.02	0.43	0.00	0.00	0.12	0.03
21	1.66	0.33	0.00	0.00	0.06	0.01
22	1.45	0.28	0.00	0.00	0.05	0.01

Table 19 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 22

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.28	0.24	0.00	0.00	0.04	0.01
24	1.14	0.20	0.00	0.00	0.03	0.01
25	1.05	0.18	0.00	0.00	0.03	0.00
26	0.90	0.15	0.00	0.00	0.02	0.00
27	0.78	0.12	0.00	0.00	0.02	0.00
28	0.65	0.10	0.00	0.00	0.02	0.00
29	0.53	0.08	0.00	0.00	0.02	0.00
30	0.47	0.07	0.00	0.00	0.03	0.00
31	0.48	0.07	0.00	0.00	0.01	0.00
32	0.46	0.06	0.00	0.00	0.00	0.00
33	0.35	0.05	0.00	0.00	0.01	0.00
34	0.35	0.04	0.00	0.00	0.01	0.00
35	0.33	0.04	0.00	0.00	0.00	0.00
36	0.30	0.04	0.00	0.00	0.00	0.00
37	0.22	0.02	0.00	0.00	0.00	0.00
38	0.17	0.02	0.00	0.00	0.00	0.00
39	0.14	0.01	0.00	0.00	0.00	0.00
40	0.09	0.01	0.00	0.00	0.00	0.00

TABLE 20

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co/Ti/Al₂O₃
SAMPLE No: 7888+1+589+24

REACTOR LOADING, MLS : 408.0 T, C : 258.3 FEED RATIO,
CATALYST LOADING, WT%: 22.3 P, PSIG : 600 CO/H₂: 1.37
TIME ON STREAM, HRS : 262.2 GHSV, 1/HR: 417.9

USAGE RATIO, CO/H₂ : 0.46 BULK ACTIVITY,
%OVERALL CONV-, CO+H₂: 26.22 MOL SYNGAS/KG CAT/HR: 21.91
%CO CONV. : 14.36 SPECIFIC ACTIVITY,
%H₂ CONV. : 42.46 MOL CO/MOL METAL/MIN: 0.20

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 5.66 H₂O: 7.74
OXYGENATES : 0.11 CO : 82.72
CO₂ : 0.88 H₂ : 2.90

HYDROCARBON SELECTIVITY, WT%:

C₁ : 15.39 C₄TENE : 4.54
C₂+ANE : 1.79 C₅+C₁₁ : 34.30
C₂TENE : 0.84 C₁₂+C₁₈: 18.75
C₃+ANE : 1.19 C₁₉+C₂₃: 7.93
C₃TENE : 5.40 C₂₄+₃₄ : 6.91
C₄ ISO+ANE: 1.78 C₃₅+ : 1.17

FUEL FRACTIONS, WT%:

GASOLINE (C₅+C₁₁): 34.30
DIESEL (C₉+C₂₅) : 40.48

% ELEMENTAL RECOVERY: CARBON : 97.75
HYDROGEN: 93.63
OXYGEN : 99.33

Table 21

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 24

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	15.39	53.37	0.00	0.00	0.00	0.00
2	1.79	3.31	0.84	1.67	0.00	0.00
3	1.19	1.51	5.40	7.13	0.00	0.00
4	1.72	1.64	4.54	4.49	0.07	0.06
5	1.78	1.37	4.56	3.62	0.20	0.15
6	6.55	4.23	0.12	0.08	0.00	0.00
7	2.74	1.52	2.16	1.22	0.15	0.08
8	2.38	1.16	1.80	0.89	0.17	0.08
9	2.09	0.90	2.05	0.90	0.34	0.15
10	1.88	0.73	1.92	0.76	0.36	0.14
11	1.50	0.53	1.22	0.44	0.32	0.11
12	1.54	0.50	1.30	0.43	0.15	0.05
13	1.57	0.47	1.28	0.39	0.24	0.07
14	1.58	0.44	1.18	0.33	0.29	0.08
15	1.63	0.43	0.93	0.25	0.30	0.08
16	2.30	0.57	0.00	0.00	0.27	0.07
17	2.14	0.50	0.00	0.00	0.09	0.02
18	1.87	0.41	0.00	0.00	0.09	0.02
19	1.85	0.38	0.00	0.00	0.07	0.02
20	1.71	0.34	0.00	0.00	0.06	0.01
21	1.53	0.29	0.00	0.00	0.05	0.01
22	1.37	0.25	0.00	0.00	0.04	0.01

Table 21 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 24

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.21	0.21	0.00	0.00	0.04	0.01
24	1.08	0.18	0.00	0.00	0.03	0.01
25	0.97	0.15	0.00	0.00	0.03	0.00
26	0.84	0.13	0.00	0.00	0.02	0.00
27	0.73	0.11	0.00	0.00	0.02	0.00
28	0.61	0.09	0.00	0.00	0.02	0.00
29	0.50	0.07	0.00	0.00	0.02	0.00
30	0.44	0.06	0.00	0.00	0.02	0.00
31	0.45	0.06	0.00	0.00	0.01	0.00
32	0.43	0.05	0.00	0.00	0.00	0.00
33	0.33	0.04	0.00	0.00	0.01	0.00
34	0.32	0.04	0.00	0.00	0.01	0.00
35	0.31	0.04	0.00	0.00	0.00	0.00
36	0.28	0.03	0.00	0.00	0.00	0.00
37	0.20	0.02	0.00	0.00	0.00	0.00
38	0.16	0.02	0.00	0.00	0.00	0.00
39	0.13	0.01	0.00	0.00	0.00	0.00
40	0.09	0.01	0.00	0.00	0.00	0.00

TABLE 22

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CATALYST : Co/Ti/Al₂O₃
SAMPLE NO: 7888+1+589+26

REACTOR LOADING, MLS :	408.0	T, C :	259.0	FEED RATIO,	
CATALYST LOADING, WT%:	22.3	P, PSIG :	600	CO/H ₂ :	1.26
TIME ON STREAM, HRS :	335.5	GHSV, L/HR:	214.6		

USAGE RATIO, CO/H ₂ :	0.45	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	23.16	MOL SYNGAS/KG CAT/HR:	9.94
%CO CONV. :	12.97	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	36.00	MOL CO/MOL METAL/MIN:	0.09

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	4.48	H ₂ O:	6.21
OXYGENATES :	0.09	CO :	84.22
CO ₂ :	1.48	H ₂ :	3.51

HYDROCARBON SELECTIVITY, WT%:

C1 :	20.88	C4+ENE :	4.93
C2+ANE :	2.23	C5+C11 :	32.28
C2+ENE :	1.11	C12+C18:	16.72
C3+ANE :	1.50	C19+C23:	5.99
C3+ENE :	6.15	C24+34 :	5.43
C4 ISO+ANE:	1.88	C35+ :	0.90

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 32.28
DIESEL (C9+C25) : 34.63

% ELEMENTAL RECOVERY: CARBON : 97.06
HYDROGEN: 90.92
OXYGEN : 99.03

Table 23

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 26

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	20.88	60.18	0.00	0.00	0.00	0.00
2	2.23	3.43	1.11	1.83	0.00	0.00
3	1.50	1.57	6.15	6.75	0.00	0.00
4	1.88	1.49	4.93	4.05	0.00	0.00
5	2.02	1.29	4.85	3.19	0.18	0.11
6	6.56	3.52	0.11	0.06	0.00	0.00
7	2.52	1.16	1.95	0.92	0.12	0.05
8	2.06	0.83	1.53	0.63	0.13	0.05
9	2.00	0.72	1.75	0.64	0.32	0.11
10	1.62	0.52	1.69	0.56	0.17	0.06
11	1.33	0.39	1.09	0.33	0.28	0.08
12	1.35	0.37	1.10	0.30	0.13	0.03
13	1.37	0.34	1.13	0.29	0.13	0.03
14	1.40	0.33	1.02	0.24	0.24	0.05
15	1.41	0.31	0.87	0.19	0.26	0.06
16	2.13	0.43	0.00	0.00	0.27	0.05
17	2.08	0.40	0.00	0.00	0.10	0.02
18	1.65	0.30	0.00	0.00	0.08	0.02
19	1.25	0.21	0.00	0.00	0.21	0.04
20	1.26	0.21	0.00	0.00	0.04	0.01
21	1.15	0.18	0.00	0.00	0.03	0.01
22	1.05	0.16	0.00	0.00	0.03	0.00

Table 23 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 26

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.94	0.13	0.00	0.00	0.03	0.00
24	0.85	0.12	0.00	0.00	0.03	0.00
25	0.77	0.10	0.00	0.00	0.02	0.00
26	0.67	0.08	0.00	0.00	0.02	0.00
27	0.58	0.07	0.00	0.00	0.01	0.00
28	0.48	0.06	0.00	0.00	0.02	0.00
29	0.41	0.05	0.00	0.00	0.01	0.00
30	0.36	0.04	0.00	0.00	0.02	0.00
31	0.35	0.04	0.00	0.00	0.01	0.00
32	0.31	0.03	0.00	0.00	0.00	0.00
33	0.27	0.03	0.00	0.00	0.00	0.00
34	0.24	0.02	0.00	0.00	0.00	0.00
35	0.23	0.02	0.00	0.00	0.00	0.00
36	0.21	0.02	0.00	0.00	0.00	0.00
37	0.15	0.01	0.00	0.00	0.00	0.00
38	0.13	0.01	0.00	0.00	0.00	0.00
39	0.10	0.01	0.00	0.00	0.00	0.00
40	0.07	0.01	0.00	0.00	0.00	0.00

TABLE 24

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co/Ti/Al 203
SAMPLE NO: 7888+1+589+31

REACTOR LOADING, MLS : 408.0 T, C : 281.4 FEED RATIO,
CATALYST LOADING, WT% : 22.3 P, PSIG : 310 CO/H2: 1.50
TIME ON STREAM, HRS : 383.3 GHSV, L/HR: 199.8

USAGE RATIO, CO/H2 : 0.50 BULK ACTIVITY,
%OVERALL CONV., CO+H2: 28.62 MOL SYNGAS/KG CAT/HR: 11.43
%CO CONV. : 15.81 SPECIFIC ACTIVITY,
%H2 CONV. : 47.76 MOL CO/MOL METAL/MIN: 0.11

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 6.70 H2O: 7.93
OXYGENATES : 0.11 CO : 80.66
CO2 : 2.21 H2 : 2.39

HYDROCARBON SELECTIVITY, WT%:

C1 : 26.75 C4+ENE : 4.64
C2+ANE : 3.20 C5+C11 : 32.30
C2+ENE : 0.77 C12+C18: 14.70
C3+ANE : 1.30 C19+C23: 4.32
C3+ENE : 5.95 C24+34 : 3.86
C4 ISO+ANE: 1.68 C35+ : 0.53

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 32.30
DIESEL (C9+C25) : 30.10

% ELEMENTAL RECOVERY: CARBON : 99.18
HYDROGEN: 98.07
OXYGEN : 100.08

Table 25

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

RUN NO. 788R-1-589

SAMPLE NO. 31

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	26.75	66.39	0.00	0.00	0.00	0.00
2	3.20	4.23	0.77	1.09	0.00	0.00
3	1.30	1.18	5.95	5.62	0.00	0.00
4	1.62	1.11	4.64	3.29	0.05	0.04
5	1.94	1.07	5.01	2.84	0.20	0.11
6	6.41	2.96	0.36	0.17	0.00	0.00
7	2.45	0.97	1.83	0.74	0.44	0.17
8	1.91	0.67	1.44	0.51	0.52	0.18
9	1.61	0.50	1.50	0.47	0.70	0.22
10	1.38	0.39	1.19	0.34	0.87	0.24
11	1.16	0.29	0.70	0.18	0.68	0.17
12	1.17	0.27	0.61	0.14	0.54	0.13
13	1.17	0.25	0.51	0.11	0.54	0.12
14	1.16	0.23	0.41	0.08	0.55	0.11
15	1.51	0.28	0.00	0.00	0.53	0.10
16	1.56	0.27	0.00	0.00	0.49	0.09
17	1.88	0.31	0.00	0.00	0.26	0.04
18	1.65	0.26	0.00	0.00	0.19	0.03
19	1.13	0.17	0.00	0.00	0.10	0.01
20	0.82	0.12	0.00	0.00	0.03	0.00
21	0.75	0.10	0.00	0.00	0.02	0.00
22	0.73	0.09	0.00	0.00	0.02	0.00

Table 25 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 31

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.69	0.08	0.00	0.00	0.03	0.00
24	0.65	0.08	0.00	0.00	0.02	0.00
25	0.59	0.07	0.00	0.00	0.02	0.00
26	0.48	0.05	0.00	0.00	0.01	0.00
27	0.41	0.04	0.00	0.00	0.01	0.00
28	0.33	0.03	0.00	0.00	0.01	0.00
29	0.28	0.03	0.00	0.00	0.01	0.00
30	0.24	0.02	0.00	0.00	0.00	0.00
31	0.23	0.02	0.00	0.00	0.01	0.00
32	0.22	0.02	0.00	0.00	0.00	0.00
33	0.17	0.01	0.00	0.00	0.00	0.00
34	0.17	0.01	0.00	0.00	0.00	0.00
35	0.16	0.01	0.00	0.00	0.00	0.00
36	0.13	0.01	0.00	0.00	0.00	0.00
37	0.09	0.01	0.00	0.00	0.00	0.00
38	0.06	0.00	0.00	0.00	0.00	0.00
39	0.05	0.00	0.00	0.00	0.00	0.00
40	0.03	0.00	0.00	0.00	0.00	0.00

TABLE 26

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CATALYST : Co/Ti/Al₂O₃
SAMPLE No: 7888t1+589t33

REACTOR LOADING, MLS :	408.0	T, C :	281.6	FEED RATIO,	
CATALYST LOADING, WT%:	22.3	P, PSIG :	310	CO/H ₂ :	1.51
TIME ON STREAM, HRS :	407.1	GHSV, L/HR:	406.3		

USAGE RATIO, CO/H ₂ :	0.52	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	20.71	MOL SYNGAS/KG CAT/HR:	16.82
%CO CONV. :	11.70	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	34.33	MOL CO/MOL METAL/MIN:	0.16

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	4.67	H ₂ O:	5.63
OXYGENATES :	0.07	CO :	85.55
CO ₂ :	1.07	H ₂ :	3.00

HYDROCARBON SELECTIVITY, WT%:

C1 :	24.82	C4+ENE :	4.33
C2+ANE :	2.51	C5+C11 :	30.32
C2+ENE :	1.09	C12+C18:	16.89
C3+ANE :	0.93	C19+C23:	9.31
C3+ENE :	5.44	C24+34 :	2.74
C4 ISO+ANE:	1.25	C35+ :	0.38

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	30.32
DIESEL (C9+C25) :	36.79

% ELEMENTAL RECOVERY:	CARBON :	98.35
	HYDROGEN:	97.57
	OXYGEN :	98.80

Table 27

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 33

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	24.82	65.89	0.00	0.00	0.00	0.00
2	2.51	3.56	1.09	1.65	0.00	0.00
3	0.93	0.90	5.44	5.50	0.00	0.00
4	1.25	0.91	4.33	3.28	0.00	0.00
5	1.35	0.80	4.85	2.94	0.16	0.10
6	5.92	2.93	0.28	0.14	0.00	0.00
7	2.09	0.89	2.07	0.90	0.31	0.13
8	1.69	0.63	1.61	0.61	0.33	0.12
9	1.52	0.50	1.68	0.57	0.43	0.14
10	1.41	0.42	1.54	0.47	0.70	0.21
11	0.94	0.25	0.90	0.25	0.56	0.15
12	1.11	0.28	0.81	0.20	0.58	0.14
13	1.19	0.28	0.73	0.17	0.50	0.12
14	1.21	0.26	0.62	0.13	0.49	0.11
15	1.20	0.24	0.50	0.10	0.48	0.10
16	1.61	0.30	0.00	0.00	0.47	0.09
17	1.81	0.32	0.00	0.00	0.49	0.09
18	2.73	0.46	0.00	0.00	0.37	0.06
19	3.08	0.49	0.00	0.00	0.42	0.07
20	1.79	0.27	0.00	0.00	0.87	0.13
21	1.20	0.17	0.00	0.00	0.39	0.06
22	0.79	0.11	0.00	0.00	0.14	0.02

Table 27 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

RUN NO. 7888-1-529

SAMPLE NO. 33

CARBON NO.	N-ALKANES		I-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.60	0.08	0.00	0.00	0.03	0.00
24	0.48	0.06	0.00	0.00	0.02	0.00
25	0.41	0.05	0.00	0.00	0.01	0.00
26	0.34	0.04	0.00	0.00	0.01	0.00
27	0.29	0.03	0.00	0.00	0.01	0.00
28	0.23	0.03	0.00	0.00	0.01	0.00
29	0.20	0.02	0.00	0.00	0.01	0.00
30	0.17	0.02	0.00	0.00	0.00	0.00
31	0.17	0.02	0.00	0.00	0.01	0.00
32	0.15	0.01	0.00	0.00	0.00	0.00
33	0.12	0.01	0.00	0.00	0.00	0.00
34	0.12	0.01	0.00	0.00	0.00	0.00
35	0.12	0.01	0.00	0.00	0.00	0.00
36	0.09	0.01	0.00	0.00	0.00	0.00
37	0.06	0.01	0.00	0.00	0.00	0.00
38	0.05	0.00	0.00	0.00	0.00	0.00
39	0.04	0.00	0.00	0.00	0.00	0.00
40	0.02	0.00	0.00	0.00	0.00	0.00

TABLE 28

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co/Ti/Al₂O₃
SAMPLE No: 7888+1+589+35

REACTOR LOADING, MLS : 408.0 T, C : 280.5 FEED RATIO,
CATALYST LOADING, WT% : 22.3 P, PSIG : 310 CO/H₂: 2.01
TIME ON STREAM, HRS : 431.1 GHSV, 1/HR: 405.2

USAGE RATIO, CO/H₂ : 0.61 BULK ACTIVITY,
%OVERALL CONV., CO+H₂: 17.96 MOL SYNGAS/KG CAT/HR: 14.55
%CO CONV. : 10.20 SPECIFIC ACTIVITY,
%H₂ CONV. : 33.56 MOL CO/MOL METAL/MIN: 0.16

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 3.41 H₂O: 3.99
OXYGENATES : 0.05 CO : 89.27
CO₂ : 0.94 H₂ : 2.34

HYDROCARBON SELECTIVITY, WT%:

C₁ : 23.33 C₄+ENE : 4.56
C₂+ANE : 1.36 C₅+C₁₁ : 28.82
C₂+ENE : 0.95 C₁₂+C₁₈: 18.36
C₃+ANE : 0.72 C₁₉+C₂₃: 11.19
C₃+ENE : 5.60 C₂₄+₃₄ : 3.61
C₄ ISO+ANE: 1.02 C₃₅+ : 0.48

FUEL FRACTIONS, WT%:

GASOLINE (C₅+C₁₁): 28.82
DIESEL (C₉+C₂₅) : 39.84

% ELEMENTAL RECOVERY: CARBON : 97.06
HYDROGEN: 95.98
OXYGEN : 97.28

Table 29

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 35

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	23.33	65.59	0.00	0.00	0.00	0.00
2	1.36	2.04	0.95	1.53	0.00	0.00
3	0.72	0.73	5.60	6.00	0.00	0.00
4	1.02	0.79	4.56	3.66	0.00	0.00
5	1.35	0.84	5.40	3.47	0.15	0.09
6	5.92	3.10	0.26	0.14	0.00	0.00
7	1.49	0.67	2.12	0.97	0.24	0.11
8	1.19	0.47	1.45	0.58	0.24	0.09
9	1.12	0.39	1.55	0.55	0.32	0.11
10	1.14	0.36	1.57	0.50	0.60	0.19
11	0.91	0.26	1.13	0.33	0.69	0.20
12	1.12	0.30	1.03	0.28	0.72	0.19
13	1.22	0.30	0.95	0.24	0.58	0.14
14	1.25	0.28	0.87	0.20	0.59	0.13
15	1.25	0.26	0.75	0.16	0.60	0.13
16	1.27	0.25	0.59	0.12	0.56	0.11
17	1.84	0.34	0.00	0.00	0.53	0.10
18	2.24	0.40	0.00	0.00	0.40	0.07
19	3.07	0.52	0.00	0.00	0.43	0.07
20	2.20	0.35	0.00	0.00	1.05	0.17
21	1.59	0.24	0.00	0.00	0.59	0.09
22	1.10	0.16	0.00	0.00	0.27	0.04

Table 29 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 35

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.79	0.11	0.00	0.00	0.12	0.02
24	0.64	0.09	0.00	0.00	0.04	0.00
25	0.57	0.07	0.00	0.00	0.02	0.00
26	0.43	0.05	0.00	0.00	0.02	0.00
27	0.37	0.04	0.00	0.00	0.01	0.00
28	0.30	0.03	0.00	0.00	0.01	0.00
29	0.25	0.03	0.00	0.00	0.01	0.00
30	0.22	0.02	0.00	0.00	0.00	0.00
31	0.21	0.02	0.00	0.00	0.01	0.00
32	0.19	0.02	0.00	0.00	0.00	0.00
33	0.16	0.02	0.00	0.00	0.00	0.00
34	0.15	0.01	0.00	0.00	0.00	0.00
35	0.15	0.01	0.00	0.00	0.00	0.00
36	0.12	0.01	0.00	0.00	0.00	0.00
37	0.08	0.01	0.00	0.00	0.00	0.00
38	0.06	0.00	0.00	0.00	0.00	0.00
39	0.04	0.00	0.00	0.00	0.00	0.00
40	0.03	0.00	0.00	0.00	0.00	0.00

TABLE 30

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co/Ti/Al 203
SAMPLE No: 7888+1+589+37

REACTOR LOADING, MLS :	408.0	T, C :	259.2	FEED RATIO,	
CATALYST LOADING, WT%:	22.3	P, PSIG :	310	CO/H2:	2.01
TIME ON STREAM, HRS :	503.5	GHSV, L/HR:	405.1		

USAGE RATIO, CO/H2 :	1.17	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	13.21	MOL SYNGAS/KG CAT/HR:	10.69
%CO CONV. :	10.66	SPECIFIC ACTIVITY,	
%H2 CONV. :	18.31	MOL CO/MOL METAL/MIN:	0.15

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	1.94	H2O:	2.28
OXYGENATES :	0.03	CO :	92.39
CO2 :	0.36	H2 :	3.01

HYDROCARBON SELECTIVITY, WT%:

C1 :	16.06	C4+ENE :	3.36
C2+ANE :	0.57	C5+C11 :	19.75
C2+ENE :	1.33	C12+C18:	20.94
C3+ANE :	0.51	C19+C23:	21.60
C3+ENE :	3.90	C24+34 :	9.96
C4 ISO+ANE:	0.81	C35+ :	1.27

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	19.75
DIESEL (C9+C25) :	53.06

% ELEMENTAL RECOVERY:	CARBON :	93.24
	HYDROGEN:	97.36
	OXYGEN :	93.22

Table 31

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 37

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	16.06	60.68	0.00	0.00	0.00	0.00
2	0.57	1.16	1.33	2.87	0.00	0.00
3	0.51	0.69	3.90	5.61	0.00	0.00
4	0.81	0.85	3.36	3.62	0.00	0.00
5	0.92	0.77	4.10	3.54	0.00	0.00
6	3.75	2.63	0.00	0.00	0.00	0.00
7	0.00	0.00	2.32	1.43	0.00	0.00
8	0.64	0.34	1.05	0.57	0.06	0.03
9	0.75	0.36	1.22	0.59	0.07	0.03
10	0.89	0.38	1.52	0.65	0.13	0.06
11	0.81	0.31	1.25	0.49	0.29	0.11
12	1.02	0.36	1.22	0.44	0.35	0.13
13	1.16	0.38	1.27	0.42	0.27	0.09
14	1.32	0.40	1.31	0.40	0.34	0.10
15	1.41	0.40	1.29	0.37	0.37	0.11
16	1.50	0.40	1.27	0.34	0.30	0.08
17	1.85	0.46	1.09	0.28	0.29	0.07
18	3.05	0.72	0.00	0.00	0.27	0.07
19	3.69	0.83	0.00	0.00	0.30	0.07
20	5.01	1.07	0.00	0.00	0.47	0.10
21	3.89	0.79	0.90	0.19	0.62	0.13
22	2.99	0.58	0.54	0.11	0.44	0.09

Table 31 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
ERRONEOUS DATA -
NOT FOR QUANTIFICATION

RUN NO. 7888-1-589

SAMPLE NO. 37

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.28	0.43	0.24	0.04	0.24	0.04
24	1.78	0.32	0.10	0.02	0.13	0.02
25	1.51	0.26	0.00	0.00	0.08	0.01
26	1.23	0.20	0.00	0.00	0.05	0.01
27	1.01	0.16	0.00	0.00	0.03	0.00
28	0.80	0.12	0.00	0.00	0.02	0.00
29	0.65	0.10	0.00	0.00	0.02	0.00
30	0.57	0.08	0.00	0.00	0.01	0.00
31	0.55	0.08	0.00	0.00	0.02	0.00
32	0.52	0.07	0.00	0.00	0.00	0.00
33	0.41	0.05	0.00	0.00	0.00	0.00
34	0.40	0.05	0.00	0.00	0.00	0.00
35	0.39	0.05	0.00	0.00	0.00	0.00
36	0.31	0.04	0.00	0.00	0.00	0.00
37	0.21	0.02	0.00	0.00	0.00	0.00
38	0.15	0.02	0.00	0.00	0.00	0.00
39	0.12	0.01	0.00	0.00	0.00	0.00
40	0.08	0.01	0.00	0.00	0.00	0.00

TABLE 32

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CATALYST : Co/Ti/Al₂O₃
SAMPLE NO: 7888+1+589+41

REACTOR LOADING, MLS : 408.0 T, C : 238.5 FEED RATIO,
CATALYST LOADING, WT%: 22.2 P, PSIG : 310 CO/H₂: 2.01
TIME ON STREAM, HRS : 526.8 GHSV, L/HR: 405.7

USAGE RATIO, CO/H₂ : 0.78 BULK ACTIVITY,
%OVERALL CONV., CO+H₂: 7.75 MOL SYNGAS/KG CAT/HR: 6.28
%CO CONV. : 5.07 SPECIFIC ACTIVITY,
%H₂ CONV. : 13.12 MOL CO/MOL METAL/MIN: 0.08

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 1.45 H₂O: 0.67
OXYGENATES : 0.01 CO : 94.43
CO₂ : 0.37 H₂ : 3.07

HYDROCARBON SELECTIVITY, WT%:

C₁ : 21.91 C₄+ENE : 4.58
C₂+ANE : 0.78 C₅+C₁₁ : 21.39
C₂+ENE : 1.81 C₁₂+C₁₈: 11.84
C₃+ANE : 0.69 C₁₉+C₂₃: 17.01
C₃+ENE : 5.32 C₂₄+34 : 11.93
C₄ ISO+ANE: 1.11 C₃₅+ : 1.62

FUEL FRACTIONS, WT%:

GASOLINE (C₅+C₁₁): 21.39
DIESEL (C₉+C₂₅) : 37.00

% ELEMENTAL RECOVERY: CARBON : 98.00
HYDROGEN: 96.05
OXYGEN : 96.45

Table 33

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888-1-589

SAMPLE NO. 41

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	21.91	65.51	0.00	0.00	0.00	0.00
2	0.78	1.25	1.81	3.10	0.00	0.00
3	0.69	0.75	5.32	6.06	0.00	0.00
4	1.11	0.92	4.58	3.91	0.00	0.00
5	1.25	0.83	5.58	3.82	0.00	0.00
6	5.61	3.12	0.00	0.00	0.00	0.00
7	0.00	0.00	3.02	1.47	0.00	0.00
8	0.65	0.27	1.06	0.45	0.06	0.03
9	0.54	0.20	0.87	0.33	0.05	0.02
10	0.52	0.18	0.89	0.30	0.08	0.03
11	0.42	0.13	0.64	0.20	0.15	0.05
12	0.53	0.15	0.63	0.18	0.18	0.05
13	0.61	0.16	0.65	0.17	0.14	0.04
14	0.70	0.17	0.68	0.16	0.18	0.04
15	0.78	0.18	0.66	0.15	0.20	0.04
16	0.89	0.19	0.65	0.14	0.16	0.03
17	1.29	0.26	0.56	0.11	0.15	0.03
18	2.06	0.39	0.00	0.00	0.14	0.03
19	2.71	0.48	0.00	0.00	0.16	0.03
20	3.72	0.63	0.00	0.00	0.27	0.05
21	3.30	0.53	0.46	0.08	0.35	0.06
22	2.82	0.44	0.28	0.04	0.27	0.04

Table 33 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PRELIMINARY DATA -
NOT FOR QUANTIFICATION

RUN NO. 7888-1-589

SAMPLE NO. 41

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.38	0.35	0.12	0.02	0.17	0.02
24	2.01	0.28	0.05	0.01	0.10	0.01
25	1.76	0.24	0.00	0.00	0.07	0.01
26	1.49	0.20	0.00	0.00	0.05	0.01
27	1.26	0.16	0.00	0.00	0.03	0.00
28	1.01	0.12	0.00	0.00	0.03	0.00
29	0.84	0.10	0.00	0.00	0.02	0.00
30	0.73	0.08	0.00	0.00	0.01	0.00
31	0.71	0.08	0.00	0.00	0.02	0.00
32	0.66	0.07	0.00	0.00	0.01	0.00
33	0.53	0.05	0.00	0.00	0.00	0.00
34	0.51	0.05	0.00	0.00	0.01	0.00
35	0.50	0.05	0.00	0.00	0.00	0.00
36	0.40	0.04	0.00	0.00	0.00	0.00
37	0.27	0.03	0.00	0.00	0.00	0.00
38	0.20	0.02	0.00	0.00	0.00	0.00
39	0.15	0.01	0.00	0.00	0.00	0.00
40	0.10	0.01	0.00	0.00	0.00	0.00

Table 34

Slurry Screening Summary

7888-33-731

23.4 wt (96.02 g) $\text{Co}_2(\text{CO})_8/\text{Zr}(\text{OPr})_4/\text{Al}_2\text{O}_3$ CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

Sample No.	Time on Stream h	P psig	T °C	SV, ml/g cat/hr	xCO+H ₂	xCO	xH ₂	Feed CO/H ₂	Usage ΔCO/ΔH ₂	Bulk Activity mol syngas/kg cat/h	Specific Activity mol CO/mol Cu/min	Selectivity WT%						
												C ₁	C ₂ -C ₄	C ₅ -C ₁₁	C ₁₂ -C ₁₈	C ₁₉ -C ₂₃	C ₂₄ ^a	C ₅ -C ₂₃
8	110.9	300	234.6	1.76	19.5	9.4	29.7	1.01	0.32	15.3	0.07	11.1	14.16	40.7	22.6	6.94	4.5	70.24
10	143.4	300	238.4	1.69	18.4	9.9	32.7	1.69	0.51	13.8	0.09	9.0	12.3	34.0	24.7	10.5	9.5	69.2
12	166.0	305	234.9	1.72	11.3	5.2	23.7	2.00	0.44	8.7	0.05	8.8	11.7	26.4	24.9	15.4	12.8	66.7
16	230.3	300	238.5	0.86	19.4	8.5	40.7	1.95	0.41	7.5	0.04	8.0	11.3	32.9	22.5	12.2	13.1	67.6
21	206.3	305	261.6	0.86	32.3	16.5	63.0	1.94	0.51	12.4	0.08	7.7	9.6	29.2	24.1	12.9	16.5	66.2
24	309.5	303	259.7	0.86	43.2	20.2	47.9	0.98	0.48	16.7	0.10	13.4	12.9	34.9	20.3	8.4	10.1	63.6
28	333.7	300	259.1	1.73	35.8	21.0	50.3	0.98	0.41	27.6	0.16	14.1	12.0	34.4	19.8	9.2	10.5	63.4
33	428.7	300	261.5	1.73	26.0	12.5	45.9	1.46	0.40	20.1	0.11	14.9	13.3	40.3	22.9	4.6	4.0	67.8
36	453.2	300	262.3	1.41	38.4	22.9	53.6	0.98	0.42	24.1	0.14	16.6	14.1	36.8	17.2	7.3	8.0	61.3
39	477.0	300	259.8	0.71	40.5	25.2	55.4	0.98	0.44	12.7	0.08	14.3	12.0	28.1	16.5	13.5	15.6	58.1
44	572.6	300	281.7	0.71	43.9	27.7	59.6	0.96	0.45	14.0	0.08	25.1	16.2	27.8	14.6	6.7	9.4	49.1
47	596.6	300	282.6	0.70	29.7	14.3	59.6	1.94	0.46	9.3	0.06	18.4	13.8	28.8	17.6	7.4	14.0	53.8
52	644.6	305	281.1	1.40	21.4	9.3	45.8	1.95	0.40	13.4	0.07	24.4	16.6	32.3	21.9	3.9	0.9	50.1
56*	669.3	308	260.8	1.41	26.2	11.1	40.8	0.97	0.26	14.8	0.06	6.2	20.6	16.2	5.9	0.6	0.5	-
59*	741.0	302	259.9	1.41	27.4	7.1	47.1	0.97	0.15	13.8	0.03	3.3	77.3	13.9	4.8	0.4	0.3	-
62*	765.4	300	258.2	0.71	36.5	13.3	59.2	0.98	0.22	9.2	0.03	4.1	70.4	18.9	5.9	0.4	0.1	-
65	788.3	300	258.1	0.70	28.8	16.5	40.8	0.98	0.40	9.1	0.05	20.6	13.5	27.3	18.8	9.4	10.1	55.6
66*	813.1	550	261.5	1.40	35.8	15.8	55.5	0.98	0.28	17.9	0.08	3.1	73.8	17.1	5.5	0.3	0.2	-

*₂C₂H₄ Conv: Sample % Conv

56	75.5
59	67.6
62	77.1
66	74.5

TABLE 35

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

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CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE NO: 7888+33+731+8

REACTOR LOADING, MLS :	452.0	T, C :	234.6	FEED RATIO,	
CATALYST LOADING, WT% :	23.4	P, PSIG :	300	CO/H ₂ :	1.01
TIME ON STREAM, HRS :	118.9	SV, L/G/HR:	1.76		

+++++

USAGE RATIO, CO/H ₂ :	0.32	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	19.50	MOL SYNGAS/KG CAT/HR:	15.291
%CO CONV.	9.43	SPECIFIC ACTIVITY,	
%H ₂ CONV.	29.70	MOL CO/MOL METAL/MIN:	0.072

+++++

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	5.15	H ₂ O:	7.90
OXYGENATES :	0.04	CO :	82.21
CO ₂ :	0.21	H ₂ :	4.50

+++++

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	11.07	C ₄ +ENE :	4.42
C ₂ +ANE :	1.01	C ₅ +C ₁₁ :	40.65
C ₂ +ENE :	0.68	C ₁₂ +C ₁₈ :	22.63
C ₃ +ANE :	1.15	C ₁₉ +C ₂₃ :	6.94
C ₃ +ENE :	5.20	C ₂₄ +34 :	3.71
C ₄ ISO+ANE:	1.81	C ₃₅ +	0.74

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FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	40.65
DIESEL (C ₉ +C ₂₅) :	45.56

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% ELEMENTAL RECOVERY:	CARBON :	101.84
	HYDROGEN:	97.16
	OXYGEN :	104.42

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Table 36

HYDROCARBON PRODUCT DISTRIBUTION

CONTAINS POTENTIALLY
 PATENTABLE DATA-
 NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 8

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	11.07	44.40	0.00	0.00	0.00	0.00
2	1.01	2.17	0.68	1.55	0.00	0.00
3	1.15	1.67	5.20	7.95	0.00	0.00
4	1.81	2.00	4.42	5.07	0.00	0.00
5	2.09	1.87	4.95	4.54	0.13	0.12
6	7.54	5.63	0.14	0.11	0.00	0.00
7	3.11	2.00	2.58	1.69	0.15	0.10
8	2.70	1.52	2.20	1.26	0.25	0.14
9	2.78	1.39	2.40	1.22	0.55	0.28
10	2.59	1.17	2.29	1.05	0.27	0.12
11	2.05	0.84	1.38	0.58	0.49	0.20
12	2.08	0.78	1.23	0.47	0.35	0.13
13	2.13	0.74	1.06	0.37	0.48	0.17
14	2.16	0.70	0.84	0.28	0.53	0.17
15	2.77	0.84	0.42	0.13	0.11	0.03
16	2.54	0.72	0.39	0.11	0.10	0.03
17	2.35	0.63	0.36	0.10	0.10	0.03
18	2.18	0.55	0.32	0.08	0.12	0.03
19	1.91	0.46	0.26	0.06	0.09	0.02
20	1.51	0.34	0.15	0.03	0.07	0.01
21	1.22	0.26	0.00	0.00	0.04	0.01
22	0.91	0.19	0.00	0.00	0.03	0.01

Table 36 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 7888+33+731

SAMPLE NO. 8

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N-TALKANES		1-TALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.73	0.14	0.00	0.00	0.02	0.00
24	0.61	0.11	0.00	0.00	0.01	0.00
25	0.54	0.10	0.00	0.00	0.01	0.00
26	0.49	0.09	0.00	0.00	0.00	0.00
27	0.41	0.07	0.00	0.00	0.00	0.00
28	0.31	0.05	0.00	0.00	0.02	0.00
29	0.25	0.04	0.00	0.00	0.01	0.00
30	0.23	0.04	0.00	0.00	0.02	0.00
31	0.23	0.03	0.00	0.00	0.02	0.00
32	0.17	0.02	0.00	0.00	0.01	0.00
33	0.17	0.02	0.00	0.00	0.02	0.00
34	0.16	0.02	0.00	0.00	0.02	0.00
35	0.17	0.02	0.00	0.00	0.00	0.00
36	0.17	0.02	0.00	0.00	0.00	0.00
37	0.13	0.02	0.00	0.00	0.00	0.00
38	0.10	0.01	0.00	0.00	0.00	0.00
39	0.09	0.01	0.00	0.00	0.00	0.00
40	0.08	0.01	0.00	0.00	0.00	0.00

TABLE 37

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE NO: 7888+33+731+10

REACTOR LOADING, MLS :	452.0	T, C :	238.4	FEED RATIO,	
CATALYST LOADING, WT%:	23.4	P, PSIG :	300	CO/H ₂ :	1.69
TIME ON STREAM, HRS :	143.4	SV, L/G/HR:	1.69		

USAGE RATIO, CO/H ₂ :	0.51	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	18.37	MOL SYNGAS/KG CAT/HR:	13.836
%CO CONV. :	9.91	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	32.66	MOL CO/MOL METAL/MIN:	0.091

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	4.00	H ₂ O:	6.05
OXYGENATES :	0.02	CO :	86.92
CO ₂ :	0.27	H ₂ :	2.75

HYDROCARBON SELECTIVITY, WT%:

C1 :	8.95	C4+ENE :	4.24
C2+ANE :	0.70	C5+C11 :	33.99
C2+ENE :	0.81	C12+C18 :	24.65
C3+ANE :	0.76	C19+C23 :	10.54
C3+ENE :	4.66	C24+34 :	7.86
C4 ISO+ANE:	1.25	C35+ :	1.59

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 33.99
DIESEL (C9+C25) : 50.13

% ELEMENTAL RECOVERY: CARBON : 98.42
HYDROGEN: 99.48
OXYGEN : 100.21

Table 36

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

UN NO. 7888+33+731

APPLE NO. 10

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	8.95	41.32	0.00	0.00	0.00	0.00
2	0.70	1.74	0.81	2.14	0.00	0.00
3	0.76	1.28	4.66	8.21	0.00	0.00
4	1.25	1.59	4.24	5.60	0.00	0.00
5	1.44	1.48	4.97	5.24	0.11	0.11
6	5.98	5.14	0.15	0.13	0.00	0.00
7	2.18	1.61	2.34	1.77	0.14	0.10
8	1.92	1.24	1.97	1.30	0.25	0.16
9	2.04	1.18	2.26	1.33	0.41	0.23
10	1.89	0.98	2.32	1.23	0.26	0.13
11	1.56	0.74	1.45	0.69	0.37	0.17
12	1.60	0.70	1.44	0.63	0.19	0.08
13	1.71	0.69	1.36	0.55	0.35	0.14
14	1.84	0.69	1.23	0.47	0.47	0.18
15	2.05	0.72	1.00	0.35	0.54	0.19
16	3.04	0.99	0.00	0.00	0.58	0.19
17	3.05	0.94	0.00	0.00	0.59	0.18
18	2.99	0.87	0.00	0.00	0.61	0.18
19	2.63	0.73	0.00	0.00	0.52	0.14
20	2.17	0.57	0.00	0.00	0.27	0.07
21	1.86	0.46	0.00	0.00	0.06	0.01
22	1.56	0.37	0.00	0.00	0.05	0.01

Table 38 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

RUN NO- 7888+33+731

SAMPLE NO- 10

CARBON NO-	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.38	0.31	0.00	0.00	0.04	0.01
24	1.23	0.27	0.00	0.00	0.03	0.01
25	1.11	0.23	0.00	0.00	0.03	0.01
26	0.97	0.20	0.00	0.00	0.02	0.00
27	0.82	0.16	0.00	0.00	0.02	0.00
28	0.66	0.12	0.00	0.00	0.03	0.00
29	0.56	0.10	0.00	0.00	0.02	0.00
30	0.50	0.09	0.00	0.00	0.02	0.00
31	0.49	0.08	0.00	0.00	0.02	0.00
32	0.49	0.08	0.00	0.00	0.00	0.00
33	0.39	0.06	0.00	0.00	0.03	0.00
34	0.41	0.06	0.00	0.00	0.02	0.00
35	0.40	0.06	0.00	0.00	0.00	0.00
36	0.36	0.05	0.00	0.00	0.00	0.00
37	0.28	0.04	0.00	0.00	0.00	0.00
38	0.22	0.03	0.00	0.00	0.00	0.00
39	0.19	0.03	0.00	0.00	0.00	0.00
40	0.14	0.02	0.00	0.00	0.00	0.00

TABLE 39

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CATALYST : Co₂(CO)₈/Zr(OPr)₄/AL₂O₃
SAMPLE No: 7888+33+731+12

REACTOR LOADING, MLS :	452.0	T, C :	234.9	FEED RATIO,	
CATALYST LOADING, WT% :	23.4	P, PSIG :	305	CO/H ₂ :	2.00
TIME ON STREAM, HRS :	166.0	SV, L/G/HR :	1.72		

USAGE RATIO, CO/H ₂ :	0.44	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	11.34	MOL SYNGAS/KG CAT/HR:	8.699
%CO CONV-	5.18	SPECIFIC ACTIVITY,	
%H ₂ CONV-	23.68	MOL CO/MOL METAL/MIN:	0.051

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	2.75	H ₂ O:	3.93
OXYGENATES :	0.01	CO :	90.54
CO ₂ :	0.17	H ₂ :	2.60

HYDROCARBON SELECTIVITY, WT%:

C1 :	8.76	C4+ENE :	4.06
C2+ANE :	0.45	C5+C11 :	26.38
C2+ENE :	0.92	C12+C18:	24.91
C3+ANE :	0.64	C19+C23:	15.42
C3+ENE :	4.33	C24+34 :	10.68
C4 ISO+ANE:	1.35	C35+ :	2.11

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	26.38
DIESEL (C9+C25) :	53.28

% ELEMENTAL RECOVERY:	CARBON :	100.60
	HYDROGEN:	101.95
	OXYGEN :	101.47

Table 40

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

RUN NO. 7888+53+731

SAMPLE NO. 12

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	8.76	42.79	0.00	0.00	0.00	0.00
2	0.45	1.17	0.92	2.56	0.00	0.00
3	0.64	1.14	4.33	8.06	0.00	0.00
4	1.11	1.49	4.06	5.66	0.24	0.33
5	1.28	1.39	4.95	5.52	0.00	0.00
6	4.50	4.09	0.09	0.08	0.00	0.00
7	1.37	1.07	1.84	1.47	0.00	0.00
8	1.22	0.84	1.40	0.98	0.15	0.10
9	1.41	0.86	1.70	1.06	0.19	0.12
10	1.35	0.74	1.86	1.04	0.15	0.08
11	1.30	0.65	1.37	0.69	0.26	0.13
12	1.39	0.64	1.38	0.64	0.11	0.05
13	1.53	0.65	1.50	0.65	0.16	0.07
14	1.68	0.66	1.46	0.58	0.32	0.13
15	1.90	0.70	1.31	0.49	0.40	0.15
16	3.27	1.13	0.00	0.00	0.46	0.16
17	3.41	1.11	0.00	0.00	0.49	0.16
18	3.60	1.11	0.00	0.00	0.55	0.17
19	3.57	1.04	0.00	0.00	0.57	0.16
20	3.19	0.88	0.00	0.00	0.54	0.15
21	2.73	0.72	0.00	0.00	0.30	0.08
22	2.38	0.60	0.00	0.00	0.08	0.02

Table 40 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 12

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.00	0.48	0.00	0.00	0.07	0.02
24	1.72	0.40	0.00	0.00	0.05	0.01
25	1.55	0.34	0.00	0.00	0.04	0.01
26	1.31	0.28	0.00	0.00	0.03	0.01
27	1.11	0.23	0.00	0.00	0.02	0.00
28	0.89	0.18	0.00	0.00	0.03	0.01
29	0.75	0.14	0.00	0.00	0.03	0.01
30	0.67	0.12	0.00	0.00	0.03	0.01
31	0.65	0.12	0.00	0.00	0.02	0.00
32	0.65	0.11	0.00	0.00	0.00	0.00
33	0.52	0.09	0.00	0.00	0.04	0.01
34	0.54	0.09	0.00	0.00	0.02	0.00
35	0.54	0.09	0.00	0.00	0.00	0.00
36	0.48	0.07	0.00	0.00	0.00	0.00
37	0.37	0.06	0.00	0.00	0.00	0.00
38	0.29	0.04	0.00	0.00	0.00	0.00
39	0.25	0.04	0.00	0.00	0.00	0.00
40	0.18	0.03	0.00	0.00	0.00	0.00

TABLE 41

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE No: 7888+33+731+16

REACTOR LOADING, MLS :	452.0	T, C :	238.5	FEED RATIO,	
CATALYST LOADING, WT%:	23.4	P, PSIG :	300	CO/H ₂ :	1.95
TIME ON STREAM, HRS :	238.3	SV, L/G/HR:	0.86		

USAGE RATIO, CO/H ₂ :	0.41	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	19.41	MOL SYNGAS/KG CAT/HR:	7.490
%CO CONV.	8.50	SPECIFIC ACTIVITY,	
%H ₂ CONV.	40.69	MOL CO/MOL METAL/MIN:	0.042

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	4.44	H ₂ O:	6.76
OXYGENATES :	0.03	CO :	86.30
CO ₂ :	0.43	H ₂ :	2.05

HYDROCARBON SELECTIVITY, WT%:

C1 :	7.97	C4+ENE :	3.94
C2+ANE :	0.71	C5+C11 :	32.90
C2+ENE :	0.72	C12+C18:	22.48
C3+ANE :	0.63	C19+C23:	12.21
C3+ENE :	4.25	C24+34 :	11.39
C4 ISO+ANE:	1.11	C35+ :	1.68

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	32.90
DIESEL (C9+C25) :	50.81

% ELEMENTAL RECOVERY:	CARBON :	101.08
	HYDROGEN:	101.47
	OXYGEN :	103.25

Table 42

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 16

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	7.97	39.56	0.00	0.00	0.00	0.00
2	0.71	1.88	0.72	2.04	0.00	0.00
3	0.63	1.13	4.25	8.04	0.00	0.00
4	1.11	1.52	3.94	5.59	0.00	0.00
5	1.22	1.35	4.51	5.12	0.00	0.00
6	5.83	5.39	0.13	0.13	0.00	0.00
7	2.16	1.71	2.24	1.82	0.15	0.12
8	1.98	1.38	1.85	1.31	0.25	0.17
9	1.84	1.14	2.24	1.41	0.54	0.34
10	1.74	0.97	2.21	1.26	0.55	0.31
11	1.49	0.76	1.44	0.74	0.52	0.27
12	1.48	0.69	1.45	0.68	0.24	0.11
13	1.49	0.64	1.39	0.61	0.37	0.16
14	1.55	0.62	1.38	0.56	0.43	0.17
15	1.64	0.62	1.22	0.46	0.45	0.17
16	1.87	0.66	1.03	0.36	0.41	0.14
17	3.00	0.99	0.00	0.00	0.13	0.04
18	2.82	0.88	0.00	0.00	0.15	0.05
19	2.48	0.73	0.00	0.00	0.30	0.09
20	2.61	0.74	0.00	0.00	0.06	0.02
21	2.40	0.64	0.00	0.00	0.05	0.01
22	2.20	0.56	0.00	0.00	0.05	0.01

Table 42 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 16

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.01	0.49	0.00	0.00	0.05	0.01
24	1.81	0.43	0.00	0.00	0.04	0.01
25	1.64	0.37	0.00	0.00	0.04	0.01
26	1.43	0.31	0.00	0.00	0.03	0.01
27	1.23	0.26	0.00	0.00	0.02	0.00
28	1.00	0.20	0.00	0.00	0.03	0.01
29	0.85	0.16	0.00	0.00	0.02	0.00
30	0.73	0.14	0.00	0.00	0.03	0.00
31	0.72	0.13	0.00	0.00	0.01	0.00
32	0.68	0.12	0.00	0.00	0.00	0.00
33	0.54	0.09	0.00	0.00	0.01	0.00
34	0.52	0.09	0.00	0.00	0.02	0.00
35	0.49	0.08	0.00	0.00	0.00	0.00
36	0.41	0.06	0.00	0.00	0.00	0.00
37	0.29	0.04	0.00	0.00	0.00	0.00
38	0.21	0.03	0.00	0.00	0.00	0.00
39	0.16	0.02	0.00	0.00	0.00	0.00
40	0.11	0.02	0.00	0.00	0.00	0.00

TABLE 43

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

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CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE No: 7888+33+731+21

REACTOR LOADING, MLS :	452.0	T, C :	261.6	FEED RATIO,	
CATALYST LOADING, WT%:	23.4	P, PSIG :	305	CU/H ₂ :	1.94
TIME ON STREAM, HRS :	286.3	SV, L/G/HR:	0.86		

+++++

USAGE RATIO, CU/H ₂ :	0.51	BULK ACTIVITY,	
%OVERALL CONV., CU+H ₂ :	32.32	MOL SYNGAS/KE CAT/HR:	12.372
%CU CONV. :	16.52	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	63.04	MOL CU/MOL METAL/MIN:	0.081

+++++

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	7.64	H ₂ O:	9.50
OXYGENATES :	0.04	CO :	79.77
CO ₂ :	1.75	H ₂ :	1.30

+++++

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	7.69	C ₄ +ENE :	3.26
C ₂ +ANE :	1.05	C ₅ +C ₁₁ :	29.24
C ₂ +ENE :	0.56	C ₁₂ +C ₁₈ :	24.11
C ₃ +ANE :	0.47	C ₁₉ +C ₂₃ :	12.89
C ₃ +ENE :	3.54	C ₂₄ +34 :	14.19
C ₄ ISO+ANE:	0.73	C ₃₅ +	2.27

+++++

FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	29.24
DIESEL (C ₉ +C ₂₅) :	53.12

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% ELEMENTAL RECOVERY:	CARBON :	100.41
	HYDROGEN:	101.56
	OXYGEN :	101.30

+++++

Table 44

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 7888+33+731

SAMPLE NO. 21

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	7.69	40.50	0.00	0.00	0.00	0.00
2	1.05	2.96	0.56	1.70	0.00	0.00
3	0.47	0.89	3.54	7.10	0.00	0.00
4	0.71	1.02	3.26	4.90	0.03	0.04
5	0.96	1.13	3.87	4.65	0.08	0.10
6	4.69	4.59	0.25	0.25	0.00	0.00
7	1.72	1.45	1.70	1.46	0.34	0.29
8	1.54	1.14	1.60	1.20	0.49	0.36
9	1.47	0.97	2.00	1.34	0.66	0.44
10	1.45	0.86	1.89	1.14	0.94	0.56
11	1.25	0.67	1.37	0.75	0.97	0.52
12	1.60	0.79	1.27	0.64	0.99	0.49
13	1.70	0.78	1.21	0.56	0.67	0.31
14	1.89	0.80	1.02	0.44	0.77	0.33
15	2.07	0.82	0.83	0.33	0.76	0.30
16	2.81	1.05	0.00	0.00	0.70	0.26
17	2.85	1.00	0.00	0.00	0.33	0.11
18	2.48	0.82	0.00	0.00	0.16	0.05
19	2.51	0.79	0.00	0.00	0.08	0.02
20	2.65	0.79	0.00	0.00	0.04	0.01
21	2.62	0.75	0.00	0.00	0.05	0.02
22	2.50	0.68	0.00	0.00	0.06	0.02

Table 44 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 21

CARBON NO.	N ⁺ TALKANES		1 ⁺ TALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.31	0.60	0.00	0.00	0.06	0.02
24	2.11	0.53	0.00	0.00	0.05	0.01
25	1.93	0.46	0.00	0.00	0.04	0.01
26	1.72	0.39	0.00	0.00	0.03	0.01
27	1.51	0.34	0.00	0.00	0.02	0.00
28	1.29	0.28	0.00	0.00	0.03	0.01
29	1.12	0.23	0.00	0.00	0.02	0.00
30	1.01	0.20	0.00	0.00	0.00	0.00
31	0.96	0.19	0.00	0.00	0.03	0.01
32	0.90	0.17	0.00	0.00	0.00	0.00
33	0.72	0.13	0.00	0.00	0.00	0.00
34	0.68	0.12	0.00	0.00	0.02	0.00
35	0.66	0.11	0.00	0.00	0.00	0.00
36	0.54	0.09	0.00	0.00	0.00	0.00
37	0.39	0.06	0.00	0.00	0.00	0.00
38	0.30	0.05	0.00	0.00	0.00	0.00
39	0.23	0.04	0.00	0.00	0.00	0.00
40	0.15	0.02	0.00	0.00	0.00	0.00

TABLE 45

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE No: 7888+33+731+24

REACTOR LOADING, MLS :	452.0	T, C :	259.7	FEED RATIO,	
CATALYST LOADING, WT%:	23.4	P, PSIG :	303	CO/H ₂ :	0.98
TIME ON STREAM, HRS :	309.5	SV, L/G/HR:	0.86		

USAGE RATIO, CO/H ₂ :	0.48	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	43.20	MOL SYNGAS/KG CAT/HR:	16.651
%CO CONV.	28.20	SPECIFIC ACTIVITY,	
%H ₂ CONV.	57.87	MOL CO/MOL METAL/MIN:	0.104

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	13.50	H ₂ O:	15.52
OXYGENATES :	0.12	CO :	65.42
CO ₂ :	2.64	H ₂ :	2.80

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	13.38	C ₄ +ENE :	3.59
C ₂ +ANE :	2.00	C ₅ +C ₁₁ :	34.93
C ₂ +ENE :	0.39	C ₁₂ +C ₁₈ :	20.34
C ₃ +ANE :	1.10	C ₁₉ +C ₂₃ :	8.43
C ₃ +ENE :	4.24	C ₂₄ + ₃₄ :	8.42
C ₄ ISO+ANE:	1.50	C ₃₅ +	1.66

FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	34.93
DIESEL (C ₉ +C ₂₅) :	45.47

% ELEMENTAL RECOVERY:	CARBON :	102.66
	HYDROGEN:	101.78
	OXYGEN :	102.08

Table 46

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 7888+33+731

SAMPLE NO. 24

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	13.38	51.49	0.00	0.00	0.00	0.00
2	2.00	4.11	0.39	0.85	0.00	0.00
3	1.10	1.54	4.24	6.21	0.00	0.00
4	1.47	1.56	3.59	3.95	0.04	0.04
5	1.83	1.57	4.07	3.58	0.13	0.11
6	5.17	3.70	0.39	0.29	0.00	0.00
7	2.39	1.47	1.56	0.98	0.55	0.34
8	2.22	1.20	1.64	0.90	0.72	0.39
9	2.31	1.11	2.00	0.98	0.91	0.44
10	2.24	0.97	1.69	0.74	1.05	0.46
11	2.08	0.82	1.10	0.44	0.88	0.35
12	2.00	0.72	0.89	0.33	0.57	0.21
13	1.95	0.65	0.71	0.24	0.55	0.18
14	1.97	0.61	0.55	0.17	0.54	0.17
15	2.37	0.69	0.00	0.00	0.55	0.16
16	2.30	0.63	0.00	0.00	0.68	0.19
17	2.07	0.53	0.00	0.00	0.39	0.10
18	1.92	0.47	0.00	0.00	0.34	0.08
19	1.85	0.43	0.00	0.00	0.04	0.01
20	1.81	0.39	0.00	0.00	0.03	0.01
21	1.68	0.35	0.00	0.00	0.04	0.01
22	1.53	0.30	0.00	0.00	0.04	0.01

Table 46 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 24

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.37	0.26	0.00	0.00	0.04	0.01
24	1.23	0.22	0.00	0.00	0.04	0.01
25	1.13	0.20	0.00	0.00	0.03	0.00
26	0.99	0.17	0.00	0.00	0.02	0.00
27	0.89	0.14	0.00	0.00	0.02	0.00
28	0.76	0.12	0.00	0.00	0.01	0.00
29	0.70	0.11	0.00	0.00	0.01	0.00
30	0.59	0.09	0.00	0.00	0.00	0.00
31	0.57	0.08	0.00	0.00	0.02	0.00
32	0.53	0.07	0.00	0.00	0.00	0.00
33	0.44	0.06	0.00	0.00	0.01	0.00
34	0.42	0.05	0.00	0.00	0.01	0.00
35	0.41	0.05	0.00	0.00	0.00	0.00
36	0.36	0.04	0.00	0.00	0.00	0.00
37	0.29	0.03	0.00	0.00	0.00	0.00
38	0.24	0.03	0.00	0.00	0.00	0.00
39	0.20	0.02	0.00	0.00	0.00	0.00
40	0.16	0.02	0.00	0.00	0.00	0.00

TABLE 47

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co₂(CO)₈/Zr(OPr)₄/AL₂O₃
SAMPLE NO: 7888+33+731+28

REACTOR LOADING, MLS :	452.0	T, C :	259.1	FEED RATIO,	
CATALYST LOADING, WT% :	23.4	P, PSIG :	300	CU/H ₂ :	0.98
TIME ON STREAM, HRS :	333.7	SV, L/G/HR:	1.73		

USAGE RATIO, CO/H ₂ :	0.41	BULK ACTIVITY,	
%OVERALL CONV-, CU+H ₂ :	35.77	MOL SYNGAS/KG CAT/HR:	27.562
%CO CONV-	21.01	SPECIFIC ACTIVITY,	
%H ₂ CONV-	50.31	MOL CO/MOL METAL/MIN:	0.155

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	9.89	H ₂ O:	13.32
OXYGENATES :	0.07	CO :	72.60
CO ₂ :	0.80	H ₂ :	3.31

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	14.13	C ₄ +ENE :	3.56
C ₂ +ANE :	1.65	C ₅ +C ₁₁ :	34.38
C ₂ +ENE :	0.42	C ₁₂ +C ₁₈ :	19.76
C ₃ +ANE :	0.95	C ₁₉ +C ₂₃ :	9.15
C ₃ +ENE :	4.02	C ₂₄ +34 :	8.96
C ₄ ISO+ANE:	1.45	C ₃₅ +	1.56

FUEL FRACTIONS, WT%:

GASOLINE (C₅+C₁₁): 34.38
DIESEL (C₉+C₂₅) : 45.00

% ELEMENTAL RECOVERY: CARBON : 100.59
HYDROGEN: 96.59
OXYGEN : 102.71

Table 48

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 28

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	14.13	53.65	0.00	0.00	0.00	0.00
2	1.65	3.34	0.42	0.91	0.00	0.00
3	0.95	1.31	4.02	5.82	0.00	0.00
4	1.42	1.48	3.56	3.86	0.04	0.04
5	1.69	1.42	3.93	3.41	0.13	0.11
6	5.37	3.79	0.23	0.17	0.00	0.00
7	2.58	1.57	1.89	1.17	0.34	0.21
8	2.36	1.26	1.89	1.02	0.46	0.25
9	2.59	1.23	2.13	1.03	0.60	0.29
10	2.25	0.96	1.93	0.84	0.60	0.26
11	1.69	0.66	1.05	0.41	0.68	0.26
12	1.71	0.61	0.90	0.32	0.45	0.16
13	1.70	0.56	0.79	0.26	0.43	0.14
14	1.75	0.54	0.62	0.19	0.46	0.14
15	2.26	0.65	0.00	0.00	0.50	0.14
16	2.22	0.60	0.00	0.00	0.55	0.15
17	2.30	0.58	0.00	0.00	0.56	0.14
18	2.36	0.57	0.00	0.00	0.22	0.05
19	2.09	0.47	0.00	0.00	0.13	0.03
20	1.91	0.41	0.00	0.00	0.06	0.01
21	1.76	0.36	0.00	0.00	0.05	0.01
22	1.60	0.31	0.00	0.00	0.05	0.01

Table 48 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 28

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.46	0.27	0.00	0.00	0.04	0.01
24	1.31	0.24	0.00	0.00	0.04	0.01
25	1.19	0.21	0.00	0.00	0.03	0.01
26	1.06	0.18	0.00	0.00	0.03	0.00
27	0.95	0.15	0.00	0.00	0.02	0.00
28	0.82	0.13	0.00	0.00	0.02	0.00
29	0.72	0.11	0.00	0.00	0.02	0.00
30	0.64	0.09	0.00	0.00	0.01	0.00
31	0.60	0.08	0.00	0.00	0.02	0.00
32	0.57	0.08	0.00	0.00	0.00	0.00
33	0.47	0.06	0.00	0.00	0.00	0.00
34	0.43	0.06	0.00	0.00	0.00	0.00
35	0.40	0.05	0.00	0.00	0.00	0.00
36	0.34	0.04	0.00	0.00	0.00	0.00
37	0.27	0.03	0.00	0.00	0.00	0.00
38	0.22	0.03	0.00	0.00	0.00	0.00
39	0.18	0.02	0.00	0.00	0.00	0.00
40	0.14	0.01	0.00	0.00	0.00	0.00

TABLE 49

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE No: 7888+33+731+33

REACTOR LOADING, MLS :	452.0	T, C :	261.5	FEED RATIO,	
CATALYST LOADING, WT%:	23.4	P, PSIG :	300	CO/H ₂ :	1.46
TIME ON STREAM, HRS :	428.7	SV, L/G/HR:	1.73		

USAGE RATIO, CO/H ₂ :	0.40	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	26.04	MOL SYNGAS/KG CAT/HR:	26.066
%CO CONV. :	12.48	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	45.89	MOL CO/MOL METAL/MIN:	0.111

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	5.87	H ₂ O:	8.96
OXYGENATES :	0.03	CO :	81.88
CO ₂ :	0.79	H ₂ :	2.47

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	14.88	C ₄ +ENE :	4.30
C ₂ +ANE :	1.62	C ₅ +C ₁₁ :	40.30
C ₂ +ENE :	0.70	C ₁₂ +C ₁₈ :	22.85
C ₃ +ANE :	0.79	C ₁₉ +C ₂₃ :	4.64
C ₃ +ENE :	4.76	C ₂₄ + ₃₄ :	3.27
C ₄ ISO+ANE:	1.21	C ₃₅ + :	0.68

FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	40.30
DIESEL (C ₉ +C ₂₅) :	43.42

% ELEMENTAL RECOVERY:	CARBON :	100.29
	HYDROGEN:	97.41
	OXYGEN :	103.52

Table 50

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 33

CARBON NO.	N ⁺ ALKANES		I ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	14.88	52.50	0.00	0.00	0.00	0.00
2	1.62	3.05	0.70	1.41	0.00	0.00
3	0.79	1.01	4.76	6.40	8.00	0.00
4	1.21	1.18	4.30	4.34	0.00	0.00
5	1.51	1.18	5.01	4.04	0.13	0.10
6	7.26	4.77	0.30	0.20	0.00	0.00
7	2.67	1.51	2.80	1.61	0.37	0.21
8	2.35	1.17	2.42	1.22	0.47	0.23
9	2.18	0.96	2.73	1.22	0.65	0.29
10	2.02	0.80	2.46	0.99	0.94	0.37
11	1.71	0.62	1.50	0.55	0.81	0.29
12	1.77	0.59	1.37	0.46	0.58	0.19
13	1.80	0.55	1.27	0.39	0.60	0.18
14	1.81	0.52	1.16	0.34	0.61	0.17
15	1.84	0.49	0.87	0.23	0.71	0.19
16	2.48	0.62	0.00	0.00	0.68	0.17
17	2.24	0.53	0.00	0.00	0.61	0.14
18	2.17	0.48	0.00	0.00	0.28	0.06
19	1.53	0.32	0.00	0.00	0.18	0.04
20	0.99	0.20	0.00	0.00	0.08	0.02
21	0.71	0.13	0.00	0.00	0.03	0.01
22	0.58	0.11	0.00	0.00	0.02	0.00

Table 50 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 33

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.50	0.09	0.00	0.00	0.02	0.00
24	0.46	0.08	0.00	0.00	0.02	0.00
25	0.44	0.07	0.00	0.00	0.01	0.00
26	0.37	0.06	0.00	0.00	0.01	0.00
27	0.34	0.05	0.00	0.00	0.01	0.00
28	0.30	0.04	0.00	0.00	0.01	0.00
29	0.26	0.04	0.00	0.00	0.01	0.00
30	0.23	0.03	0.00	0.00	0.00	0.00
31	0.23	0.03	0.00	0.00	0.01	0.00
32	0.21	0.03	0.00	0.00	0.00	0.00
33	0.18	0.02	0.00	0.00	0.00	0.00
34	0.17	0.02	0.00	0.00	0.00	0.00
35	0.16	0.02	0.00	0.00	0.00	0.00
36	0.14	0.02	0.00	0.00	0.00	0.00
37	0.12	0.01	0.00	0.00	0.00	0.00
38	0.10	0.01	0.00	0.00	0.00	0.00
39	0.09	0.01	0.00	0.00	0.00	0.00
40	0.07	0.01	0.00	0.00	0.00	0.00

TABLE 51

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

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CATALYST : Co₂(Cu)₈/Zr(OPr)₄/Al₂O₃
SAMPLE NO: 7888+33+731+36

REACTOR LOADING, MLS :	452.0	T, C :	262.3	FEED RATIO,	
CATALYST LOADING, WT% :	23.4	P, PSIG :	300	Cu/H ₂ :	0.98
TIME ON STREAM, HRS :	453.2	SV, L/G/HR :	1.41		

+++++

USAGE RATIO, Cu/H ₂ :	0.42	BULK ACTIVITY,	
%OVERALL CONV., Cu+H ₂ :	38.40	MOL SYNGAS/KG CAT/HR :	24.095
%Cu CONV. :	22.86	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	53.55	MOL Cu/MOL METAL/MIN :	0.137

+++++

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS :	11.34	H ₂ O :	14.54
OXYGENATES :	0.18	Cu :	69.49
CO ₂ :	1.39	H ₂ :	3.06

+++++

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	16.64	C ₄ +ENE :	3.93
C ₂ +ANE :	2.16	C ₅ +C ₁₁ :	36.81
C ₂ +ENE :	0.41	C ₁₂ +C ₁₈ :	17.22
C ₃ +ANE :	1.22	C ₁₉ +C ₂₃ :	7.31
C ₃ +ENE :	4.60	C ₂₄ + ₃₄ :	7.36
C ₄ ISO+ANE :	1.71	C ₃₅ + :	0.63

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FUEL FRACTIONS, WT%:

GASOLINE (C₅+C₁₁): 36.81
DIESEL (C₉+C₂₅) : 40.19

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% ELEMENTAL RECOVERY: CARBON : 102.76
HYDROGEN: 100.36
OXYGEN : 104.35

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Table 52

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 7888+33+731

SAMPLE NO. 36

CONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	16.64	55.98	0.00	0.00	0.00	0.00
2	2.16	3.87	0.41	0.79	0.00	0.00
3	1.22	1.49	4.60	5.90	0.00	0.00
4	1.67	1.55	3.93	3.78	0.04	0.04
5	2.04	1.52	4.27	3.28	0.16	0.12
6	6.65	4.16	0.29	0.19	0.00	0.00
7	2.88	1.55	2.09	1.15	0.34	0.18
8	2.47	1.16	1.82	0.88	0.42	0.20
9	2.38	1.00	1.99	0.85	0.65	0.27
10	2.30	0.87	1.78	0.68	0.83	0.31
11	1.79	0.62	1.04	0.36	0.63	0.22
12	1.77	0.56	0.91	0.29	0.48	0.15
13	1.75	0.51	0.72	0.21	0.52	0.15
14	1.73	0.47	0.50	0.14	0.55	0.15
15	1.99	0.50	0.00	0.00	0.51	0.13
16	1.74	0.41	0.00	0.00	0.48	0.11
17	1.57	0.35	0.00	0.00	0.35	0.08
18	1.55	0.33	0.00	0.00	0.13	0.03
19	1.52	0.31	0.00	0.00	0.08	0.02
20	1.48	0.28	0.00	0.00	0.06	0.01
21	1.42	0.26	0.00	0.00	0.06	0.01
22	1.33	0.23	0.00	0.00	0.06	0.01

Table 52 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 36

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.24	0.21	0.00	0.00	0.06	0.01
24	1.14	0.18	0.00	0.00	0.05	0.01
25	1.05	0.16	0.00	0.00	0.05	0.01
26	0.93	0.14	0.00	0.00	0.04	0.01
27	0.82	0.12	0.00	0.00	0.03	0.00
28	0.70	0.10	0.00	0.00	0.03	0.00
29	0.59	0.08	0.00	0.00	0.02	0.00
30	0.50	0.06	0.00	0.00	0.01	0.00
31	0.44	0.05	0.00	0.00	0.02	0.00
32	0.39	0.05	0.00	0.00	0.01	0.00
33	0.29	0.03	0.00	0.00	0.00	0.00
34	0.25	0.03	0.00	0.00	0.01	0.00
35	0.21	0.02	0.00	0.00	0.00	0.00
36	0.16	0.02	0.00	0.00	0.00	0.00
37	0.10	0.01	0.00	0.00	0.00	0.00
38	0.07	0.01	0.00	0.00	0.00	0.00
39	0.05	0.00	0.00	0.00	0.00	0.00
40	0.03	0.00	0.00	0.00	0.00	0.00

TABLE 53

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

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CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE No: 7888+33+731+39

REACTOR LOADING, MLS :	452.0	T, C :	259.8	FEED RATIO,	
CATALYST LOADING, WT%:	23.4	P, PSIG :	300	CO/H ₂ :	0.98
TIME ON STREAM, HRS :	477.0	SV, L/G/HR:	0.71		

+++++

USAGE RATIO, CO/H ₂ :	0.44	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	40.45	MOL SYNGAS/KG CAT/HR:	12.743
%CO CONV.	25.16	SPECIFIC ACTIVITY,	
%H ₂ CONV.	55.41	MOL CO/MOL METAL/MIN:	0.076

+++++

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	14.74	H ₂ O:	12.90
OXYGENATES :	0.12	CO :	66.42
CO ₂ :	2.92	H ₂ :	2.89

+++++

HYDROCARBON SELECTIVITY, WT%:

C1 :	14.27	C4+ENE :	3.25
C2+ANE :	2.03	C5+C11 :	28.06
C2+ENE :	0.37	C12+C18:	16.50
C3+ANE :	1.05	C19+C23:	13.49
C3+ENE :	3.97	C24+34 :	14.25
C4 ISO+ANE:	1.37	C35+ :	1.39

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FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	28.06
DIESEL (C9+C25) :	45.36

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% ELEMENTAL RECOVERY:	CARBON :	109.43
	HYDROGEN:	104.67
	OXYGEN :	101.73

+++++

Table 54

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUP: NO. 7888+33+731

SAMPLE NO. 39

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	14.27	55.26	0.00	0.00	0.00	0.00
2	2.03	4.18	0.37	0.81	0.00	0.00
3	1.05	1.48	3.97	5.86	0.00	0.00
4	1.33	1.42	3.25	3.59	0.04	0.04
5	1.60	1.37	3.64	3.22	0.13	0.12
6	4.22	3.04	0.30	0.22	0.00	0.00
7	1.82	1.13	1.36	0.86	0.43	0.27
8	1.74	0.95	1.35	0.74	0.56	0.30
9	1.82	0.88	1.57	0.77	0.72	0.35
10	1.71	0.75	1.28	0.57	0.80	0.35
11	1.54	0.61	0.82	0.33	0.65	0.26
12	1.52	0.55	0.65	0.24	0.45	0.16
13	1.50	0.51	0.51	0.17	0.44	0.15
14	1.48	0.46	0.38	0.12	0.45	0.14
15	1.87	0.55	0.00	0.00	0.51	0.15
16	1.83	0.50	0.00	0.00	0.49	0.14
17	1.82	0.47	0.00	0.00	0.41	0.11
18	2.01	0.49	0.00	0.00	0.20	0.05
19	2.53	0.59	0.00	0.00	0.09	0.02
20	2.75	0.60	0.00	0.00	0.10	0.02
21	2.71	0.57	0.00	0.00	0.12	0.02
22	2.57	0.51	0.00	0.00	0.12	0.02

Table 54 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 39

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.37	0.45	0.00	0.00	0.12	0.02
24	2.16	0.40	0.00	0.00	0.11	0.02
25	2.10	0.37	0.00	0.00	0.09	0.02
26	1.74	0.29	0.00	0.00	0.08	0.01
27	1.53	0.25	0.00	0.00	0.06	0.01
28	1.32	0.21	0.00	0.00	0.06	0.01
29	1.13	0.17	0.00	0.00	0.05	0.01
30	0.97	0.14	0.00	0.00	0.04	0.01
31	0.87	0.12	0.00	0.00	0.04	0.01
32	0.72	0.10	0.00	0.00	0.02	0.00
33	0.60	0.08	0.00	0.00	0.02	0.00
34	0.54	0.07	0.00	0.00	0.02	0.00
35	0.46	0.06	0.00	0.00	0.00	0.00
36	0.35	0.04	0.00	0.00	0.00	0.00
37	0.24	0.03	0.00	0.00	0.00	0.00
38	0.16	0.02	0.00	0.00	0.00	0.00
39	0.12	0.01	0.00	0.00	0.00	0.00
40	0.07	0.01	0.00	0.00	0.00	0.00

TABLE 55

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co2(Co)8/Zr(OPr)4/AL2O3
SAMPLE NO: 7888+33+731+44

REACTOR LOADING, MLS : 452.0 T, C : 281.7 FEED RATIO,
CATALYST LOADING, WT%: 23.4 P, PSIG : 300 CO/H2: 0.96
TIME ON STREAM, HRS : 572.6 SV, L/G/HR: 0.71

USAGE RATIO, CO/H2 : 0.45 BULK ACTIVITY,
%OVERALL CONV., CO+H2: 43.94 MOL SYNGAS/KG CAT/HR: 13.989
%CO CONV. : 27.69 SPECIFIC ACTIVITY,
%H2 CONV. : 59.60 MOL CO/MOL METAL/MIN: 0.084

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 14.76 H2O: 13.69
OXYGENATES : 0.06 CO : 62.99
CO2 : 5.89 H2 : 2.60

HYDROCARBON SELECTIVITY, WT%:

C1 : 25.07 C4+ENE : 3.82
C2+ANE : 3.43 C5+C11 : 27.77
C2+ENE : 0.41 C12+C18: 14.64
C3+ANE : 1.77 C19+C23: 6.70
C3+ENE : 4.90 C24+34 : 8.64
C4 ISO+ANE: 1.88 C35+ : 0.97

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 27.77
DIESEL (C9+C25) : 34.31

% ELEMENTAL RECOVERY: CARBON : 109.19
HYDROGEN: 104.83
OXYGEN : 105.42

Table 56

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 44

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	25.07	66.75	0.00	0.00	0.00	0.00
2	3.43	4.87	0.41	0.62	0.00	0.00
3	1.77	1.72	4.90	4.97	0.00	0.00
4	1.83	1.35	3.82	2.91	0.05	0.03
5	2.11	1.25	3.59	2.19	0.21	0.13
6	2.51	1.24	1.33	0.67	0.51	0.25
7	1.80	0.76	0.96	0.42	0.74	0.32
8	1.60	0.60	0.95	0.36	0.91	0.34
9	1.58	0.53	1.05	0.36	1.06	0.35
10	1.48	0.45	0.86	0.26	1.33	0.40
11	1.44	0.39	0.57	0.16	1.19	0.32
12	1.38	0.34	0.43	0.11	0.92	0.23
13	1.26	0.29	0.30	0.07	0.83	0.19
14	1.35	0.29	0.00	0.00	0.75	0.16
15	1.19	0.24	0.00	0.00	0.67	0.13
16	1.19	0.22	0.00	0.00	0.68	0.13
17	1.36	0.24	0.00	0.00	0.57	0.10
18	1.34	0.22	0.00	0.00	0.44	0.07
19	1.27	0.20	0.00	0.00	0.13	0.02
20	1.29	0.20	0.00	0.00	0.07	0.01
21	1.31	0.19	0.00	0.00	0.08	0.01
22	1.14	0.16	0.00	0.00	0.09	0.01

Table 56 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUP. NO. 7888+33+731

SAMPLE NO. 44

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.23	0.16	0.00	0.00	0.08	0.01
24	1.16	0.15	0.00	0.00	0.07	0.01
25	1.11	0.13	0.00	0.00	0.07	0.01
26	0.99	0.12	0.00	0.00	0.06	0.01
27	0.90	0.10	0.00	0.00	0.06	0.01
28	0.80	0.09	0.00	0.00	0.05	0.01
29	0.71	0.07	0.00	0.00	0.04	0.00
30	0.63	0.06	0.00	0.00	0.03	0.00
31	0.58	0.06	0.00	0.00	0.03	0.00
32	0.49	0.05	0.00	0.00	0.02	0.00
33	0.41	0.04	0.00	0.00	0.01	0.00
34	0.38	0.03	0.00	0.00	0.01	0.00
35	0.32	0.03	0.00	0.00	0.00	0.00
36	0.24	0.02	0.00	0.00	0.00	0.00
37	0.16	0.01	0.00	0.00	0.00	0.00
38	0.11	0.01	0.00	0.00	0.00	0.00
39	0.08	0.01	0.00	0.00	0.00	0.00
40	0.05	0.00	0.00	0.00	0.00	0.00

TABLE 57

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE No: 7888+33+731+47

REACTOR LOADING, MLS :	452.0	T, C :	282.6	FEED RATIO,	
CATALYST LOADING, WT%:	23.4	P, PSIG :	300	CO/H ₂ :	1.94
TIME ON STREAM, HRS :	596.6	SV, L/G/HR:	0.70		

USAGE RATIO, CO/H ₂ :	0.46	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	29.74	MOL SYNGAS/KG CAT/HR:	9.342
%CO CONV.	14.31	SPECIFIC ACTIVITY,	
%H ₂ CONV.	59.64	MOL CO/MOL METAL/MIN:	0.057

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	7.73	H ₂ O:	8.10
OXYGENATES :	0.06	CO :	79.32
CO ₂ :	3.42	H ₂ :	1.38

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	18.42	C ₄ +ENE :	3.98
C ₂ +ANE :	2.22	C ₅ +C ₁₁ :	28.79
C ₂ +ENE :	0.80	C ₁₂ +C ₁₈ :	17.62
C ₃ +ANE :	0.80	C ₁₉ +C ₂₃ :	7.42
C ₃ +ENE :	4.92	C ₂₄ + ₃₄ :	12.43
C ₄ ISO+ANE:	1.02	C ₃₅ + :	1.57

FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	28.79
DIESEL (C ₉ +C ₂₅) :	39.61

% ELEMENTAL RECOVERY:	CARBON :	104.29
	HYDROGEN:	105.37
	OXYGEN :	104.04

Table 58

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 47

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	18.42	60.34	0.00	0.00	0.00	0.00
2	2.22	3.87	0.80	1.50	0.00	0.00
3	0.80	0.96	4.92	6.14	0.00	0.00
4	0.99	0.89	3.98	3.72	0.03	0.03
5	1.41	1.03	4.30	3.22	0.09	0.07
6	4.19	2.55	0.43	0.27	0.00	0.00
7	1.66	0.87	1.29	0.69	0.61	0.32
8	1.19	0.55	1.29	0.61	0.82	0.37
9	1.36	0.56	1.52	0.63	1.26	0.52
10	1.30	0.48	1.38	0.52	1.48	0.54
11	1.02	0.34	0.92	0.31	1.25	0.42
12	1.31	0.40	0.78	0.24	1.21	0.37
13	1.32	0.38	0.64	0.19	0.88	0.25
14	1.27	0.34	0.51	0.14	0.81	0.22
15	1.27	0.31	0.33	0.08	0.85	0.21
16	1.55	0.36	0.00	0.00	0.73	0.17
17	1.50	0.33	0.00	0.00	0.72	0.16
18	1.41	0.29	0.00	0.00	0.53	0.11
19	1.32	0.26	0.00	0.00	0.22	0.04
20	1.33	0.25	0.00	0.00	0.10	0.02
21	1.38	0.24	0.00	0.00	0.10	0.02
22	1.38	0.23	0.00	0.00	0.11	0.02

Table 58 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7886+33+731

SAMPLE NO. 47

CARBON NO.	NALKANES		1ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.37	0.22	0.00	0.00	0.11	0.02
24	1.46	0.23	0.00	0.00	0.10	0.02
25	1.41	0.21	0.00	0.00	0.09	0.01
26	1.35	0.19	0.00	0.00	0.09	0.01
27	1.28	0.18	0.00	0.00	0.09	0.01
28	1.19	0.16	0.00	0.00	0.08	0.01
29	1.09	0.14	0.00	0.00	0.07	0.01
30	0.99	0.12	0.00	0.00	0.06	0.01
31	0.92	0.11	0.00	0.00	0.06	0.01
32	0.80	0.09	0.00	0.00	0.04	0.00
33	0.66	0.07	0.00	0.00	0.03	0.00
34	0.53	0.06	0.00	0.00	0.03	0.00
35	0.52	0.05	0.00	0.00	0.01	0.00
36	0.39	0.04	0.00	0.00	0.00	0.00
37	0.26	0.03	0.00	0.00	0.00	0.00
38	0.18	0.02	0.00	0.00	0.00	0.00
39	0.13	0.01	0.00	0.00	0.00	0.00
40	0.08	0.01	0.00	0.00	0.00	0.00

TABLE 59

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co₂(CO)₈/Zr(OPr)₄/AL₂O₃
SAMPLE No: 7888+33+731+52

REACTOR LOADING, MLS :	452.0	T, C :	281.1	FEED RATIO,	
CATALYST LOADING, WT% :	23.4	P, PSIG :	305	CO/H ₂ :	1.95
TIME ON STREAM, HRS :	644.6	SV, L/G/HR :	1.40		

USAGE RATIO, CO/H ₂ :	0.40	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	21.38	MOL SYNGAS/KG CAT/HR:	13.40
%CO CONV. :	9.29	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	44.97	MOL CU/MOL METAL/MIN:	0.074

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS :	4.62	H ₂ O :	6.32
OXYGENATES :	0.02	CO :	85.60
CO ₂ :	1.53	H ₂ :	1.90

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	24.41	C ₄ +ENE :	4.95
C ₂ +ANE :	2.51	C ₅ +C ₁₁ :	32.31
C ₂ +ENE :	1.08	C ₁₂ +C ₁₈ :	21.91
C ₃ +ANE :	0.87	C ₁₉ +C ₂₃ :	3.86
C ₃ +ENE :	6.00	C ₂₄ + ₃₄ :	0.73
C ₄ ISO+ANE:	1.16	C ₃₅ +	0.21

FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	32.31
DIESEL (C ₉ +C ₂₅) :	37.50

% ELEMENTAL RECOVERY: CARBON : 101.19
HYDROGEN: 98.98
OXYGEN : 103.22

Table 60

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 7888+35+731

SAMPLE NO. 52

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	24.41	64.46	0.00	0.00	0.00	0.00
2	2.51	3.54	1.08	1.63	0.00	0.00
3	0.87	0.83	6.00	6.03	0.00	0.00
4	1.16	0.85	4.95	3.73	0.00	0.00
5	1.56	0.92	5.19	3.13	0.00	0.00
6	5.79	2.85	0.43	0.22	0.00	0.00
7	1.84	0.78	1.82	0.79	0.51	0.22
8	1.53	0.57	1.47	0.56	0.60	0.22
9	1.44	0.47	1.76	0.59	0.77	0.25
10	1.39	0.41	1.65	0.50	1.09	0.32
11	1.17	0.32	1.22	0.33	1.09	0.30
12	1.50	0.37	1.09	0.28	1.16	0.29
13	1.52	0.35	0.97	0.23	0.91	0.21
14	1.50	0.32	0.82	0.18	0.87	0.18
15	1.52	0.30	0.62	0.12	0.84	0.17
16	1.98	0.37	0.00	0.00	0.82	0.15
17	1.90	0.34	0.00	0.00	0.88	0.16
18	1.94	0.32	0.00	0.00	1.07	0.18
19	1.36	0.21	0.00	0.00	0.80	0.13
20	0.68	0.10	0.00	0.00	0.33	0.05
21	0.30	0.04	0.00	0.00	0.09	0.01
22	0.15	0.02	0.00	0.00	0.03	0.00

Table 60 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

PUB. NO. 7889+33+731

SAMPLE NO. 52

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.10	0.01	0.00	0.00	0.01	0.00
24	0.08	0.01	0.00	0.00	0.01	0.00
25	0.08	0.01	0.00	0.00	0.01	0.00
26	0.07	0.01	0.00	0.00	0.00	0.00
27	0.07	0.01	0.00	0.00	0.00	0.00
28	0.06	0.01	0.00	0.00	0.00	0.00
29	0.06	0.01	0.00	0.00	0.00	0.00
30	0.06	0.01	0.00	0.00	0.00	0.00
31	0.06	0.01	0.00	0.00	0.00	0.00
32	0.05	0.00	0.00	0.00	0.00	0.00
33	0.05	0.00	0.00	0.00	0.00	0.00
34	0.05	0.00	0.00	0.00	0.00	0.00
35	0.05	0.00	0.00	0.00	0.00	0.00
36	0.05	0.00	0.00	0.00	0.00	0.00
37	0.04	0.00	0.00	0.00	0.00	0.00
38	0.03	0.00	0.00	0.00	0.00	0.00
39	0.03	0.00	0.00	0.00	0.00	0.00
40	0.02	0.00	0.00	0.00	0.00	0.00

Table 61

Mass Balance
Process Conditions and Product Summary

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

Catalyst: $\text{Co}_2(\text{CO})_8/\text{Zr}(\text{OPr})_4/\text{Al}_2\text{O}_3$
Sample No: 7888-33-731-56

Reactor Loading, mLs: 452.0	T, C: 260.8	Feed Ratio, CO/H_2 : 0.97
Catalyst Loading, wt%: 23.4	P, psig: 308	
Time On Stream, hrs.: 669.3	SV, L/g/hr: 1.41	Vol % C_2H_4 : 10.0

Usage Ratio, CO/H_2 : 0.26	Bulk Activity, mol syngas/: 14.852
%Overall Conv., $\text{CO}+\text{H}_2$: 26.18	kg cat/hr
%CO Conv.: 11.10	Specific Activity, mol: 0.060
% H_2 Conv.: 40.79	$\text{CO}/\text{mol metal}/\text{min}$
% C_2H_4 Conv.: 75.50	

Weight % Product Distribution:

Hydrocarbons: 20.46	H_2O : 6.34
Oxygenates: 0.66	CO : 68.61
CO_2 : 0.66	H_2 : 3.37

Hydrocarbon Selectivity, wt%:

C_1 : 6.17	C_4 -ene: 2.41
C_2 -ane: 42.70	C_5 - C_{11} : 16.25
C_2 -ene: 20.88	C_{12} - C_{18} : 5.92
C_2 -ane: 0.62	C_{19} - C_{23} : 0.64
C_3 -ene: 3.20	C_{24} - C_{34} : 0.33
C_4 iso-ane: 0.78	C_{35}^+ : 0.10

Fuel Fractions, wt%:

Gasoline (C_5 - C_{11}): 16.25
Diesel (C_9 - C_{25}): 12.27

% Elemental Recovery:

Carbon: 97.40
Hydrogen: 95.00
Oxygen: 103.02

Table 62

Mass Balance
Process Conditions and Product Summary

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

Catalyst: $\text{Co}_2(\text{CO})_8/\text{Zr}(\text{OPr})_4/\text{Al}_2\text{O}_3$
Sample No: 7888-33-731-59

Reactor Loading, mLs: 452.0	T, C: 259.9	Feed Ratio, CO/H ₂ : 0.97
Catalyst Loading, wt%: 23.4	P, psig: 302	Vol % C ₂ H ₆ : 20.0
Time On Stream, hrs.: 741.0	SV, L/g/hr: 1.41	

Usage Ratio, CO/H ₂ : 0.15	Bulk Activity, mol syngas/: 13.762
%Overall Conv., CO+H ₂ : 27.36	kg cat/hr
%CO Conv.: 7.11	Specific Activity, mol: 0.034
%H ₂ Conv.: 47.06	CO/mol metal/min
%C ₂ H ₄ Conv.: 67.60	

Weight % Product Distribution:

Hydrocarbons: 34.66	H ₂ O: 4.03
Oxygenates: 0.59	CO: 57.86
CO ₂ : 0.45	H ₂ : 2.42

Hydrocarbon Selectivity, wt%:

C ₁ : 3.28	C ₄ -ene: 2.04
C ₂ -ane: 41.86	C ₅ -C ₁₁ : 13.96
C ₂ -ene: 29.68	C ₁₂ -C ₁₈ : 4.84
C ₂ -ane: 0.43	C ₁₉ -C ₂₃ : 0.42
C ₃ -ene: 2.75	C ₂₄ -C ₃₄ : 0.21
C ₄ iso-ane: 0.51	C ₃₅ +: 0.04

Fuel Fractions, wt%:

Gasoline (C ₅ -C ₁₁): 13.96
Diesel (C ₉ -C ₂₅): 10.74

% Elemental Recovery:

Carbon: 100.05
Hydrogen: 97.97
Oxygen: 104.32

Table 63

Mass Balance

Process Conditions and Product Summary

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

Catalyst: $\text{Co}_2(\text{CO})_8/\text{Zr}(\text{OPr})_4/\text{Al}_2\text{O}_3$
Sample No: 7868-33-731-62

Reactor Loading, mLs:	452.0	T, C:	258.2	Feed Ratio, CO/H ₂ :	0.92
Catalyst Loading, wt%:	23.4	P, psig:	300	Vol % C ₂ H ₄ :	20.0 ²
Time On Stream, hrs.:	765.4	SV, L/g/hr:	0.71		

Usage Ratio, CO/H ₂ :	0.22	Bulk Activity, mol syngas/:	9.232
%Overall Conv., CO+H ₂ :	36.46	kg cat/hr	
%CO Conv.:	13.34	Specific Activity, mol:	0.032
%H ₂ Conv.:	59.18	CO/mol metal/min	
%C ₂ H ₄ Conv.:	77.10		

Weight % Product Distribution:

Hydrocarbons:	36.08	H ₂ O:	6.12
Oxygenates:	0.92	CO:	54.17
CO ₂	0.85	H ₂ :	1.85

Hydrocarbon Selectivity, wt%:

C ₁ :	3.91	C ₄ -ene :	2.18
C ₂ -ane:	40.98	C ₅ -C ₁₁ :	18.06
C ₂ -ene:	19.92	C ₁₂ -C ₁₈ :	6.23
C ₃ -ane:	0.52	C ₁₉ -C ₂₃ :	2.17
C ₃ -ene:	3.00	C ₂₄ -C ₃₄ :	2.18
C ₄ iso-ane:	0.61	C ₃₅ ⁺ :	0.24

Fuel Fractions, wt%:

Gasoline (C ₅ -C ₁₁):	18.06
Diesel (C ₉ -C ₂₅):	17.11

% Elemental Recovery:

Carbon:	100.10
Hydrogen:	98.65
Oxygen:	104.33

TABLE 64

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co₂(CO)₈/Zr(OPr)₄/AL₂O₃
SAMPLE NO: 7888+33+731+65

REACTOR LOADING, MLS : 452.0 T, C : 258.1 FEED RATIO,
CATALYST LOADING, WT%: 23.4 P, PSIG : 300 CU/H₂: 0.98
TIME ON STREAM, HRS : 788.3 SV, L/G/HR: 0.70

USAGE RATIO, CU/H₂ : 0.40 BULK ACTIVITY,
OVERALL CONV., CU+H₂: 28.80 MOL SYNGAS/KG CAT/HR: 9.051
CO CONV- : 16.54 SPECIFIC ACTIVITY,
H₂ CONV- : 40.78 MOL CO/MOL METAL/MIN: 0.050

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 9.91 H₂O: 9.57
OXYGENATES : 0.05 CO : 75.30
CO₂ : 1.27 H₂ : 3.90

HYDROCARBON SELECTIVITY, WT%:

C₁ : 20.58 C₄+ENE : 3.57
C₂+ANE : 2.35 C₅+C₁₁ : 27.34
C₂+ENE : 0.48 C₁₂+C₁₈: 18.78
C₃+ANE : 1.18 C₁₉+C₂₃: 9.51
C₃+ENE : 4.36 C₂₄+34 : 9.24
C₄ ISO+ANE: 1.61 C₃₅+ : 1.01

FUEL FRACTIONS, WT%:

GASOLINE (C₅+C₁₁): 27.34
DIESEL (C₉+C₂₅) : 41.81

ELEMENTAL RECOVERY: CARBON : 105.62
HYDROGEN: 101.34
OXYGEN : 101.80

Table 65

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUR NO. 7888+33+731

SAMPLE NO. 65

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	20.58	63.56	0.00	0.00	0.00	0.00
2	2.35	3.88	0.48	0.85	0.00	0.00
3	1.18	1.32	4.36	5.13	0.00	0.00
4	1.55	1.32	3.57	3.15	0.05	0.04
5	1.79	1.23	3.78	2.67	0.15	0.10
6	4.13	2.37	0.21	0.12	0.00	0.00
7	1.81	0.89	1.26	0.63	0.29	0.14
8	1.63	0.71	1.29	0.57	0.35	0.15
9	1.91	0.74	1.57	0.62	0.59	0.23
10	1.93	0.67	1.40	0.49	0.43	0.15
11	1.53	0.48	0.93	0.30	0.38	0.12
12	1.51	0.44	0.78	0.23	0.37	0.11
13	1.54	0.41	0.67	0.18	0.41	0.11
14	1.68	0.42	0.46	0.12	0.57	0.14
15	2.13	0.50	0.02	0.00	0.72	0.17
16	2.06	0.45	0.00	0.00	0.87	0.19
17	1.88	0.39	0.00	0.00	0.81	0.17
18	1.71	0.33	0.00	0.00	0.59	0.12
19	1.81	0.33	0.00	0.00	0.26	0.05
20	1.80	0.32	0.00	0.00	0.25	0.04
21	1.70	0.28	0.00	0.00	0.24	0.04
22	1.57	0.25	0.00	0.00	0.23	0.04

Table 65 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS ESSENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

RUN NO. 7888+33+731

SAMPLE NO. 65

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.43	0.22	0.00	0.00	0.22	0.03
24	1.30	0.19	0.00	0.00	0.19	0.03
25	1.19	0.17	0.00	0.00	0.17	0.02
26	1.04	0.14	0.00	0.00	0.14	0.02
27	0.91	0.12	0.00	0.00	0.12	0.02
28	0.80	0.10	0.00	0.00	0.10	0.01
29	0.69	0.08	0.00	0.00	0.08	0.01
30	0.61	0.07	0.00	0.00	0.06	0.01
31	0.53	0.06	0.00	0.00	0.05	0.01
32	0.45	0.05	0.00	0.00	0.03	0.00
33	0.37	0.04	0.00	0.00	0.02	0.00
34	0.35	0.04	0.00	0.00	0.02	0.00
35	0.32	0.03	0.00	0.00	0.01	0.00
36	0.24	0.02	0.00	0.00	0.00	0.00
37	0.17	0.02	0.00	0.00	0.00	0.00
38	0.12	0.01	0.00	0.00	0.00	0.00
39	0.09	0.01	0.00	0.00	0.00	0.00
40	0.06	0.01	0.00	0.00	0.00	0.00

Table 66

Mass Balance
Process Conditions and Product Summary

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

Catalyst: $\text{Co}_2(\text{CO})_8/\text{Zr}(\text{OPr})_4/\text{Al}_2\text{O}_3$
Sample No: 7888-33-731-66

Reactor Loading, mLs:	452.0	T, C:	261.5	Feed Ratio, CO/H_2 :	0.98
Catalyst Loading, wt%:	23.4	P, psig:	550		
Time On Stream, hrs.:	813.1	SV, L/g/hr:	1.40	Vol% C_2H_4 :	20.0

Usage Ratio, CO/H_2 :	0.28	Bulk Activity, mol syngas/:	17.866
%Overall Conv., $\text{CO}+\text{H}_2$:	35.83	kg cat/hr	
%CO Conv.:	15.80	Specific Activity, mol:	0.076
% H_2 Conv.:	55.51	$\text{CO}/\text{mol metal}/\text{min}$	
% C_2H_4 Conv.:	74.50		

Weight % Product Distribution:

Hydrocarbons:	35.85	H_2O :	6.57
Oxygenates:	0.91	CO :	53.85
CO_2	0.76	H_2 :	2.07

Hydrocarbon Selectivity, wt%:

C_1 :	3.08	C_4 -ene :	1.74
C_2 -ane:	45.54	C_5 - C_{11} :	17.20
C_2 -ene:	23.30	C_{12} - C_{18} :	5.48
C_2 -ane:	0.50	C_{19} - C_{23} :	0.17
C_3 -ene:	2.38	C_{24} - C_{34} :	0.01
C_4 iso-ane:	0.60	C_{35}^+ :	0.00

Fuel Fractions, wt%:

Gasoline (C_5 - C_{11}):	17.20
Diesel (C_9 - C_{25}):	13.10

% Elemental Recovery:

Carbon:	96.12
Hydrogen:	98.33
Oxygen:	102.38

Table 67

Slurry Screening Summary
8385-60-70720.6 wt% (80.06 g) $\text{FeCo}_3(\text{CO})_{12}/\text{K}/\text{Al}_2/\text{O}_3$ CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

Sample No.	Time on Stream h	P psig	T °C	SV, NL/g cat/hr	$\% \text{CO} + \text{H}_2$	$\% \text{CO}$	$\% \text{H}_2$	Feed CO/H_2	Usage $\Delta \text{CO}/\Delta \text{H}_2$	Bulk Activity mol syngas/kg cat/h	Specific Activity mol CO/mol Co/min	Selectivity Wt%						
												C_1	$\text{C}_2 - \text{C}_4$	$\text{C}_5 - \text{C}_{11}$	$\text{C}_{12} - \text{C}_{18}$	$\text{C}_{19} - \text{C}_{23}$	C_{24}^+	$\text{C}_5 - \text{C}_{23}$
3	47.7	315	240.0	1.6	16.1	10.2	22.0	1.01	0.47	11.3	0.11	14.0	14.8	27.4	17.6	13.0	13.2	50.0
6	96.5	320	240.2	1.6	12.9	7.8	20.6	1.52	0.58	9.1	0.10	13.0	14.8	30.0	19.7	13.1	9.4	62.8
8	119.5	320	240.4	1.6	11.9	6.9	21.9	2.01	0.64	8.4	0.10	9.8	11.7	31.0	22.1	14.6	10.8	67.7
10	143.7	320	241.2	0.7	15.1	7.4	30.6	2.02	0.49	4.9	0.05	9.0	12.5	29.1	20.8	12.8	15.8	62.7
11	168.0	320	260.4	0.7	28.0	13.9	56.7	2.02	0.49	9.3	0.09	9.2	13.0	35.3	24.8	9.2	8.5	69.3
12	191.5	320	260.0	1.6	20.6	12.5	37.2	2.03	0.68	14.5	0.18	10.0	11.6	34.1	24.9	12.3	7.1	71.5
15	264.7	320	250.8	1.6	22.3	13.1	36.2	1.52	0.55	15.8	0.17	13.7	14.4	35.8	20.1	9.7	6.3	65.6
17	289.7	300	259.2	1.5	23.3	11.9	34.7	1.01	0.34	15.5	0.12	16.7	15.8	36.7	18.3	7.7	4.8	62.7
20	312.5	295	261.4	0.7	42.4	28.2	56.4	1.00	0.50	13.9	0.14	14.3	15.2	42.4	18.4	5.4	4.3	66.2
22	336.5	300	281.4	0.7	58.1	41.9	74.3	1.00	0.56	19.1	0.21	15.3	15.4	42.2	20.0	4.4	2.7	66.6
24	361.0	300	279.3	0.7	34.6	20.7	62.7	2.02	0.67	11.4	0.14	11.8	12.9	38.2	25.5	6.4	5.2	73.1
27	412.7	298	282.1	1.5	41.0	27.3	55.0	1.01	0.50	27.3	0.27	19.1	15.7	35.4	17.4	7.5	4.9	60.3
29	456.4	300	280.5	1.5	26.1	16.0	46.6	2.03	0.70	17.5	0.22	13.9	13.3	31.9	20.5	12.3	8.1	64.7
33	504.2	625	280.4	1.5	18.2	8.1	37.9	1.96	0.42	12.2	0.11	14.7	15.0	31.0	19.8	9.9	9.6	60.7
36	529.6	320	241.9	1.5	6.1	3.0	9.3	1.00	0.32	4.1	0.03	9.5	6.3	8.9	12.5	23.1	39.5	44.7

TABLE 68

CONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : $FeCo_3(CO)_{12}/K/Al_2O_3$
SAMPLE No: 8385+60+707+3

REACTOR LOADING, MLS :	444.0	T, C :	240.8	FEED RATIO,	
CATALYST LOADING, WT% :	20.6	P, PSIG :	315	CO/H ₂ :	1.01
TIME ON STREAM, HRS :	47.7	SV, L/G/HR :	1.6		

USAGE RATIO, CO/H ₂ :	0.47	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	16.09	MOL SYNGAS/KG CAT/HR :	11.307
%CO CONV. :	10.20	SPECIFIC ACTIVITY,	
H ₂ CONV. :	22.04	MOL CO/MOL METAL/MIN :	0.109

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS :	4.12	H ₂ O :	6.50
OXYGENATES :	0.14	CO :	83.81
CO ₂ :	0.29	H ₂ :	5.13

HYDROCARBON SELECTIVITY, WT%:

C1 :	13.98	C4+ENE :	4.37
C2+ANE :	1.40	C5+C11 :	27.35
C2+ENE :	0.70	C12+C18 :	17.60
C3+ANE :	1.27	C19+C23 :	12.97
C3+ENE :	5.35	C24+34 :	10.90
C4 ISO+ANE :	1.86	C35+ :	2.25

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11) :	27.35
DIESEL (C9+C25) :	43.78

% ELEMENTAL RECOVERY:	CARBON :	98.79
	HYDROGEN :	99.54
	OXYGEN :	101.13

Table 69

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

RUN NO. 8385+60+707

SAMPLE NO. 3

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	13.98	52.92	0.00	0.00	0.00	0.00
2	1.40	2.82	0.70	1.52	0.00	0.00
3	1.27	1.75	5.35	7.72	0.00	0.00
4	1.86	1.94	4.37	4.72	0.00	0.00
5	1.93	1.62	4.63	4.00	0.00	0.00
6	4.59	3.23	0.06	0.04	0.00	0.00
7	1.84	1.11	1.50	0.93	0.00	0.00
8	1.61	0.86	1.11	0.60	0.58	0.31
9	1.75	0.83	1.44	0.69	0.46	0.22
10	1.64	0.70	1.47	0.63	0.05	0.02
11	1.45	0.56	0.95	0.37	0.29	0.11
12	1.46	0.52	0.80	0.29	0.20	0.07
13	1.53	0.50	0.66	0.22	0.25	0.08
14	1.65	0.50	0.53	0.16	0.25	0.08
15	2.19	0.63	0.00	0.00	0.24	0.07
16	2.26	0.61	0.00	0.00	0.23	0.06
17	2.38	0.60	0.00	0.00	0.25	0.06
18	2.61	0.62	0.00	0.00	0.12	0.03
19	2.62	0.59	0.00	0.00	0.15	0.03
20	2.56	0.55	0.00	0.00	0.17	0.04
21	2.52	0.52	0.00	0.00	0.16	0.03
22	2.40	0.47	0.00	0.00	0.14	0.03

Table 69 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION:

RUN NO. 8385+60+707

SAMPLE NO. 3

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.07	0.39	0.00	0.00	0.18	0.03
24	1.86	0.33	0.00	0.00	0.10	0.02
25	1.76	0.30	0.00	0.00	0.00	0.00
26	1.52	0.25	0.00	0.00	0.13	0.02
27	1.12	0.18	0.00	0.00	0.00	0.00
28	0.61	0.09	0.00	0.00	0.12	0.02
29	0.52	0.08	0.00	0.00	0.12	0.02
30	0.42	0.06	0.00	0.00	0.16	0.02
31	0.53	0.07	0.00	0.00	0.14	0.02
32	0.26	0.04	0.00	0.00	0.19	0.03
33	0.37	0.05	0.00	0.00	0.16	0.02
34	0.61	0.08	0.00	0.00	0.21	0.03
35	0.68	0.08	0.00	0.00	0.00	0.00
36	0.58	0.07	0.00	0.00	0.00	0.00
37	0.39	0.05	0.00	0.00	0.00	0.00
38	0.23	0.03	0.00	0.00	0.00	0.00
39	0.21	0.02	0.00	0.00	0.00	0.00
40	0.17	0.02	0.00	0.00	0.00	0.00

TABLE 70

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : FeCo3(CO)12/K/AL2O3
SAMPLE NO: 8385+60+707+6

REACTOR LOADING, MLS :	444.0	T, C :	240.2	FEED RATIO,	
CATALYST LOADING, WT% :	20.6	P, PSIG :	320	CG/H2:	1.52
TIME ON STREAM, HRS :	96.5	SV, L/G/HR:	1.6		

USAGE RATIO, CO/H2 :	0.58	BULK ACTIVITY,	
OVERALL CONV., CO+H2:	12.90	MOL SYNGAS/KG CAT/HR:	9.130
CO CONV.	7.84	SPECIFIC ACTIVITY,	
H2 CONV.	20.58	MOL CO/MOL METAL/MIN:	0.101

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	2.38	H2O:	3.12
OXYGENATES :	0.04	CO :	90.57
CO2 :	0.22	H2 :	3.67

HYDROCARBON SELECTIVITY, WT%:

C1 :	12.98	C4+ENE :	4.70
C2+ANE :	1.07	C5+C11 :	29.97
C2+ENE :	0.96	C12+C18:	19.69
C3+ANE :	0.99	C19+C23:	13.06
C3+ENE :	5.62	C24+34 :	8.73
C4 ISO+ANE:	1.61	C35+ :	0.62

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 29.97
DIESEL (C9+C25) : 47.36

ELEMENTAL RECOVERY: CARBON : 97.08
HYDROGEN: 95.46
OXYGEN : 97.41

Table 71

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8385+60+707

SAMPLE NO. 6

CONTAINS POTENTIALLY
PERCENTAGE DATA
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	12.98	50.17	0.00	0.00	0.00	0.00
2	1.07	2.20	0.96	2.13	0.00	0.00
3	0.99	1.40	5.62	8.27	0.00	0.00
4	1.61	1.72	4.70	5.19	0.00	0.00
5	1.77	1.52	5.23	4.62	0.00	0.00
6	5.46	3.93	0.00	0.00	0.00	0.00
7	1.65	1.02	1.83	1.16	0.00	0.00
8	1.42	0.77	1.30	0.72	0.43	0.23
9	1.51	0.73	1.73	0.85	0.22	0.10
10	1.79	0.78	2.03	0.90	0.29	0.12
11	1.65	0.66	1.36	0.55	0.32	0.13
12	1.61	0.58	1.13	0.41	0.16	0.06
13	1.65	0.55	0.96	0.33	0.27	0.09
14	1.74	0.54	0.82	0.26	0.34	0.11
15	1.82	0.53	0.64	0.19	0.37	0.11
16	2.38	0.65	0.00	0.00	0.38	0.10
17	2.34	0.60	0.00	0.00	0.36	0.09
18	2.37	0.58	0.00	0.00	0.35	0.08
19	2.38	0.55	0.00	0.00	0.35	0.08
20	2.37	0.52	0.00	0.00	0.37	0.08
21	2.55	0.53	0.00	0.00	0.15	0.03
22	2.40	0.48	0.00	0.00	0.17	0.03

Table 71 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 8385+60+707

SAMPLE NO. 6

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.10	0.40	0.00	0.00	0.20	0.04
24	1.76	0.32	0.00	0.00	0.17	0.03
25	1.64	0.29	0.00	0.00	0.14	0.02
26	1.14	0.19	0.00	0.00	0.21	0.04
27	0.83	0.14	0.00	0.00	0.16	0.03
28	0.59	0.09	0.00	0.00	0.06	0.01
29	0.29	0.04	0.00	0.00	0.02	0.00
30	0.28	0.04	0.00	0.00	0.05	0.01
31	0.30	0.04	0.00	0.00	0.04	0.01
32	0.29	0.04	0.00	0.00	0.04	0.01
33	0.31	0.04	0.00	0.00	0.04	0.01
34	0.27	0.03	0.00	0.00	0.07	0.01
35	0.29	0.04	0.00	0.00	0.00	0.00
36	0.22	0.03	0.00	0.00	0.00	0.00
37	0.11	0.01	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 72

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : FeCo3(CO)12/K/AL2O3
SAMPLE NO: 8385+60+707+8

REACTOR LOADING, MLS :	444.0	T, C :	240.4	FEED RATIO,	
CATALYST LOADING, WT%:	20.6	P, PSIG :	320	CO/H2:	2.01
TIME ON STREAM, HRS :	119.5	SV, L/G/HR:	1.6		

USAGE RATIO, CO/H2 :	0.64	BULK ACTIVITY,	
%OVERALL CONV., C1+H2:	11.84	MOL SYNGAS/KG CAT/HR:	8.393
%CO CONV. :	6.93	SPECIFIC ACTIVITY,	
%H2 CONV. :	21.86	MOL CO/MOL METAL/MIN:	0.098

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	1.84	H2O:	2.61
OXYGENATES :	0.03	CO :	92.58
CO2 :	0.18	H2 :	2.75

HYDROCARBON SELECTIVITY, WT%:

C1 :	9.80	C4+ENE :	3.80
C2+ANE :	0.58	C5+C11 :	31.01
C2+ENE :	0.99	C12+C18:	22.06
C3+ANE :	0.72	C19+C23:	14.64
C3+ENE :	4.51	C24+34 :	10.05
C4 ISO+ANE:	1.11	C35+ :	0.73

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	31.01
DIESEL (C9+C25) :	53.03

% ELEMENTAL RECOVERY:	CARBON :	96.85
	HYDROGEN:	94.83
	OXYGEN :	97.39

Table 73

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 8385+60+707

SAMPLE NO. 8

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	9.80	44.78	0.00	0.00	0.00	0.00
2	0.58	1.42	0.99	2.58	0.00	0.00
3	0.72	1.20	4.51	7.84	0.00	0.00
4	1.11	1.40	3.80	4.97	0.00	0.00
5	1.29	1.31	4.53	4.74	0.00	0.00
6	5.30	4.50	0.00	0.00	0.00	0.00
7	1.76	1.28	2.24	1.67	0.00	0.00
8	1.67	1.07	1.76	1.15	0.25	0.16
9	1.89	1.08	2.10	1.22	0.51	0.29
10	1.89	0.97	2.32	1.21	0.15	0.08
11	1.41	0.66	1.51	0.71	0.42	0.20
12	1.64	0.70	1.33	0.58	0.40	0.17
13	1.68	0.67	1.29	0.52	0.13	0.05
14	1.80	0.66	1.10	0.41	0.28	0.10
15	1.91	0.66	0.93	0.32	0.33	0.11
16	2.76	0.89	0.00	0.00	0.36	0.12
17	2.71	0.82	0.00	0.00	0.36	0.11
18	2.70	0.78	0.00	0.00	0.36	0.10
19	2.94	0.80	0.00	0.00	0.12	0.03
20	2.93	0.76	0.00	0.00	0.14	0.04
21	2.87	0.71	0.00	0.00	0.15	0.04
22	2.73	0.64	0.00	0.00	0.17	0.04

Table 73 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE P.E.S.
NOT FOR PUBLICATION

RUN NO. 8385+60+707

SAMPLE NO. 8

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.40	0.54	0.00	0.00	0.20	0.05
24	2.03	0.44	0.00	0.00	0.18	0.04
25	1.75	0.36	0.00	0.00	0.15	0.03
26	1.41	0.28	0.00	0.00	0.13	0.03
27	0.97	0.19	0.00	0.00	0.17	0.03
28	0.76	0.14	0.00	0.00	0.09	0.02
29	0.35	0.06	0.00	0.00	0.03	0.01
30	0.33	0.06	0.00	0.00	0.05	0.01
31	0.35	0.06	0.00	0.00	0.05	0.01
32	0.35	0.06	0.00	0.00	0.05	0.01
33	0.37	0.06	0.00	0.00	0.05	0.01
34	0.32	0.05	0.00	0.00	0.09	0.01
35	0.34	0.05	0.00	0.00	0.00	0.00
36	0.25	0.04	0.00	0.00	0.00	0.00
37	0.13	0.02	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 74

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : FeCo₃(CO)₁₂/K/AL₂O₃
SAMPLE No: 8385+60+707+10

REACTOR LOADING, MLS :	444.0	T, C :	241.2	FEED RATIO,	
CATALYST LOADING, WT%:	20.6	P, PSIG :	320	CO/H ₂ :	2.02
TIME ON STREAM, HRS :	143.7	SV, L/G/HR:	0.7		

USAGE RATIO, CO/-2 :	0.46	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	15.06	MOL SYNGAS/KG CAT/HR:	4.970
%CO CONV-	7.38	SPECIFIC ACTIVITY,	
%H ₂ CONV-	30.55	MOL CO/MOL METAL/MIN:	0.049

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	3.25	H ₂ O:	4.96
OXYGENATES :	0.09	CO :	88.91
CO ₂ :	0.43	H ₂ :	2.36

HYDROCARBON SELECTIVITY, WT%:

C1 :	9.04	C4+ENE :	4.10
C2+ANE :	0.89	C5+C11 :	29.05
C2+ENE :	0.78	C12+C18 :	20.83
C3+ANE :	0.75	C19+C23 :	12.75
C3+ENE :	4.80	C24+34 :	13.26
C4 ISO+ANE:	1.19	C35+ :	2.56

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	29.05
DIESEL (C9+C25) :	49.29

% ELEMENTAL RECOVERY:	CARBON :	99.66
	HYDROGEN:	101.23
	OXYGEN :	101.28

Table 75
HYDROCARBON PRODUCT DISTRIBUTION

CONTAINS POTENTIALLY
 PATENTABLE DATA-
 NOT FOR PUBLICATION

RUI. NO- 8385+60+707

SAMPLE NO- 10

CARBON NO-	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	9.04	42.84	0.00	0.00	0.00	0.00
2	0.89	2.24	0.78	2.12	0.00	0.00
3	0.75	1.29	4.80	8.66	0.00	0.00
4	1.19	1.56	4.10	5.56	0.00	0.00
5	1.33	1.40	4.43	4.80	0.00	0.00
6	5.04	4.44	0.08	0.07	0.00	0.00
7	1.78	1.35	1.61	1.25	0.06	0.04
8	1.63	1.09	1.35	0.91	0.37	0.24
9	1.62	0.96	1.84	1.11	0.15	0.09
10	1.76	0.94	1.98	1.07	0.44	0.24
11	1.48	0.72	1.51	0.74	0.59	0.29
12	1.73	0.77	1.26	0.57	0.63	0.28
13	1.72	0.71	1.07	0.45	0.36	0.15
14	1.72	0.66	0.90	0.35	0.37	0.14
15	1.76	0.63	0.72	0.26	0.35	0.13
16	2.59	0.87	0.00	0.00	0.33	0.11
17	2.44	0.77	0.00	0.00	0.30	0.09
18	2.32	0.69	0.00	0.00	0.28	0.08
19	2.50	0.71	0.00	0.00	0.08	0.02
20	2.42	0.65	0.00	0.00	0.10	0.03
21	2.43	0.62	0.00	0.00	0.11	0.03
22	2.50	0.61	0.00	0.00	0.09	0.02

Table 75 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8385+60+707

SAMPLE NO. 10

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.41	0.56	0.00	0.00	0.10	0.02
24	2.19	0.49	0.00	0.00	0.09	0.02
25	1.99	0.43	0.00	0.00	0.07	0.02
26	1.73	0.36	0.00	0.00	0.06	0.01
27	1.39	0.28	0.00	0.00	0.06	0.01
28	1.03	0.20	0.00	0.00	0.07	0.01
29	0.84	0.16	0.00	0.00	0.04	0.01
30	0.78	0.14	0.00	0.00	0.07	0.01
31	0.72	0.12	0.00	0.00	0.06	0.01
32	0.71	0.12	0.00	0.00	0.00	0.00
33	0.64	0.10	0.00	0.00	0.06	0.01
34	0.59	0.09	0.00	0.00	0.08	0.01
35	0.66	0.10	0.00	0.00	0.00	0.00
36	0.56	0.08	0.00	0.00	0.00	0.00
37	0.43	0.06	0.00	0.00	0.00	0.00
38	0.32	0.05	0.00	0.00	0.00	0.00
39	0.32	0.04	0.00	0.00	0.00	0.00
40	0.27	0.04	0.00	0.00	0.00	0.00

TABLE 76

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CATALYST : $FeCo_3(CO)_{12}/K_2Al_2O_3$
SAMPLE NO: 8385+60+707+11

REACTOR LOADING, MLS :	444.0	T, C :	260.4	FEED RATIO,	
CATALYST LOADING, WT%:	20.6	P, PSIG :	320	CO/H ₂ :	2.02
TIME ON STREAM, HRS :	168.0	SV, L/G/HR:	0.7		

USAGE RATIO, CO/H ₂ :	0.49	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	28.04	MOL SYNGAS/KG CAT/HR:	9.256
%CO CONV-	13.86	SPECIFIC ACTIVITY,	
%H ₂ CONV-	56.65	MOL CO/MOL METAL/HIN:	0.092

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	5.63	H ₂ O:	8.12
OXYGENATES :	0.16	CO :	83.21
CO ₂ :	1.40	H ₂ :	1.48

HYDROCARBON SELECTIVITY, WT%:

C1 :	9.22	C4+ENE :	4.22
C2+ANE :	1.46	C5+C11 :	35.29
C2+ENE :	0.56	C12+C18:	24.77
C3+ANE :	0.81	C19+C23:	9.15
C3+ENE :	4.83	C24+34 :	7.05
C4 ISO+ANE:	1.15	C35+ :	1.49

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	35.29
DIESEL (C9+C25) :	50.83

% ELEMENTAL RECOVERY: CARBON : 98.67
HYDROGEN: 96.75
OXYGEN : 101.15

Table 77
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8385+60+707

SAMPLE NO. 11

CONTAINS POTENTIALLY
 PATENTABLE DATA -
 NOT FOR PUBLICATION

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	9.22	41.42	0.00	0.00	0.00	0.00
2	1.46	3.49	0.56	1.44	0.00	0.00
3	0.81	1.33	4.83	8.27	0.00	0.00
4	1.15	1.42	4.22	5.42	0.00	0.00
5	1.49	1.48	4.77	4.89	0.12	0.11
6	5.88	4.91	0.17	0.15	0.00	0.00
7	2.29	1.65	1.71	1.26	0.19	0.14
8	1.75	1.10	1.67	1.07	0.42	0.26
9	2.12	1.19	1.96	1.12	1.05	0.59
10	2.26	1.14	1.91	0.98	0.96	0.48
11	1.98	0.91	1.54	0.72	1.05	0.48
12	2.38	1.00	1.42	0.61	1.01	0.43
13	2.29	0.89	1.11	0.44	0.64	0.25
14	2.24	0.81	0.87	0.32	0.64	0.23
15	2.85	0.97	0.00	0.00	0.60	0.20
16	2.74	0.87	0.00	0.00	0.52	0.16
17	2.47	0.74	0.00	0.00	0.43	0.13
18	2.41	0.68	0.00	0.00	0.16	0.05
19	2.21	0.59	0.00	0.00	0.11	0.03
20	1.97	0.50	0.00	0.00	0.09	0.02
21	1.77	0.43	0.00	0.00	0.08	0.02
22	1.56	0.36	0.00	0.00	0.05	0.01

Table 77 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION:

RUN NO. 8385+60+707

SAMPLE NO. 11

FIGURES POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CARBON NO.	N ⁺ TALKANES		1 ⁺ TALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.28	0.28	0.00	0.00	0.02	0.00
24	1.08	0.23	0.00	0.00	0.00	0.00
25	1.01	0.21	0.00	0.00	0.00	0.00
26	0.89	0.17	0.00	0.00	0.00	0.00
27	0.78	0.15	0.00	0.00	0.00	0.00
28	0.59	0.11	0.00	0.00	0.03	0.01
29	0.48	0.09	0.00	0.00	0.02	0.00
30	0.45	0.08	0.00	0.00	0.04	0.01
31	0.42	0.07	0.00	0.00	0.04	0.01
32	0.42	0.07	0.00	0.00	0.00	0.00
33	0.37	0.06	0.00	0.00	0.03	0.01
34	0.34	0.05	0.00	0.00	0.05	0.01
35	0.38	0.06	0.00	0.00	0.00	0.00
36	0.33	0.05	0.00	0.00	0.00	0.00
37	0.25	0.03	0.00	0.00	0.00	0.00
38	0.19	0.03	0.00	0.00	0.00	0.00
39	0.18	0.02	0.00	0.00	0.00	0.00
40	0.16	0.02	0.00	0.00	0.00	0.00

TABLE 78

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : $FeCo_3(CO)_{12}/K/Al_2O_3$
SAMPLE NO: 8385+60+707+12

REACTOR LOADING, MLS :	444.0	T, C :	260.0	FEED RATIO,	
CATALYST LOADING, WT%:	20.6	P, PSIG :	320	CU/H2:	2.03
TIME ON STREAM, HRS :	191.5	SV, L/G/HR:	1.6		

USAGE RATIO, CU/H2 :	0.68	BULK ACTIVITY,	
OVERALL CONV., CU+H2:	20.60	MOL SYNGAS/KG CAT/HR:	14.537
CO CONV.	12.46	SPECIFIC ACTIVITY,	
H2 CONV.	37.16	MOL CU/MOL METAL/MIN:	0.177

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	3.76	H2O:	5.39
OXYGENATES :	0.06	CO :	88.10
CO2 :	0.47	H2 :	2.22

HYDROCARBON SELECTIVITY, -WT%:

C1 :	9.96	C4+ENE :	3.85
C2+ANE :	1.02	C5+C11 :	34.09
C2+ENE :	0.71	C12+C18:	24.85
C3+ANE :	0.68	C19+C23:	12.28
C3+ENE :	4.40	C24+34 :	6.05
C4 ISO+ANE:	1.04	C35+ :	1.08

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 34.09
DIESEL (C9+C25) : 53.15

% ELEMENTAL RECOVERY: CARBON : 95.24
HYDROGEN: 97.10
OXYGEN : 96.50

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Table 79

HYDROCARBON PRODUCT DISTRIBUTION:CERTAINLY POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 8385+60+707

SAMPLE NO. 12

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	9.96	44.38	0.00	0.00	0.00	0.00
2	1.02	2.42	0.71	1.82	0.00	0.00
3	0.68	1.10	4.40	7.48	0.00	0.00
4	1.04	1.28	3.85	4.90	0.00	0.00
5	1.31	1.29	4.52	4.61	0.00	0.00
6	6.07	5.04	0.15	0.12	0.00	0.00
7	2.14	1.53	1.99	1.45	0.17	0.12
8	2.04	1.28	1.78	1.13	0.29	0.18
9	2.04	1.14	2.27	1.29	0.56	0.31
10	2.06	1.03	2.13	1.08	0.71	0.36
11	1.76	0.80	1.47	0.68	0.61	0.28
12	2.09	0.88	1.31	0.56	0.58	0.24
13	2.14	0.83	1.23	0.48	0.29	0.11
14	2.19	0.79	0.99	0.36	0.44	0.16
15	2.26	0.76	0.75	0.26	0.50	0.17
16	2.98	0.94	0.00	0.00	0.52	0.17
17	2.83	0.84	0.00	0.00	0.53	0.16
18	2.68	0.75	0.00	0.00	0.52	0.15
19	2.56	0.68	0.00	0.00	0.47	0.12
20	2.58	0.65	0.00	0.00	0.19	0.05
21	2.33	0.55	0.00	0.00	0.16	0.04
22	2.07	0.48	0.00	0.00	0.13	0.03

Table 79 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

RUN NO. 8385+60+707

SAMPLE NO. 12

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.70	0.37	0.00	0.00	0.11	0.02
24	1.22	0.26	0.00	0.00	0.08	0.02
25	1.09	0.22	0.00	0.00	0.03	0.01
26	0.57	0.13	0.00	0.00	0.00	0.00
27	0.57	0.11	0.00	0.00	0.00	0.00
28	0.43	0.08	0.00	0.00	0.03	0.00
29	0.35	0.06	0.00	0.00	0.02	0.00
30	0.33	0.06	0.00	0.00	0.03	0.00
31	0.30	0.05	0.00	0.00	0.03	0.00
32	0.30	0.05	0.00	0.00	0.00	0.00
33	0.27	0.04	0.00	0.00	0.03	0.00
34	0.25	0.04	0.00	0.00	0.04	0.01
35	0.28	0.04	0.00	0.00	0.00	0.00
36	0.24	0.03	0.00	0.00	0.00	0.00
37	0.18	0.02	0.00	0.00	0.00	0.00
38	0.14	0.02	0.00	0.00	0.00	0.00
39	0.13	0.02	0.00	0.00	0.00	0.00
40	0.12	0.01	0.00	0.00	0.00	0.00

TABLE 80

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
FAVORABLE DATA -
NOT FOR PRESENTATION

CATALYST : FeCo3(CO)12/K/AL2O3
SAMPLE No: 8385+60+707+15

REACTOR LOADING, MLS :	444.0	T, C :	258.8	FEED RATIO,	
CATALYST LOADING, WT%:	20.6	P, PSIG :	320	CU/H2:	1.52
TIME ON STREAM, HRS :	264.7	SV, L/G/HR:	1.6		

USAGE RATIO, CU/H2 :	0.55	BULK ACTIVITY,	
%OVERALL CONV., CU+H2:	22.28	MOL SYNGAS/KE CAT/HR:	15.776
%CU CONV.	13.11	SPECIFIC ACTIVITY,	
%H2 CONV.	36.22	MOL CU/MOL METAL/MIN:	0.168

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	4.47	H2O:	6.08
OXYGENATES :	0.09	CO :	85.90
CO2 :	0.51	H2 :	2.96

HYDROCARBON SELECTIVITY, WT%:

C1 :	13.71	C4+ENE :	4.47
C2+ANE :	1.49	C5+C11 :	35.78
C2+ENE :	0.68	C12+C18:	20.10
C3+ANE :	1.05	C19+C23:	9.65
C3+ENE :	5.26	C24+34 :	5.38
C4 ISO+ANE:	1.52	C35+ :	0.89

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	35.78
DIESEL (C9+C25) :	45.29

% ELEMENTAL RECOVERY: CARBON : 96.13
HYDROGEN: 94.43
OXYGEN : 97.16

Table 81
HYDROCARBON PRODUCT DISTRIBUTION

CONTAINS POTENTIALLY
 PATENTABLE DATA -
 NOT FOR PUBLICATION

RUI. NO. 8385+60+707

SAMPLE NO. 15

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	13.71	50.76	0.00	0.00	0.00	0.00
2	1.49	2.94	0.68	1.45	0.00	0.00
3	1.05	1.42	5.25	7.42	0.00	0.00
4	1.52	1.55	4.47	4.72	0.00	0.00
5	1.74	1.43	5.00	4.23	0.00	0.00
6	6.65	4.58	0.17	0.12	0.00	0.00
7	2.50	1.48	1.96	1.19	0.19	0.11
8	2.19	1.14	1.75	0.92	0.31	0.16
9	2.18	1.01	2.09	0.98	0.65	0.30
10	2.08	0.87	1.80	0.76	0.65	0.27
11	2.03	0.77	1.20	0.46	0.65	0.24
12	1.99	0.69	1.06	0.37	0.27	0.10
13	1.98	0.64	0.96	0.31	0.27	0.09
14	1.98	0.59	0.71	0.22	0.39	0.12
15	2.00	0.56	0.48	0.14	0.42	0.12
16	2.28	0.60	0.00	0.00	0.43	0.11
17	2.11	0.52	0.00	0.00	0.41	0.10
18	1.98	0.46	0.00	0.00	0.38	0.09
19	1.87	0.41	0.00	0.00	0.34	0.07
20	1.78	0.37	0.00	0.00	0.30	0.06
21	1.86	0.37	0.00	0.00	0.11	0.02
22	1.72	0.33	0.00	0.00	0.10	0.02

Table 81 (CONT'D)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8385+60+707

SAMPLE NO. 15

CONTAINS POTENTIALLY
REPEATABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.49	0.27	0.00	0.00	0.09	0.02
24	1.16	0.20	0.00	0.00	0.07	0.01
25	0.94	0.16	0.00	0.00	0.04	0.01
26	0.59	0.09	0.00	0.00	0.01	0.00
27	0.53	0.08	0.00	0.00	0.00	0.00
28	0.39	0.06	0.00	0.00	0.02	0.00
29	0.32	0.05	0.00	0.00	0.02	0.00
30	0.29	0.04	0.00	0.00	0.02	0.00
31	0.28	0.04	0.00	0.00	0.02	0.00
32	0.22	0.03	0.00	0.00	0.01	0.00
33	0.21	0.03	0.00	0.00	0.02	0.00
34	0.21	0.03	0.00	0.00	0.02	0.00
35	0.23	0.03	0.00	0.00	0.01	0.00
36	0.20	0.02	0.00	0.00	0.00	0.00
37	0.16	0.02	0.00	0.00	0.00	0.00
38	0.12	0.01	0.00	0.00	0.00	0.00
39	0.10	0.01	0.00	0.00	0.00	0.00
40	0.07	0.01	0.00	0.00	0.00	0.00

TABLE 82

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : $FeCo_3(CO)_{12}/K/AL_2O_3$
SAMPLE NO: 8385+60+707+17

REACTOR LOADING, MLS :	444.0	T, C :	259.2	FEED RATIO,	
CATALYST LOADING, WT% :	20.6	P, PSIG :	300	CU/H2 :	1.01
TIME ON STREAM, HRS :	289.7	SV, L/G/HR :	1.5		

USAGE RATIO, CU/H2 :	0.34	BULK ACTIVITY,	
%OVERALL CONV., CU+H2 :	23.27	MOL SYNGAS/KG CAT/HR :	15.495
%CU CONV. :	11.88	SPECIFIC ACTIVITY,	
%H2 CONV. :	34.74	MOL CU/MOL METAL/MIN :	0.120

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS :	6.91	H2O :	8.96
OXYGENATES :	0.15	CO :	79.21
CO2 :	0.61	H2 :	4.16

HYDROCARBON SELECTIVITY, WT%:

C1 :	16.74	C4+ENE :	4.32
C2+ANE :	2.17	C5+C11 :	36.71
C2+ENE :	0.48	C12+C18 :	18.30
C3+ANE :	1.40	C19+C23 :	7.65
C3+ENE :	5.30	C24+34 :	4.11
C4 ISO+ANE :	2.07	C35+ :	0.67

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 36.71
DIESEL (C9+C25) : 40.25

% ELEMENTAL RECOVERY: CARBON : 103.65
HYDROGEN: 99.58
OXYGEN : 104.61

Table 83

HYDROCARBON PRODUCT DISTRIBUTION

RUL. NO. 8385+60+707

SAMPLE NO. 17

CONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	16.74	54.94	0.00	0.00	0.00	0.00
2	2.17	3.79	0.48	0.89	0.00	0.00
3	1.49	1.78	5.30	6.63	0.00	0.00
4	2.07	1.88	4.32	4.05	0.00	0.00
5	2.33	1.70	4.54	3.40	0.12	0.09
6	7.28	4.45	0.20	0.13	0.00	0.00
7	3.11	1.63	1.78	0.95	0.23	0.12
8	2.52	1.16	1.63	0.76	0.38	0.17
9	2.47	1.02	1.69	0.71	0.30	0.12
10	2.38	0.88	1.44	0.54	0.59	0.22
11	2.18	0.73	0.91	0.31	0.62	0.21
12	2.11	0.65	0.79	0.25	0.27	0.08
13	2.06	0.59	0.70	0.20	0.26	0.07
14	2.02	0.54	0.46	0.12	0.37	0.10
15	2.26	0.56	0.00	0.00	0.38	0.09
16	2.04	0.47	0.00	0.00	0.38	0.09
17	1.85	0.41	0.00	0.00	0.34	0.08
18	1.69	0.35	0.00	0.00	0.32	0.07
19	1.56	0.31	0.00	0.00	0.28	0.06
20	1.44	0.27	0.00	0.00	0.25	0.05
21	1.46	0.26	0.00	0.00	0.09	0.02
22	1.31	0.22	0.00	0.00	0.08	0.01

Table 83 (Cont'd)
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8365+60+707

SAMPLE NO. 17

CONTAINS POTENTIALLY
 PATENTABLE DATA
 NOT FOR PUBLICATION

CARBON NO.	N ⁿ ALKANES		1 ⁿ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.12	0.18	0.00	0.00	0.07	0.01
24	0.86	0.13	0.00	0.00	0.05	0.01
25	0.77	0.11	0.00	0.00	0.03	0.00
26	0.44	0.06	0.00	0.00	0.01	0.00
27	0.40	0.05	0.00	0.00	0.00	0.00
28	0.29	0.04	0.00	0.00	0.01	0.00
29	0.24	0.03	0.00	0.00	0.01	0.00
30	0.22	0.03	0.00	0.00	0.02	0.00
31	0.21	0.03	0.00	0.00	0.01	0.00
32	0.17	0.02	0.00	0.00	0.01	0.00
33	0.16	0.02	0.00	0.00	0.01	0.00
34	0.16	0.02	0.00	0.00	0.02	0.00
35	0.17	0.02	0.00	0.00	0.00	0.00
36	0.15	0.02	0.00	0.00	0.00	0.00
37	0.12	0.01	0.00	0.00	0.00	0.00
38	0.09	0.01	0.00	0.00	0.00	0.00
39	0.08	0.01	0.00	0.00	0.00	0.00
40	0.06	0.01	0.00	0.00	0.00	0.00

TABLE 84

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : $FeCo_3(CO)_{12}/K/AL_2O_3$
SAMPLE No: 8385+60+707+20

REACTOR LOADING, MLS :	444.0	T, C :	261.4	FEED RATIO,	
CATALYST LOADING, WT% :	20.6	P, PSIG :	295	CO/H ₂ :	1.00
TIME ON STREAM, HRS :	312.5	SV, L/G/HR:	0.7		

USAGE RATIO, CL/H ₂ :	0.50	BULK ACTIVITY,	
% OVERALL CONV., CO+H ₂ :	42.35	MOL SYNGAS/KG CAT/HR:	15.900
% CO CONV. :	28.22	SPECIFIC ACTIVITY,	
% H ₂ CONV. :	56.42	MOL CO/MOL METAL/MIN:	0.139

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	10.99	H ₂ O:	15.00
OXYGENATES :	0.34	CO :	69.11
CO ₂ :	1.55	H ₂ :	3.01

HYDROCARBON SELECTIVITY, WT%:

C1 :	14.33	C4+ENE :	3.95
C2+ANE :	2.23	C5+C11 :	42.38
C2+ENE :	0.31	C12+C18:	18.43
C3+ANE :	1.72	C19+C23:	5.35
C3+ENE :	4.71	C24+34 :	3.77
C4 ISO+ANE:	2.25	C35+ :	0.57

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	42.38
DIESEL (C9+C25) :	40.88

% ELEMENTAL RECOVERY:	CARBON :	95.39
	HYDROGEN:	95.08
	OXYGEN :	98.28

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Table 65

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUI. NO. 8385+50+707

SAMPLE NO. 20

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	14.33	50.35	0.00	0.00	0.00	0.00
2	2.23	4.18	0.31	0.61	0.00	0.00
3	1.72	2.20	4.71	6.31	0.00	0.00
4	2.22	2.15	3.95	3.97	0.04	0.03
5	2.68	2.09	4.30	3.45	0.12	0.10
6	8.04	5.26	0.28	0.18	0.00	0.00
7	3.85	2.17	1.60	0.92	0.32	0.18
8	3.17	1.57	1.58	0.79	0.63	0.31
9	3.08	1.35	1.76	0.78	0.81	0.36
10	2.93	1.16	1.42	0.57	1.11	0.44
11	2.72	0.98	1.00	0.36	0.96	0.35
12	2.50	0.83	0.83	0.28	0.47	0.16
13	2.30	0.70	0.57	0.18	0.51	0.16
14	2.50	0.71	0.00	0.00	0.47	0.13
15	2.17	0.57	0.00	0.00	0.41	0.11
16	1.87	0.46	0.00	0.00	0.35	0.09
17	1.60	0.37	0.00	0.00	0.29	0.07
18	1.37	0.30	0.00	0.00	0.23	0.05
19	1.24	0.26	0.00	0.00	0.14	0.03
20	1.07	0.21	0.00	0.00	0.11	0.02
21	0.94	0.18	0.00	0.00	0.09	0.02
22	0.88	0.16	0.00	0.00	0.05	0.01

Table 85 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO- 8385+60+707

SAMPLE NO- 20

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.80	0.14	0.00	0.00	0.04	0.01
24	0.57	0.11	0.00	0.00	0.03	0.01
25	0.60	0.10	0.00	0.00	0.02	0.00
26	0.44	0.07	0.00	0.00	0.01	0.00
27	0.37	0.06	0.00	0.00	0.01	0.00
28	0.31	0.04	0.00	0.00	0.02	0.00
29	0.25	0.03	0.00	0.00	0.01	0.00
30	0.23	0.03	0.00	0.00	0.02	0.00
31	0.22	0.03	0.00	0.00	0.02	0.00
32	0.18	0.02	0.00	0.00	0.01	0.00
33	0.17	0.02	0.00	0.00	0.02	0.00
34	0.17	0.02	0.00	0.00	0.01	0.00
35	0.17	0.02	0.00	0.00	0.00	0.00
36	0.14	0.02	0.00	0.00	0.00	0.00
37	0.11	0.01	0.00	0.00	0.00	0.00
38	0.07	0.01	0.00	0.00	0.00	0.00
39	0.05	0.01	0.00	0.00	0.00	0.00
40	0.03	0.00	0.00	0.00	0.00	0.00

TABLE 86

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

CATALYST : $\text{FeCo}_3(\text{CO})_{12}/\text{K}/\text{Al}_2\text{O}_3$
SAMPLE No: 8385+60+707+22

REACTOR LOADING, MLS :	444.0	T, C :	281.4	FEED RATIO,	
CATALYST LOADING, WT% :	20.6	P, PSIG :	300	CU/H ₂ :	1.00
TIME ON STREAM, HRS :	336.5	SV, L/G/HR :	0.7		

USAGE RATIO, CU/H ₂ :	0.56	BULK ACTIVITY,	
%OVERALL CONV., CU+H ₂ :	58.11	MOL SYNGAS/KG CAT/HR:	19.075
%CU CONV. :	41.88	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	74.29	MOL CU/MOL METAL/MIN:	0.206

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	16.70	H ₂ O:	19.11
OXYGENATES :	0.32	CO :	56.64
CO ₂ :	5.44	H ₂ :	1.80

HYDROCARBON SELECTIVITY, WT%:

C1 :	15.28	C4+ENE :	3.82
C2+ANE :	2.71	C5+C11 :	42.19
C2+ENE :	0.29	C12+C18:	19.96
C3+ANE :	2.07	C19+C23:	4.43
C3+ENE :	4.28	C24+34 :	2.33
C4 ISO+ANE:	2.26	C35+ :	0.38

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	42.19
DIESEL (C9+C25) :	42.14

% ELEMENTAL RECOVERY:	CARBON :	95.30
	HYDROGEN:	97.18
	OXYGEN :	95.93

Table 87
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8385+60+707

SAMPLE NO. 22

CONTAINS POTENTIALLY
 PATENTABLE DATA -
 NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	15.28	51.85	0.00	0.00	0.00	0.00
2	2.71	4.89	0.29	0.56	0.00	0.00
3	2.07	2.56	4.28	5.53	0.00	0.00
4	2.22	2.08	3.82	3.70	0.04	0.03
5	2.74	2.07	4.04	3.13	0.17	0.13
6	6.94	4.38	0.54	0.35	0.00	0.00
7	3.55	1.93	1.30	0.72	0.74	0.40
8	2.58	1.23	1.49	0.72	1.06	0.50
9	3.09	1.31	1.47	0.63	1.85	0.78
10	2.94	1.12	1.13	0.44	1.64	0.63
11	2.78	0.97	0.74	0.26	1.40	0.49
12	2.56	0.82	0.57	0.18	0.84	0.27
13	2.35	0.69	0.43	0.13	0.76	0.22
14	2.50	0.69	0.00	0.00	0.70	0.19
15	2.24	0.57	0.00	0.00	0.62	0.16
16	1.98	0.48	0.00	0.00	0.52	0.13
17	1.71	0.39	0.00	0.00	0.41	0.09
18	1.46	0.31	0.00	0.00	0.30	0.06
19	1.21	0.25	0.00	0.00	0.22	0.04
20	0.98	0.19	0.00	0.00	0.16	0.03
21	0.74	0.14	0.00	0.00	0.10	0.02
22	0.53	0.09	0.00	0.00	0.06	0.01

Table 87 (Cont'd)
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8385+60+707

SAMPLE NO. 22

CONTAINS POTENTIALLY
 PATENTABLE COMPS.
 NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.41	0.07	0.00	0.00	0.03	0.00
24	0.35	0.06	0.00	0.00	0.01	0.00
25	0.33	0.05	0.00	0.00	0.01	0.00
26	0.29	0.04	0.00	0.00	0.01	0.00
27	0.25	0.04	0.00	0.00	0.01	0.00
28	0.20	0.03	0.00	0.00	0.01	0.00
29	0.17	0.02	0.00	0.00	0.01	0.00
30	0.15	0.02	0.00	0.00	0.01	0.00
31	0.14	0.02	0.00	0.00	0.01	0.00
32	0.12	0.01	0.00	0.00	0.01	0.00
33	0.11	0.01	0.00	0.00	0.01	0.00
34	0.11	0.01	0.00	0.00	0.01	0.00
35	0.11	0.01	0.00	0.00	0.00	0.00
36	0.09	0.01	0.00	0.00	0.00	0.00
37	0.07	0.01	0.00	0.00	0.00	0.00
38	0.05	0.01	0.00	0.00	0.00	0.00
39	0.04	0.00	0.00	0.00	0.00	0.00
40	0.02	0.00	0.00	0.00	0.00	0.00

TABLE 88

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR REPRODUCTION

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : FeCo₃(CO)₁₂/K/AL₂O₃
SAMPLE No: 8385+60+707+24

REACTOR LOADING, MLS :	444.0	T, C :	279-3	FEED RATIO,	
CATALYST LOADING, WT% :	20.6	P, PSIG :	300	CO/H ₂ :	2.02
TIME ON STREAM, HRS :	361.0	SV, L/G/HR:	0.7		

USAGE RATIO, CO/H ₂ :	0.67	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	34.59	MOL SYNGAS/KG CAT/HR:	11.417
%CO CONV. :	20.69	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	62.69	MOL CO/MOL METAL/MIN:	0.137

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	6.70	H ₂ O:	8.91
OXYGENATES :	0.05	CO :	80.72
CO ₂ :	2.28	H ₂ :	1.34

HYDROCARBON SELECTIVITY, WT%:

C1 :	11.84	C4+ENE :	3.80
C2+ANE :	2.00	C5+C11 :	38.21
C2+ENE :	0.67	C12+C18:	25.45
C3+ANE :	0.82	C19+C23:	6.42
C3+ENE :	4.60	C24+34 :	4.41
C4 ISO+ANE:	1.04	C35+ :	0.74

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	38.21
DIESEL (C9+C25) :	49.23

% ELEMENTAL RECOVERY:	CARBON :	93.64
	HYDROGEN:	95.53
	OXYGEN :	95.82

Table 89

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8385+60+707

CONTAINS POTENTIALLY
FATIGUING OILS
NOT FOR FUELS

SAMPLE NO. 24

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	11.84	47.04	0.00	0.00	0.00	0.00
2	2.00	4.24	0.67	1.52	0.00	0.00
3	0.82	1.18	4.50	6.96	0.00	0.00
4	1.04	1.14	3.80	4.31	0.00	0.00
5	1.44	1.27	4.76	4.32	0.11	0.10
6	6.08	4.49	0.40	0.30	0.00	0.00
7	2.58	1.64	1.70	1.10	0.54	0.34
8	1.86	1.04	1.82	1.03	0.82	0.46
9	2.25	1.12	2.05	1.04	1.56	0.77
10	2.21	0.99	1.82	0.83	1.55	0.69
11	1.87	0.76	1.30	0.54	1.48	0.60
12	2.30	0.86	1.08	0.41	1.40	0.52
13	2.19	0.76	0.90	0.31	0.80	0.28
14	2.15	0.69	0.74	0.24	0.79	0.25
15	2.73	0.82	0.00	0.00	0.80	0.24
16	2.61	0.73	0.00	0.00	0.81	0.23
17	2.45	0.65	0.00	0.00	0.79	0.21
18	2.22	0.56	0.00	0.00	0.69	0.17
19	1.88	0.45	0.00	0.00	0.5	0.13
20	1.39	0.31	0.00	0.00	0.34	0.08
21	0.85	0.18	0.00	0.00	0.13	0.03
22	0.62	0.13	0.00	0.00	0.05	0.01

Table 89 (Cont'd)
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8385+60+707

SAMPLE NO. 24

CONTAINS POTENTIALLY
 PATENTABLE DATA -
 NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.61	0.12	0.00	0.00	0.02	0.00
24	0.62	0.12	0.00	0.00	0.02	0.00
25	0.61	0.11	0.00	0.00	0.02	0.00
26	0.55	0.10	0.00	0.00	0.02	0.00
27	0.48	0.08	0.00	0.00	0.02	0.00
28	0.39	0.06	0.00	0.00	0.02	0.00
29	0.32	0.05	0.00	0.00	0.02	0.00
30	0.29	0.04	0.00	0.00	0.02	0.00
31	0.28	0.04	0.00	0.00	0.02	0.00
32	0.23	0.03	0.00	0.00	0.01	0.00
33	0.21	0.03	0.00	0.00	0.02	0.00
34	0.21	0.03	0.00	0.00	0.01	0.00
35	0.21	0.03	0.00	0.00	0.00	0.00
36	0.18	0.02	0.00	0.00	0.00	0.00
37	0.14	0.02	0.00	0.00	0.00	0.00
38	0.10	0.01	0.00	0.00	0.00	0.00
39	0.07	0.01	0.00	0.00	0.00	0.00
40	0.04	0.00	0.00	0.00	0.00	0.00

TABLE 90

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA.
NOT FOR PUBLICATION

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CATALYST : $FeCo_3(CO)_{12}/K/Al_2O_3$
SAMPLE NO: 8385+60+707+27

REACTOR LOADING, MLS :	444.0	T, C :	282.1	FEED RATIO,	
CATALYST LOADING, WT% :	20.6	P, PSIG :	298	CO/H ₂ :	1.01
TIME ON STREAM, HRS :	432.7	SV, L/G/HR :	1.5		

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USAGE RATIO, CO/H ₂ :	0.50	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	41.04	MOL SYNGAS/KG CAT/HR :	27.336
%CO CONV. :	27.25	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	54.95	MOL CU/MOL METAL/MIN :	0.274

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WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS :	10.57	H ₂ O :	13.46
OXYGENATES :	0.11	CO :	71.16
CO ₂ :	1.58	H ₂ :	3.12

+++++

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	19.08	C ₄ +ENE :	3.91
C ₂ +ANE :	2.74	C ₅ +C ₁₁ :	35.35
C ₂ +ENE :	0.39	C ₁₂ +C ₁₈ :	17.43
C ₃ +ANE :	1.76	C ₁₉ +C ₂₃ :	7.48
C ₃ +ENE :	4.81	C ₂₄ + ₃₄ :	4.42
C ₄ ISO+ANE :	2.18	C ₃₅ + :	0.45

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FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁) :	35.35
DIESEL (C ₉ +C ₂₅) :	40.29

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% ELEMENTAL RECOVERY:	CARBON :	94.78
	HYDROGEN :	93.12
	OXYGEN :	96.29

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Table 91

HYDROCARBON PRODUCT DISTRIBUTION:

RJR: NO. 8385+60+707

SAMPLE NO. 27

CONTAINS POTENTIALLY
HAZARDOUS SUBS.
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	19.08	58.71	0.00	0.00	0.00	0.00
2	2.74	4.50	0.39	0.69	0.00	0.00
3	1.76	1.97	4.81	5.63	0.00	0.00
4	2.14	1.82	3.91	3.44	0.04	0.03
5	2.59	1.77	4.20	2.96	0.15	0.11
6	5.32	3.04	0.40	0.23	0.00	0.00
7	2.61	1.28	1.24	0.62	0.53	0.26
8	2.46	1.06	1.33	0.58	0.74	0.32
9	2.51	0.97	1.52	0.59	0.98	0.38
10	2.34	0.81	1.17	0.41	1.21	0.42
11	2.25	0.71	0.76	0.24	1.04	0.33
12	2.10	0.61	0.57	0.17	0.62	0.18
13	1.96	0.52	0.13	0.04	0.87	0.23
14	1.86	0.46	0.31	0.08	0.54	0.13
15	1.94	0.45	0.00	0.00	0.50	0.12
16	1.77	0.39	0.00	0.00	0.44	0.10
17	1.60	0.33	0.00	0.00	0.40	0.08
18	1.48	0.29	0.00	0.00	0.35	0.07
19	1.41	0.26	0.00	0.00	0.33	0.06
20	1.40	0.24	0.00	0.00	0.32	0.05
21	1.36	0.23	0.00	0.00	0.27	0.04
22	1.18	0.19	0.00	0.00	0.19	0.03

Table 91 (Cont'd)

HYDROCARBON: PRODUCT DISTRIBUTION

RUN NO. 8385+60+707

SAMPLE NO. 27

CONTAINS POTENTIALLY
HAZARDOUS MATERIALS
SEE MSDS FOR HAZARD DATA

CARBON NO.	N ⁺ ALKANES		I ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.91	0.14	0.00	0.00	0.11	0.02
24	0.77	0.11	0.00	0.00	0.07	0.01
25	0.69	0.10	0.00	0.00	0.05	0.01
26	0.56	0.08	0.00	0.00	0.04	0.01
27	0.45	0.06	0.00	0.00	0.03	0.00
28	0.35	0.04	0.00	0.00	0.04	0.01
29	0.29	0.03	0.00	0.00	0.02	0.00
30	0.24	0.03	0.00	0.00	0.02	0.00
31	0.21	0.02	0.00	0.00	0.01	0.00
32	0.20	0.02	0.00	0.00	0.01	0.00
33	0.18	0.02	0.00	0.00	0.01	0.00
34	0.16	0.02	0.00	0.00	0.02	0.00
35	0.15	0.01	0.00	0.00	0.00	0.00
36	0.11	0.01	0.00	0.00	0.00	0.00
37	0.08	0.01	0.00	0.00	0.00	0.00
38	0.05	0.00	0.00	0.00	0.00	0.00
39	0.04	0.00	0.00	0.00	0.00	0.00
40	0.02	0.00	0.00	0.00	0.00	0.00

TABLE 92

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

CATALYST : FeCo₃(CO)₁₂/K/AL₂O₃
SAMPLE NO: 8385+60+707+29

REACTOR LOADING, MLS :	444.0	T, C :	280.5	FEED RATIO,	
CATALYST LOADING, WT%:	20.6	P, PSIG :	300	CU/H ₂ :	2.03
TIME ON STREAM, HRS :	456.4	SV, L/G/HR:	1.5		

USAGE RATIO, CU/H ₂ :	0.70	BULK ACTIVITY,	
%OVERALL CONV., CU+H ₂ :	26.11	MOL SYNGAS/KG CAT/HR:	17.467
%CO CONV.	16.03	SPECIFIC ACTIVITY,	
%H ₂ CONV.	46.63	MOL CO/MOL METAL/MIN:	0.216

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	5.11	H ₂ O:	6.30
OXYGENATES :	0.05	CO :	85.68
CO ₂ :	0.94	H ₂ :	1.91

HYDROCARBON SELECTIVITY, WT%:

C1 :	13.91	C4+ENE :	4.13
C2+ANE :	1.80	C5+C11 :	31.87
C2+ENE :	0.82	C12+C18:	20.48
C3+ANE :	0.78	C19+C23:	12.27
C3+ENE :	4.81	C24+34 :	7.33
C4 ISO+ANE:	1.08	C35+ :	0.73

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 31.87
DIESEL (C9+C25) : 48.23

% ELEMENTAL RECOVERY: CARBON : 94.38
HYDROGEN: 96.68
OXYGEN : 94.79

Table 93

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8385+60+707

SAMPLE NO. 29

CONTAINS POTENTIALLY
ERRONEOUS DATA -
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	13.91	52.37	0.00	0.00	0.00	0.00
2	1.80	3.63	0.82	1.77	0.00	0.00
3	0.78	1.07	4.81	6.90	0.00	0.00
4	1.08	1.12	4.13	4.44	0.00	0.00
5	1.44	1.20	4.56	3.93	0.00	0.00
6	5.34	3.74	0.28	0.20	0.00	0.00
7	2.05	1.24	1.57	0.96	0.36	0.22
8	1.49	0.79	1.56	0.84	0.51	0.27
9	1.74	0.82	1.82	0.87	1.01	0.47
10	1.72	0.73	1.66	0.72	1.10	0.47
11	1.42	0.55	1.16	0.45	1.08	0.42
12	1.79	0.63	0.97	0.35	1.06	0.37
13	1.74	0.57	0.81	0.27	0.64	0.21
14	1.71	0.52	0.67	0.21	0.63	0.19
15	1.69	0.48	0.51	0.15	0.62	0.18
16	2.09	0.56	0.00	0.00	0.57	0.15
17	1.98	0.50	0.00	0.00	0.56	0.14
18	1.91	0.45	0.00	0.00	0.54	0.13
19	1.92	0.43	0.00	0.00	0.53	0.12
20	2.00	0.43	0.00	0.00	0.55	0.12
21	2.13	0.43	0.00	0.00	0.53	0.11
22	2.09	0.41	0.00	0.00	0.48	0.09

Table 93 (Cont'd)
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8385+50+707

SAMPLE NO. 29

CONTAINS POTENTIALLY
 PATENTABLE DATA -
 NOT FOR PUBLICATION

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.73	0.32	0.00	0.00	0.32	0.06
24	1.35	0.24	0.00	0.00	0.15	0.03
25	1.17	0.20	0.00	0.00	0.10	0.02
26	0.91	0.15	0.00	0.00	0.07	0.01
27	0.72	0.11	0.00	0.00	0.05	0.01
28	0.57	0.09	0.00	0.00	0.07	0.01
29	0.46	0.07	0.00	0.00	0.03	0.00
30	0.39	0.06	0.00	0.00	0.03	0.00
31	0.34	0.05	0.00	0.00	0.01	0.00
32	0.31	0.04	0.00	0.00	0.01	0.00
33	0.28	0.04	0.00	0.00	0.02	0.00
34	0.25	0.03	0.00	0.00	0.03	0.00
35	0.24	0.03	0.00	0.00	0.00	0.00
36	0.18	0.02	0.00	0.00	0.00	0.00
37	0.13	0.02	0.00	0.00	0.00	0.00
38	0.08	0.01	0.00	0.00	0.00	0.00
39	0.06	0.01	0.00	0.00	0.00	0.00
40	0.04	0.00	0.00	0.00	0.00	0.00

TABLE 94

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

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CATALYST : FeCo3(CO)12/K/AL2O3
SAMPLE NO: 8385+60+707+33

REACTOR LOADING, MLS :	444.0	T, C :	280.4	FEED RATIO,	
CATALYST LOADING, WT% :	20.6	P, PSIG :	625	CU/H2:	1.96
TIME ON STREAM, HRS :	504.2	SV, L/G/HR:	1.5		

+++++

USAGE RATIO, CO/H2 :	0.42	BULK ACTIVITY,	
%OVERALL CONV., C1+H2:	18.15	MOL SYNGAS/KG CAT/HR:	12.196
%CU CONV. :	8.07	SPECIFIC ACTIVITY,	
%H2 CONV. :	37.91	MOL CU/MOL METAL/MIN:	0.108

+++++

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	4.25	H2O:	5.03
OXYGENATES :	0.05	CO :	87.66
CO2 :	0.85	H2 :	2.16

+++++

HYDROCARBON SELECTIVITY, WT%:

C1 :	14.68	C4+ENE :	4.42
C2+ANE :	1.89	C5+C11 :	31.03
C2+ENE :	0.81	C12+C18:	19.76
C3+ANE :	1.12	C19+C23:	9.93
C3+ENE :	5.24	C24+34 :	8.70
C4 ISO+ANE:	1.52	C35+ :	0.90

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FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 31.03
DIESEL (C9+C25) : 44.55

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% ELEMENTAL RECOVERY: CARBON : 101.24
HYDROGEN: 98.64
OXYGEN : 101.31

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Table 95

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8385+60+707

SAMPLE NO. 33

CONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	14.68	53.09	0.00	0.00	0.00	0.00
2	1.89	3.64	0.81	1.68	0.00	0.00
3	1.12	1.47	5.24	7.22	0.00	0.00
4	1.52	1.52	4.42	4.57	0.00	0.00
5	1.65	1.32	4.96	4.10	0.00	0.00
6	4.83	3.25	0.14	0.09	0.00	0.00
7	2.23	1.29	1.39	0.82	0.17	0.10
8	2.10	1.06	1.33	0.69	0.30	0.15
9	2.05	0.93	1.72	0.79	0.60	0.27
10	1.89	0.77	1.66	0.68	0.70	0.28
11	1.49	0.55	1.16	0.44	0.68	0.25
12	1.68	0.57	1.13	0.39	0.62	0.21
13	1.63	0.51	1.10	0.35	0.29	0.09
14	1.58	0.46	1.07	0.31	0.29	0.09
15	1.57	0.43	1.08	0.30	0.18	0.05
16	2.50	0.64	0.00	0.00	0.18	0.05
17	2.32	0.56	0.00	0.00	0.20	0.05
18	2.13	0.48	0.00	0.00	0.19	0.04
19	1.92	0.41	0.00	0.00	0.18	0.04
20	1.81	0.37	0.00	0.00	0.16	0.03
21	1.84	0.36	0.00	0.00	0.16	0.03
22	1.83	0.34	0.00	0.00	0.24	0.04

Table 95 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION:

RUN NO. 8385+60+707

SAMPLE NO. 33

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.60	0.29	0.00	0.00	0.19	0.03
24	1.40	0.24	0.00	0.00	0.13	0.02
25	1.28	0.21	0.00	0.00	0.11	0.02
26	1.08	0.17	0.00	0.00	0.09	0.01
27	0.90	0.14	0.00	0.00	0.08	0.01
28	0.75	0.11	0.00	0.00	0.06	0.01
29	0.62	0.09	0.00	0.00	0.05	0.01
30	0.53	0.07	0.00	0.00	0.05	0.01
31	0.46	0.06	0.00	0.00	0.04	0.01
32	0.37	0.05	0.00	0.00	0.02	0.00
33	0.32	0.04	0.00	0.00	0.02	0.00
34	0.31	0.04	0.00	0.00	0.03	0.00
35	0.29	0.03	0.00	0.00	0.00	0.00
36	0.23	0.03	0.00	0.00	0.00	0.00
37	0.16	0.02	0.00	0.00	0.00	0.00
38	0.10	0.01	0.00	0.00	0.00	0.00
39	0.08	0.01	0.00	0.00	0.00	0.00
40	0.05	0.00	0.00	0.00	0.00	0.00

TABLE 96

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : FeCo₃(CO)₁₂/K/AL₂O₃
SAMPLE NO: 8385+60+707+36

REACTOR LOADING, MLS :	444.0	T, C :	241.9	FEED RATIO,	
CATALYST LOADING, WT%:	20.6	P, PSIG :	320	CO/H ₂ :	1.00
TIME ON STREAM, HRS :	529.6	SV, L/G/HR:	1.5		

USAGE RATIO, CO/H ₂ :	0.32	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	6.14	MOL SYNGAS/KG CAT/HR:	4.114
%CO CONV.	3.00	SPECIFIC ACTIVITY,	
%H ₂ CONV.	9.27	MOL CO/MOL METAL/MIN:	0.030

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	2.59	H ₂ O:	1.23
OXYGENATES :	0.01	CO :	89.98
CO ₂ :	0.16	H ₂ :	6.03

HYDROCARBON SELECTIVITY, WT%:

C1 :	9.49	C4+ENE :	1.72
C2+ANE :	0.00	C5+C11 :	8.91
C2+ENE :	0.92	C12+C18:	12.48
C3+ANE :	0.47	C19+C23:	23.30
C3+ENE :	2.46	C24+34 :	35.98
C4 ISO+ANE:	0.75	C35+ :	3.50

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	8.91
DIESEL (C9+C25) :	51.08

% ELEMENTAL RECOVERY:	CARBON :	102.60
	HYDROGEN:	98.96
	OXYGEN :	99.29

Table 97

HYDROCARBON PRODUCT DISTRIBUTION

RUI: NO. 8385+60+707

SAMPLE NO. 35

CONTAINS POTENTIALLY
EXTENSIBLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	9.49	55.39	0.00	0.00	0.00	0.00
2	0.00	0.00	0.92	3.08	0.00	0.00
3	0.47	1.00	2.46	5.48	0.00	0.00
4	0.75	1.21	1.72	2.87	0.00	0.00
5	0.94	1.21	2.20	2.94	0.00	0.00
6	1.20	1.31	0.08	0.09	0.00	0.00
7	0.37	0.35	0.43	0.41	0.00	0.00
8	0.30	0.25	0.34	0.28	0.02	0.01
9	0.37	0.27	0.42	0.31	0.02	0.02
10	0.51	0.33	0.51	0.34	0.08	0.05
11	0.51	0.31	0.44	0.27	0.16	0.10
12	0.68	0.37	0.41	0.23	0.20	0.11
13	0.78	0.40	0.42	0.21	0.13	0.07
14	0.89	0.42	0.43	0.20	0.13	0.06
15	1.04	0.46	0.50	0.22	0.09	0.04
16	1.78	0.73	0.00	0.00	0.13	0.05
17	2.09	0.81	0.00	0.00	0.18	0.07
18	2.41	0.89	0.00	0.00	0.20	0.07
19	2.70	0.94	0.00	0.00	0.25	0.09
20	3.57	1.18	0.00	0.00	0.29	0.10
21	4.06	1.28	0.00	0.00	0.30	0.09
22	5.13	1.55	0.00	0.00	0.57	0.17

Table 97 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8385+60+707

SAMPLE NO. 36

CONTAINS POTENTIALLY
HAZARDOUS WASTE
NO. 101 REGULATION

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	5.50	1.58	0.00	0.00	0.93	0.27
24	5.93	1.64	0.00	0.00	0.56	0.16
25	5.15	1.37	0.00	0.00	0.63	0.17
26	4.40	1.12	0.00	0.00	0.66	0.17
27	3.63	0.89	0.00	0.00	0.49	0.12
28	2.98	0.71	0.00	0.00	0.39	0.09
29	2.46	0.56	0.00	0.00	0.29	0.07
30	2.06	0.46	0.00	0.00	0.20	0.04
31	1.81	0.39	0.00	0.00	0.16	0.03
32	1.43	0.30	0.00	0.00	0.10	0.02
33	1.25	0.25	0.00	0.00	0.09	0.02
34	1.19	0.23	0.00	0.00	0.12	0.02
35	1.14	0.22	0.00	0.00	0.00	0.00
36	0.89	0.16	0.00	0.00	0.00	0.00
37	0.61	0.11	0.00	0.00	0.00	0.00
38	0.39	0.07	0.00	0.00	0.00	0.00
39	0.29	0.05	0.00	0.00	0.00	0.00
40	0.18	0.03	0.00	0.00	0.00	0.00

Table 98

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

Slurry Screening Summary

8523-1-4

16.9 wt% (75.96 g) $\text{Co}_2(\text{CO})_{12}/\text{Zr}(\text{OPr})_4/\text{Al}_2\text{O}_3$

Sample No.	Time on Stream h	P psig	T °C	SV, ML/g cat/hr	x _{CO+H₂}	x _{CO}	x _{H₂}	Feed CO/H ₂	Usage ΔCO/ΔH ₂	Bulk Activity mol syngas/kg cat/h	Specific Activity mol CO/mol Co/min	Selectivity wt%						
												C ₁	C _{2-C₄}	C _{5-C₁₁}	C _{12-C₁₈}	C _{19-C₂₃}	C ₂₄	C _{5-C₂₃}
2	24.2	300	222	1.05	28.6	17.7	39.6	1.00	0.45	23.6	0.18	10.6	20.3	36.4	18.4	7.3	7.0	62.10
4	48.2	297	219	1.06	20.7	11.7	34.0	1.48	0.51	17.2	0.14	10.4	18.7	32.6	19.8	9.8	8.7	62.2
7	96.0	310	221	0.95	31.5	17.0	52.2	1.43	0.47	13.3	0.10	8.9	16.2	32.6	19.5	11.9	10.9	64.0
10	144.0	310	240	0.95	43.1	27.0	66.2	1.43	0.58	18.3	0.16	7.8	13.3	34.2	22.2	10.8	11.7	67.2
13	168.0	310	243	0.94	38.9	22.8	69.3	1.88	0.62	16.3	0.15	8.5	15.2	36.6	23.6	7.8	8.3	68.0
17	192.0	307	242	1.07	26.2	13.4	51.9	1.99	0.51	21.9	0.18	11.0	17.7	36.7	22.2	6.7	5.7	65.6
20	216.0	302	241	1.06	42.5	29.0	56.0	0.99	0.51	35.3	0.29	7.9	13.7	37.0	23.4	8.9	9.1	69.2
25	311.1	310	259.0	1.06	46.4	32.0	60.6	0.99	0.52	38.5	0.32	10.4	15.0	44.5	25.8	2.0	2.7	72.3
29	334.6	306.7	257.9	1.07	34.5	19.9	56.0	1.48	0.53	28.7	0.24	7.2	10.8	34.1	27.9	8.6	11.4	70.6
32	359.1	310	258.2	0.95	43.9	26.5	68.8	1.44	0.55	18.5	0.16	6.3	9.4	30.6	27.7	12.6	13.4	70.9
34	384.1	301.7	259.9	0.94	37.6	21.2	60.3	1.87	0.58	15.8	0.14	4.9	7.1	26.2	26.2	17.2	10.4	69.6
38	480.1	310	279.4	0.94	40.8	23.8	72.6	1.88	0.62	17.1	0.16	8.3	9.1	24.4	23.7	16.5	18.0	64.6
40	504.1	310	281.4	0.95	42.9	27.8	64.6	1.43	0.62	18.1	0.17	10.2	10.2	27.8	21.3	14.5	15.9	63.7
43	528.1	310	282.1	1.06	34.3	21.2	53.7	1.48	0.50	28.5	0.26	12.0	13.3	35.2	23.7	8.5	7.3	67.4
47	553.1	310	282.0	1.05	27.3	14.9	51.6	1.95	0.56	22.6	0.20	10.6	12.3	31.5	26.5	9.9	9.2	67.9
50	625.6	310	221.6	1.06	4.5	4.1	4.9	0.99	0.83	3.8	0.03	15.7	16.8	21.3	22.3	23.5	0.4	67.1

Table 100

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO- 8523-1-4

SAMPLE NO- 2

CONTAINS POTENTIALLY
RELEASABLE DATA -
SEE ISO REGISTRATION

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	10.57	40.79	0.00	0.00	0.00	0.00
2	2.18	4.49	0.34	0.74	0.00	0.00
3	2.29	3.21	7.09	10.41	0.00	0.00
4	2.95	3.14	5.41	5.95	0.11	0.12
5	3.14	2.69	4.95	4.37	0.25	0.21
6	6.88	4.94	0.21	0.15	0.00	0.00
7	3.27	2.02	1.46	0.92	0.29	0.18
8	1.92	1.04	1.06	0.59	1.57	0.85
9	2.15	1.04	1.24	0.61	0.85	0.41
10	2.20	0.95	1.11	0.49	0.79	0.34
11	1.73	0.68	0.67	0.27	0.64	0.25
12	1.75	0.63	0.54	0.20	0.65	0.24
13	1.74	0.58	0.40	0.14	0.63	0.21
14	1.83	0.57	0.28	0.09	0.58	0.18
15	2.10	0.61	0.00	0.00	0.52	0.15
16	2.15	0.59	0.00	0.00	0.44	0.12
17	2.09	0.54	0.00	0.00	0.45	0.12
18	1.80	0.44	0.00	0.00	0.37	0.09
19	1.77	0.41	0.00	0.00	0.17	0.04
20	1.49	0.33	0.00	0.00	0.06	0.01
21	1.48	0.31	0.00	0.00	0.01	0.00
22	1.18	0.24	0.00	0.00	0.04	0.01

TABLE 99

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

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CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE NO: 8523+1+4+2

REACTOR LOADING, MLS :	470.0	T, C :	222-2	FEED RATIO,	
CATALYST LOADING, WT% :	16.9	P, PSIG :	300	CO/H ₂ :	1.00
TIME ON STREAM, HRS :	24-2	SV, L/G/HR:	1.85		

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USAGE RATIO, CO/H ₂ :	0.45	BULK ACTIVITY,	
OVERALL CONV., CO+H ₂ :	28.61	MOL SYNGAS/KG CAT/HR:	23.52
CO CONV. :	17.65	SPECIFIC ACTIVITY,	
H ₂ CONV. :	39.61	MOL CO/MOL METAL/HR:	0.142

+++++

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	7.64	H ₂ O:	10.45
OXYGENATES :	0.18	CO :	77.43
CO ₂ :	0.27	H ₂ :	4.04

+++++

HYDROCARBON SELECTIVITY, WT%:

C1 :	10.57	C4+ENE :	5.41
C2+ANE :	2.18	C5+C11 :	36.38
C2+ENE :	0.34	C12+C18:	18.35
C3+ANE :	2.29	C19+C23:	7.31
C3+ENE :	7.09	C24+34 :	6.06
C4 ISO+ANE:	3.06	C35+ :	0.95

+++++

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 36.38
DIESEL (C9+C25) : 38.82

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% ELEMENTAL RECOVERY: CARBON : 98.61
HYDROGEN: 96.81
OXYGEN : 100.10

+++++

Table 100

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523+1+4

SAMPLE NO. 2

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N-ALKANES		I-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	10.57	40.79	0.00	0.00	0.00	0.00
2	2.18	4.49	0.34	0.74	0.00	0.00
3	2.29	3.21	7.09	10.41	0.00	0.00
4	2.95	3.14	5.41	5.96	0.11	0.12
5	3.14	2.69	4.95	4.37	0.25	0.21
6	6.88	4.94	0.21	0.15	0.00	0.00
7	3.27	2.02	1.46	0.92	0.29	0.18
8	1.92	1.04	1.06	0.59	1.57	0.85
9	2.15	1.04	1.24	0.61	0.85	0.41
10	2.20	0.95	1.11	0.49	0.79	0.34
11	1.73	0.68	0.67	0.27	0.64	0.25
12	1.75	0.63	0.54	0.20	0.65	0.24
13	1.74	0.58	0.40	0.14	0.63	0.21
14	1.83	0.57	0.28	0.09	0.58	0.18
15	2.10	0.61	0.00	0.00	0.52	0.15
16	2.15	0.59	0.00	0.00	0.44	0.12
17	2.09	0.54	0.00	0.00	0.45	0.12
18	1.80	0.44	0.00	0.00	0.37	0.09
19	1.77	0.41	0.00	0.00	0.17	0.04
20	1.49	0.33	0.00	0.00	0.06	0.01
21	1.48	0.31	0.00	0.00	0.01	0.00
22	1.18	0.24	0.00	0.00	0.04	0.01

Table 100 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523-1-4

SAMPLE NO. 2

CONTAINS POTENTIALLY
PATENTABLE DATA-
NET FOR PUBLICATION

CARBON NO.	N ^o TALKANES		1 ^o TALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.05	0.20	0.00	0.00	0.05	0.01
24	0.90	0.16	0.00	0.00	0.00	0.00
25	0.87	0.15	0.00	0.00	0.00	0.00
26	0.82	0.14	0.00	0.00	0.00	0.00
27	0.68	0.11	0.00	0.00	0.00	0.00
28	0.34	0.05	0.00	0.00	0.18	0.03
29	0.29	0.04	0.00	0.00	0.16	0.02
30	0.24	0.04	0.00	0.00	0.14	0.02
31	0.24	0.03	0.00	0.00	0.14	0.02
32	0.21	0.03	0.00	0.00	0.15	0.02
33	0.19	0.02	0.00	0.00	0.17	0.02
34	0.19	0.02	0.00	0.00	0.16	0.02
35	0.34	0.04	0.00	0.00	0.00	0.00
36	0.25	0.03	0.00	0.00	0.00	0.00
37	0.17	0.02	0.00	0.00	0.00	0.00
38	0.08	0.01	0.00	0.00	0.00	0.00
39	0.06	0.01	0.00	0.00	0.00	0.00
40	0.04	0.00	0.00	0.00	0.00	0.00

TABLE 101

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : $\text{Co}_2(\text{CO})_8/\text{Zr}(\text{OPr})_4/\text{AL}_2\text{O}_3$
SAMPLE No: 8523+1+4+4

REACTOR LOADING, MLS :	470.0	T, C :	218.6	FEED RATIO,	
CATALYST LOADING, WT% :	16.9	P, PSIG :	297	CO/H ₂ :	1.48
TIME ON STREAM, HRS :	48.2	SV, L/G/HR :	1.86		

USAGE RATIO, CO/H ₂ :	0.51	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	20.65	MOL SYNGAS/KG CAT/HR :	17.187
%CO CONV. :	11.66	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	33.98	MOL CO/MOL METAL/MIN :	0.112

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS :	5.26	H ₂ O :	5.60
OXYGENATES :	0.05	CO :	85.75
CO ₂ :	0.24	H ₂ :	3.09

HYDROCARBON SELECTIVITY, WT%:

C1 :	10.43	C4+ENE :	5.46
C2+ANE :	1.83	C5+C11 :	32.62
C2+ENE :	0.52	C12+C18 :	19.83
C3+ANE :	1.63	C19+C23 :	9.83
C3+ENE :	6.93	C24+34 :	7.56
C4 ISO+ANE :	2.17	C55+ :	1.18

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11) :	32.62
DIESEL (C9+C25) :	42.28

% ELEMENTAL RECOVERY:	CARBON :	99.16
	HYDROGEN :	97.73
	OXYGEN :	97.66

Table 102

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523-1+4

SAMPLE NO. 4

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N ^o ALKANES		1 ^o ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	10.43	41.98	0.00	0.00	0.00	0.00
2	1.83	3.92	0.52	1.19	0.00	0.00
3	1.63	2.39	6.93	10.63	0.00	0.00
4	2.17	2.41	5.46	6.28	0.00	0.00
5	2.21	1.98	5.11	4.70	0.20	0.18
6	5.97	4.47	0.19	0.15	0.00	0.00
7	2.56	1.65	1.53	1.00	0.40	0.26
8	1.75	0.99	1.25	0.72	1.04	0.59
9	1.82	0.91	1.43	0.73	0.90	0.45
10	1.78	0.81	1.27	0.58	0.62	0.28
11	1.37	0.57	0.74	0.31	0.48	0.20
12	1.43	0.54	0.60	0.23	0.48	0.18
13	1.54	0.54	0.49	0.17	0.49	0.17
14	1.81	0.59	0.38	0.13	0.50	0.16
15	2.38	0.72	0.00	0.00	0.51	0.15
16	2.62	0.75	0.00	0.00	0.50	0.14
17	2.62	0.70	0.00	0.00	0.59	0.16
18	2.33	0.59	0.00	0.00	0.56	0.14
19	2.32	0.56	0.00	0.00	0.31	0.07
20	1.99	0.45	0.00	0.00	0.23	0.05
21	1.99	0.43	0.00	0.00	0.06	0.01
22	1.49	0.31	0.00	0.00	0.07	0.01

Table 102 (Cont'd)
HYDROCARBON PRODUCT DISTRIBUTION

CONTAINS POTENTIALLY
 PATENTABLE DATA -
 NOT FOR PUBLICATION

RUN NO. 8523-174

SAMPLE NO. 4

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.31	0.26	0.00	0.00	0.07	0.01
24	1.12	0.21	0.00	0.00	0.00	0.00
25	1.09	0.20	0.00	0.00	0.00	0.00
26	1.02	0.18	0.00	0.00	0.00	0.00
27	0.84	0.14	0.00	0.00	0.00	0.00
28	0.42	0.07	0.00	0.00	0.23	0.04
29	0.36	0.06	0.00	0.00	0.20	0.03
30	0.30	0.05	0.00	0.00	0.17	0.03
31	0.29	0.04	0.00	0.00	0.17	0.03
32	0.26	0.04	0.00	0.00	0.19	0.03
33	0.23	0.03	0.00	0.00	0.21	0.03
34	0.24	0.03	0.00	0.00	0.20	0.03
35	0.43	0.06	0.00	0.00	0.00	0.00
36	0.31	0.04	0.00	0.00	0.00	0.00
37	0.22	0.03	0.00	0.00	0.00	0.00
38	0.11	0.01	0.00	0.00	0.00	0.00
39	0.07	0.01	0.00	0.00	0.00	0.00
40	0.05	0.01	0.00	0.00	0.00	0.00

TABLE 103

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE No: 8523t1+4+7

REACTOR LOADING, MLS : 470.0 T, C : 221.3 FEED RATIO,
CATALYST LOADING, WT% : 16.9 P, PSIG : 310 CO/H₂: 1.43
TIME ON STREAM, HRS : 9.0 SV, L/G/HR: 0.95

USAGE RATIO, CO/H₂ : 0.47 BULK ACTIVITY,
%OVERALL CONV., CO+H₂: 31.48 MOL SYNGAS/KG CAT/HR: 13.322
%CO CONV. : 15.99 SPECIFIC ACTIVITY,
%H₂ CONV. : 52.24 MOL CO/MOL METAL/MIN: 0.082

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 9.08 H₂O: 9.74
OXYGENATES : 0.15 CO : 78.32
CO₂ : 0.45 H₂ : 2.25

HYDROCARBON SELECTIVITY, WT%:

C1 : 8.86 C4+ENE : 4.59
C2+ANE : 1.68 C5+C11 : 32.58
C2+ENE : 0.29 C12+C18: 19.47
C3+ANE : 1.53 C19+C23: 11.95
C3+ENE : 6.00 C24+34 : 9.39
C4 ISO+ANE: 2.05 C35+ : 1.62

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 32.58
DIESEL (C9+C25) : 44.35

% ELEMENTAL RECOVERY: CARBON : 102.36
HYDROGEN: 102.31
OXYGEN : 99.77

Table 104

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523+1+4

SAMPLE NO. 7

CONTAINS POTENTIALLY
SENSITIVE DATA -
NOT FOR PUBLICATION

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	8.86	39.31	0.00	0.00	0.00	0.00
2	1.68	3.98	0.29	0.73	0.00	0.00
3	1.53	2.46	6.00	10.14	0.00	0.00
4	1.98	2.42	4.59	5.81	0.07	0.09
5	2.13	2.10	4.32	4.38	0.19	0.19
6	6.80	5.62	0.22	0.19	0.00	0.00
7	2.91	2.05	1.49	1.08	0.55	0.40
8	1.97	1.23	1.18	0.75	0.96	0.60
9	1.86	1.03	1.19	0.67	0.88	0.49
10	1.77	0.88	0.99	0.50	0.71	0.35
11	1.32	0.60	0.59	0.27	0.55	0.25
12	1.41	0.59	0.50	0.21	0.54	0.22
13	1.56	0.60	0.43	0.17	0.52	0.20
14	1.76	0.63	0.37	0.13	0.49	0.18
15	2.30	0.77	0.00	0.00	0.45	0.15
16	2.45	0.77	0.00	0.00	0.50	0.16
17	2.72	0.80	0.00	0.00	0.55	0.17
18	2.53	0.71	0.00	0.00	0.38	0.11
19	2.57	0.68	0.00	0.00	0.25	0.07
20	2.48	0.62	0.00	0.00	0.18	0.04
21	2.30	0.55	0.00	0.00	0.12	0.03
22	2.08	0.48	0.00	0.00	0.08	0.02

Table 104 (Cont'd)
HYDROCARBON PRODUCT DISTRIBUTION

CONTAINS POTENTIAL
 PATENTABLE DATA
 NOT FOR PUBLICATION

RUN NO. 8523+1+4

SAMPLE NO. 7

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.81	0.40	0.00	0.00	0.09	0.02
24	1.56	0.33	0.00	0.00	0.06	0.01
25	1.42	0.29	0.00	0.00	0.04	0.01
26	1.30	0.25	0.00	0.00	0.00	0.00
27	1.11	0.21	0.00	0.00	0.00	0.00
28	0.67	0.12	0.00	0.00	0.08	0.02
29	0.46	0.08	0.00	0.00	0.07	0.01
30	0.45	0.08	0.00	0.00	0.13	0.02
31	0.52	0.08	0.00	0.00	0.09	0.02
32	0.29	0.05	0.00	0.00	0.11	0.02
33	0.35	0.05	0.00	0.00	0.09	0.01
34	0.45	0.07	0.00	0.00	0.13	0.02
35	0.49	0.07	0.00	0.00	0.00	0.00
36	0.42	0.06	0.00	0.00	0.00	0.00
37	0.26	0.03	0.00	0.00	0.00	0.00
38	0.16	0.02	0.00	0.00	0.00	0.00
39	0.16	0.02	0.00	0.00	0.00	0.00
40	0.13	0.02	0.00	0.00	0.00	0.00

TABLE 105

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

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CATALYST : Co₂(CO)₈/Zr(OPr)₄/AL₂O₃
SAMPLE NO: 8523+1+4+10

REACTOR LOADING, MLS :	470.0	T, C :	239.9	FEED RATIO,	
CATALYST LOADING, WT%:	16.9	P, PSIG :	310	CO/H ₂ :	1.43
TIME ON STREAM, HRS :	120.0	SV, L/G/HR:	0.95		

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USAGE RATIO, CO/H ₂ :	0.58	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	43.14	MOL SYNGAS/KG CAT/HR:	18.247
%CO CONV.	27.02	SPECIFIC ACTIVITY,	
%H ₂ CONV.	66.23	MOL CO/MOL METAL/MIN:	0.130

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WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	10.44	H ₂ O:	13.89
OXYGENATES :	0.18	CO :	72.34
CO ₂ :	1.48	H ₂ :	1.67

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HYDROCARBON SELECTIVITY, WT%:

C ₁ :	7.84	C ₄ +ENE :	4.06
C ₂ +ANE :	1.52	C ₅ +C ₁₁ :	34.21
C ₂ +ENE :	0.25	C ₁₂ +C ₁₈ :	22.22
C ₃ +ANE :	1.06	C ₁₉ +C ₂₃ :	10.78
C ₃ +ENE :	4.85	C ₂₄ +34 :	10.32
C ₄ ISO+ANE:	1.49	C ₃₅ + :	1.38

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FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	34.21
DIESEL (C ₉ +C ₂₅) :	48.75

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% ELEMENTAL RECOVERY:	CARBON :	94.80
	HYDROGEN:	99.18
	OXYGEN :	96.78

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Table 106

HYDROCARBON PRODUCT DISTRIBUTION:

RUN NO. 8523-1-4

SAMPLE NO. 10

CONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	7.84	37.76	0.00	0.00	0.00	0.00
2	1.52	3.90	0.25	0.68	0.00	0.00
3	1.06	1.86	4.85	8.90	0.00	0.00
4	1.44	1.91	4.06	5.59	0.05	0.07
5	1.83	1.96	4.12	4.53	0.18	0.19
6	6.01	5.39	0.31	0.29	0.00	0.00
7	2.56	1.97	1.71	1.35	0.33	0.26
8	2.10	1.42	1.50	1.03	0.83	0.56
9	2.30	1.38	1.70	1.04	1.05	0.63
10	2.17	1.18	1.48	0.82	0.79	0.43
11	1.69	0.83	0.91	0.45	0.64	0.32
12	1.73	0.78	0.74	0.34	0.68	0.31
13	1.80	0.75	0.59	0.25	0.69	0.29
14	1.96	0.76	0.44	0.17	0.66	0.26
15	2.54	0.92	0.00	0.00	0.61	0.22
16	2.57	0.88	0.00	0.00	0.77	0.26
17	2.80	0.90	0.00	0.00	0.58	0.19
18	2.58	0.78	0.00	0.00	0.48	0.15
19	2.39	0.69	0.00	0.00	0.19	0.05
20	2.22	0.	0.00	0.00	0.07	0.02
21	2.06	0.54	0.00	0.00	0.07	0.02
22	1.90	0.47	0.00	0.00	0.07	0.02

Table 106 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523-1+4

SAMPLE NO. 10

CONTAINS POTENTIALLY
REWORKABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.72	0.41	0.00	0.00	0.08	0.02
24	1.52	0.35	0.00	0.00	0.06	0.01
25	1.40	0.31	0.00	0.00	0.05	0.01
26	1.36	0.29	0.00	0.00	0.00	0.00
27	1.14	0.23	0.00	0.00	0.00	0.00
28	0.78	0.15	0.00	0.00	0.07	0.01
29	0.57	0.11	0.00	0.00	0.07	0.01
30	0.57	0.10	0.00	0.00	0.12	0.02
31	0.60	0.11	0.00	0.00	0.09	0.02
32	0.58	0.10	0.00	0.00	0.09	0.01
33	0.53	0.09	0.00	0.00	0.10	0.02
34	0.50	0.08	0.00	0.00	0.11	0.02
35	0.51	0.08	0.00	0.00	0.00	0.00
36	0.39	0.06	0.00	0.00	0.00	0.00
37	0.23	0.03	0.00	0.00	0.00	0.00
38	0.12	0.02	0.00	0.00	0.00	0.00
39	0.09	0.01	0.00	0.00	0.00	0.00
40	0.04	0.01	0.00	0.00	0.00	0.00

TABLE 107

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PRESENTABLE DATA -
NOT FOR PUBLICATION

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CATALYST : Co₂(CO)₈/Zr(OPr)₄/AL₂O₃
SAMPLE NO: 8523+1+4+13

REACTOR LOADING, MLS :	470.0	T, C :	242.5	FEED RATIO,	
CATALYST LOADING, WT%:	16.9	P, PSIG :	310	CO/H ₂ :	1.88
TIME ON STREAM, HRS :	144.0	SV, L/G/HR:	0.94		

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USAGE RATIO, CO/H ₂ :	0.62	BULK ACTIVITY,	
OVERALL CONV., CO+H ₂ :	38.93	MOL SYNGAS/KG CAT/HR:	16.337
CO CONV. :	22.79	SPECIFIC ACTIVITY,	
H ₂ CONV. :	69.27	MOL CO/MOL METAL/MIN:	0.121

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WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	7.00	H ₂ O:	11.00
OXYGENATES :	0.14	CO :	79.19
CO ₂ :	1.48	H ₂ :	1.20

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HYDROCARBON SELECTIVITY, WT%:

C1 :	8.53	C4+ENE :	5.04
C2+ANE :	1.63	C5+C11 :	36.59
C2+ENE :	0.38	C12+C18:	23.58
C3+ANE :	0.96	C19+C23:	7.79
C3+ENE :	5.85	C24+34 :	7.00
C4 ISO+ANE:	1.33	C35+ :	1.34

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FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	36.59
DIESEL (C9+C25) :	48.12

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% ELEMENTAL RECOVERY:	CARBON :	91.67
	HYDROGEN:	91.23
	OXYGEN :	95.80

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Table 108

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523-1+4

SAMPLE NO. 13

CONTAINS POTENTIALLY
ERRONEOUS DATA -
NOT FOR PUBLICATION

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	8.53	38.16	0.00	0.00	0.00	0.00
2	1.63	3.89	0.38	0.97	0.00	0.00
3	0.96	1.56	5.85	9.96	0.00	0.00
4	1.33	1.64	5.04	6.44	0.00	0.00
5	1.87	1.86	5.25	5.38	0.19	0.19
6	5.39	4.48	0.35	0.30	0.00	0.00
7	2.13	1.52	1.73	1.27	0.43	0.31
8	2.11	1.32	1.70	1.09	0.85	0.54
9	2.47	1.38	2.21	1.26	1.11	0.62
10	2.08	1.05	1.91	0.98	0.70	0.35
11	1.91	0.88	1.32	0.61	0.87	0.40
12	1.88	0.79	1.10	0.47	0.71	0.30
13	1.89	0.73	0.90	0.35	0.77	0.30
14	1.98	0.72	0.71	0.26	0.78	0.28
15	2.16	0.73	0.50	0.17	0.76	0.25
16	2.58	0.82	0.00	0.00	0.80	0.25
17	2.55	0.76	0.00	0.00	0.65	0.19
18	2.32	0.65	0.00	0.00	0.54	0.15
19	1.81	0.48	0.00	0.00	0.22	0.06
20	1.56	0.40	0.00	0.00	0.07	0.02
21	1.43	0.35	0.00	0.00	0.06	0.01
22	1.32	0.31	0.00	0.00	0.06	0.01

Table 108 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523+1+4

SAMPLE NO. 13

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.20	0.27	0.00	0.00	0.06	0.01
24	1.07	0.23	0.00	0.00	0.05	0.01
25	0.99	0.20	0.00	0.00	0.04	0.01
26	0.85	0.17	0.00	0.00	0.03	0.01
27	0.83	0.16	0.00	0.00	0.00	0.00
28	0.57	0.10	0.00	0.00	0.06	0.01
29	0.45	0.08	0.00	0.00	0.04	0.01
30	0.43	0.07	0.00	0.00	0.07	0.01
31	0.42	0.07	0.00	0.00	0.05	0.01
32	0.32	0.05	0.00	0.00	0.04	0.01
33	0.31	0.05	0.00	0.00	0.04	0.01
34	0.29	0.04	0.00	0.00	0.06	0.01
35	0.34	0.05	0.00	0.00	0.00	0.00
36	0.34	0.05	0.00	0.00	0.00	0.00
37	0.23	0.03	0.00	0.00	0.00	0.00
38	0.17	0.02	0.00	0.00	0.00	0.00
39	0.15	0.02	0.00	0.00	0.00	0.00
40	0.11	0.01	0.00	0.00	0.00	0.00

TABLE 109

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
EXCESSIVE DATA
NOT FOR PUBLICATION

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CATALYST : Co₂(CO)₈/Zr(OPr)₄/AL₂O₃
SAMPLE NO: 8523+1+4+17

REACTOR LOADING, MLS :	470.0	T, C :	242.0	FEED RATIO,	
CATALYST LOADING, WT% :	16.9	P, PSIG :	307	CO/H ₂ :	1.99
TIME ON STREAM, HRS :	168.0	SV, L/G/HR:	1.87		

+++++

USAGE RATIO, CO/H ₂ :	0.51	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	26.24	MOL SYNGAS/KG CAT/HR:	21.910
%CO CONV.	13.37	SPECIFIC ACTIVITY,	
%H ₂ CONV.	51.90	MOL CO/MOL METAL/MIN:	0.144

+++++

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	4.59	H ₂ O:	8.21
OXYGENATES :	0.06	CO :	84.90
CO ₂ :	0.56	H ₂ :	1.69

+++++

HYDROCARBON: SELECTIVITY, WT%:

C ₁ :	10.95	C ₄ +ENE :	5.76
C ₂ +ANE :	2.05	C ₅ +C ₁₁ :	36.65
C ₂ +ENE :	0.57	C ₁₂ +C ₁₈ :	22.19
C ₃ +ANE :	1.15	C ₁₉ +C ₂₃ :	6.73
C ₃ +ENE :	6.91	C ₂₄ +C ₃₄ :	4.63
C ₄ ISO+ANE:	1.54	C ₃₅ +	0.88

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FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	36.65
DIESEL (C ₉ +C ₂₅) :	43.32

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% ELEMENTAL RECOVERY:	CARBON :	96.22
	HYDROGEN:	95.52
	OXYGEN :	100.42

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Table 110

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523-1-4

SAMPLE NO. 17

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N-TALKANES		1-TALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	10.95	42.59	0.00	0.00	0.00	0.00
2	2.05	4.25	0.57	1.26	0.00	0.00
3	1.15	1.63	6.91	10.24	0.00	0.00
4	1.54	1.66	5.76	6.40	0.00	0.00
5	1.99	1.72	5.65	5.03	0.23	0.19
6	6.35	4.60	0.34	0.25	0.00	0.00
7	2.30	1.43	1.97	1.25	0.38	0.24
8	2.04	1.11	1.69	0.94	0.73	0.40
9	2.19	1.07	2.10	1.04	0.84	0.41
10	2.08	0.91	1.84	0.82	0.53	0.23
11	1.68	0.67	1.27	0.51	0.43	0.17
12	1.67	0.61	1.07	0.39	0.51	0.19
13	1.70	0.58	0.89	0.31	0.62	0.21
14	1.76	0.55	0.73	0.23	0.68	0.21
15	1.87	0.55	0.55	0.16	0.72	0.21
16	2.40	0.66	0.00	0.00	0.74	0.20
17	2.39	0.62	0.00	0.00	0.78	0.20
18	2.31	0.57	0.00	0.00	0.79	0.19
19	1.84	0.43	0.00	0.00	0.60	0.14
20	1.27	0.28	0.00	0.00	0.20	0.04
21	1.01	0.21	0.00	0.00	0.06	0.01
22	0.87	0.17	0.00	0.00	0.05	0.01

Table 110 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8525+1+4

SAMPLE NO. 17

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CARBON NO.	N-TALKANES		I-TALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.79	0.15	0.00	0.00	0.05	0.01
24	0.71	0.13	0.00	0.00	0.04	0.01
25	0.65	0.11	0.00	0.00	0.03	0.01
26	0.56	0.10	0.00	0.00	0.03	0.00
27	0.54	0.09	0.00	0.00	0.00	0.00
28	0.39	0.06	0.00	0.00	0.03	0.01
29	0.31	0.05	0.00	0.00	0.03	0.00
30	0.29	0.04	0.00	0.00	0.03	0.00
31	0.29	0.04	0.00	0.00	0.03	0.00
32	0.21	0.03	0.00	0.00	0.02	0.00
33	0.21	0.03	0.00	0.00	0.02	0.00
34	0.19	0.03	0.00	0.00	0.03	0.00
35	0.22	0.03	0.00	0.00	0.00	0.00
36	0.22	0.03	0.00	0.00	0.00	0.00
37	0.15	0.02	0.00	0.00	0.00	0.00
38	0.11	0.01	0.00	0.00	0.00	0.00
39	0.10	0.01	0.00	0.00	0.00	0.00
40	0.07	0.01	0.00	0.00	0.00	0.00

TABLE 111

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

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CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE NO: 8523+1+4+20

REACTOR LOADING, MLS :	470.0	T, C :	240.6	FEED RATIO,	
CATALYST LOADING, WT%:	16.9	P, PSIG :	302	CO/H ₂ :	0.99
TIME ON STREAM, HRS :	192.0	SV, L/G/HR:	1.86		

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USAGE RATIO, CO/H ₂ :	0.51	BULK ACTIVITY,	
OVERALL CONV., CO+H ₂ :	42.54	MOL SYNGAS/KG CAT/HR:	35.321
CO CONV. :	29.02	SPECIFIC ACTIVITY,	
H ₂ CONV. :	55.95	MOL CO/MOL METAL/MIN:	0.232

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WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	11.35	H ₂ O:	16.28
OXYGENATES :	0.22	CO :	68.33
CO ₂ :	0.78	H ₂ :	3.05

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HYDROCARBON SELECTIVITY, WT%:

C1 :	7.87	C4+ENE :	3.75
C2+ANE :	1.63	C5+C11 :	37.03
C2+ENE :	0.17	C12+C18:	23.39
C3+ANE :	1.55	C19+C23:	8.98
C3+ENE :	4.31	C24+34 :	7.82
C4 ISO+ANE:	2.13	C35+ :	1.37

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FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 37.03
DIESEL (C9+C25) : 49.80

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% ELEMENTAL RECOVERY: CARBON : 94.85
HYDROGEN: 96.85
OXYGEN : 98.46

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Table 112

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523+1+4

SAMPLE NO. 20

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CARBON NO.	N-ALKANES		I-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	7.87	37.18	0.00	0.00	0.00	0.00
2	1.63	4.11	0.17	0.45	0.00	0.00
3	1.55	2.66	4.31	7.75	0.00	0.00
4	2.13	2.78	3.75	5.07	0.00	0.00
5	2.66	2.79	3.82	4.12	0.25	0.26
6	5.95	5.22	0.31	0.28	0.00	0.00
7	2.74	2.07	1.45	1.12	0.39	0.29
8	2.45	1.62	1.42	0.96	0.67	0.44
9	2.94	1.74	1.63	0.98	0.82	0.48
10	3.06	1.63	1.44	0.78	0.64	0.34
11	2.61	1.26	1.13	0.55	0.66	0.32
12	2.52	1.12	0.86	0.39	0.79	0.35
13	2.45	1.01	0.63	0.26	0.83	0.34
14	2.40	0.92	0.40	0.15	0.80	0.31
15	2.58	0.92	0.00	0.00	0.75	0.27
16	2.37	0.79	0.00	0.00	0.67	0.22
17	2.20	0.69	0.00	0.00	0.61	0.19
18	1.99	0.59	0.00	0.00	0.52	0.16
19	1.94	0.55	0.00	0.00	0.22	0.06
20	1.82	0.49	0.00	0.00	0.09	0.02
21	1.69	0.43	0.00	0.00	0.08	0.02
22	1.57	0.38	0.00	0.00	0.08	0.02

Table 112 (Cont'd)
HYDROCARBON PRODUCT DISTRIBUTION:

RUN NO. 8523+1+4

SAMPLE NO. 20

CONTAINS POTENTIALLY
 PATENTABLE DATA
 NOT FOR PUBLICATION

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.42	0.33	0.00	0.00	0.08	0.02
24	1.25	0.28	0.00	0.00	0.07	0.02
25	1.12	0.24	0.00	0.00	0.05	0.01
26	0.95	0.20	0.00	0.00	0.04	0.01
27	0.80	0.16	0.00	0.00	0.03	0.01
28	0.66	0.13	0.00	0.00	0.04	0.01
29	0.53	0.10	0.00	0.00	0.03	0.01
30	0.48	0.09	0.00	0.00	0.03	0.01
31	0.46	0.08	0.00	0.00	0.03	0.00
32	0.43	0.07	0.00	0.00	0.01	0.00
33	0.41	0.07	0.00	0.00	0.00	0.00
34	0.40	0.06	0.00	0.00	0.00	0.00
35	0.38	0.06	0.00	0.00	0.00	0.00
36	0.33	0.05	0.00	0.00	0.00	0.00
37	0.24	0.03	0.00	0.00	0.00	0.00
38	0.18	0.03	0.00	0.00	0.00	0.00
39	0.14	0.02	0.00	0.00	0.00	0.00
40	0.09	0.01	0.00	0.00	0.00	0.00

TABLE 113

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
SENSITIVE DATA
NOT FOR PUBLICATION

CATALYST : Co₂(CO)₈/Zr(OPr)₄/AL₂O₃
SAMPLE NO: 8523+1+4+25

REACTOR LOADING, MLS :	470-0	T, C :	259-0	FEED RATIO,	
CATALYST LOADING, WT%:	16-9	P, PSIG :	310	CO/H ₂ :	0-95
TIME ON STREAM, HRS :	287-1	SV, L/G/HR:	1-86		

USAGE RATIO, CO/H ₂ :	0-52	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	46-37	MOL SYNGAS/KG CAT/HR:	38-510
%CO CONV-	32-01	SPECIFIC ACTIVITY,	
%H ₂ CONV-	60-64	MOL CO/MOL METAL/MIN:	0-257

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	11-11	H ₂ O:	17-60
OXYGENATES :	0-27	CO :	66-79
CO ₂ :	1-45	H ₂ :	2-78

HYDROCARBON SELECTIVITY, WT%:

C1 :	10-38	C4+ENE :	4-26
C2+ANE :	2-09	C5+C11 :	44-48
C2+ENE :	0-22	C12+C18:	25-81
C3+ANE :	1-64	C19+C23:	1-97
C3+ENE :	4-64	C24+34 :	2-01
C4 ISO+ANE:	2-26	C35+ :	0-26

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	44-48
DIESEL (C9+C25) :	48-29

% ELEMENTAL RECOVERY:	CARBON :	91-33
	HYDROGEN:	93-32
	OXYGEN :	97-91

Table 114

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523+1+4

SAMPLE NO. 25

CONTAINS POTENTIALLY
ESTIMABLE QUANTITIES
NOT FOR POLLUTION

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	10.38	41.77	0.00	0.00	0.00	0.00
2	2.09	4.48	0.22	0.51	0.00	0.00
3	1.64	2.40	4.64	7.10	0.00	0.00
4	2.19	2.43	4.26	4.90	0.07	0.08
5	2.91	2.60	4.38	4.03	0.30	0.27
6	5.39	4.03	0.52	0.40	0.00	0.00
7	2.65	1.71	1.63	1.07	0.82	0.52
8	2.91	1.64	1.84	1.06	1.20	0.68
9	3.73	1.87	2.29	1.17	1.57	0.79
10	3.67	1.66	1.88	0.86	1.21	0.55
11	3.15	1.30	1.30	0.54	1.14	0.47
12	2.98	1.13	1.06	0.41	1.08	0.41
13	2.84	0.99	0.85	0.30	1.05	0.37
14	2.74	0.89	0.64	0.21	1.00	0.33
15	2.98	0.91	0.00	0.00	1.01	0.31
16	2.56	0.73	0.00	0.00	0.93	0.26
17	1.93	0.52	0.00	0.00	0.72	0.19
18	1.10	0.28	0.00	0.00	0.34	0.09
19	0.53	0.13	0.00	0.00	0.10	0.02
20	0.35	0.08	0.00	0.00	0.03	0.01
21	0.31	0.07	0.00	0.00	0.03	0.01
22	0.29	0.06	0.00	0.00	0.03	0.01

Table 114 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523+1+4

SAMPLE NO. 25

CONTAINING POTENTIAL
FATS FIELD DATA
NOT FOR PUBLICATION

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.28	0.06	0.00	0.00	0.03	0.01
24	0.25	0.05	0.00	0.00	0.03	0.00
25	0.27	0.05	0.00	0.00	0.02	0.00
26	0.23	0.04	0.00	0.00	0.02	0.00
27	0.21	0.03	0.00	0.00	0.02	0.00
28	0.18	0.03	0.00	0.00	0.02	0.00
29	0.15	0.02	0.00	0.00	0.01	0.00
30	0.14	0.02	0.00	0.00	0.01	0.00
31	0.12	0.02	0.00	0.00	0.01	0.00
32	0.11	0.02	0.00	0.00	0.01	0.00
33	0.09	0.01	0.00	0.00	0.01	0.00
34	0.09	0.01	0.00	0.00	0.01	0.00
35	0.08	0.01	0.00	0.00	0.00	0.00
36	0.07	0.01	0.00	0.00	0.00	0.00
37	0.05	0.01	0.00	0.00	0.00	0.00
38	0.03	0.00	0.00	0.00	0.00	0.00
39	0.02	0.00	0.00	0.00	0.00	0.00
40	0.01	0.00	0.00	0.00	0.00	0.00

TABLE 115

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
FALSIFIED DATA.
SEE IGA PUBLICATION

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CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE No: 8523+1+4+29

REACTOR LOADING, MLS :	470.0	T, C :	257.9	FEED RATIO,	
CATALYST LOADING, WT% :	16.9	P, PSIG :	307	CO/H ₂ :	1.45
TIME ON STREAM, HRS :	310.6	SV, L/G/HR :	1.87		

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USAGE RATIO, CO/H ₂ :	0.53	BULK ACTIVITY,	
%OVERALL CONV., CO-H ₂ :	34.46	MOL SYNGAS/KE CAT/HR:	28.708
%CO CONV. :	19.92	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	55.99	MOL CU/MOL METAL/MIN:	0.192

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WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	7.63	H ₂ O:	10.83
OXYGENATES :	0.10	CO :	78.45
CO ₂ :	0.92	H ₂ :	2.08

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HYDROCARBON SELECTIVITY, WT%:

C ₁ :	7.24	C ₄ +ENE :	3.60
C ₂ +ANE :	1.26	C ₅ +C ₁₁ :	34.07
C ₂ +ENE :	0.33	C ₁₂ +C ₁₈ :	27.85
C ₃ +ANE :	0.71	C ₁₉ +C ₂₃ :	8.64
C ₃ +ENE :	3.88	C ₂₄ +34 :	9.78
C ₄ ISO+ANE:	1.06	C ₃₅ +	1.58

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FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	34.07
DIESEL (C ₉ +C ₂₅) :	54.70

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% ELEMENTAL RECOVERY:	CARBON :	96.09
	HYDROGEN:	95.34
	OXYGEN :	98.53

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Table 116

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523+1+4

SAMPLE NO. 29

CONTAINS POTENTIALLY
PATENTABLE DATA-
NET FOR PUS:02113

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	7.24	37.29	0.00	0.00	0.00	0.00
2	1.26	3.47	0.33	0.96	0.00	0.00
3	0.71	1.33	3.88	7.62	0.00	0.00
4	1.06	1.50	3.60	5.30	0.00	0.00
5	1.50	1.72	3.91	4.61	0.18	0.20
6	4.60	4.40	0.34	0.33	0.00	0.00
7	1.86	1.53	1.52	1.27	0.48	0.39
8	1.88	1.36	1.61	1.18	0.72	0.52
9	2.39	1.54	2.17	1.42	1.11	0.71
10	2.11	1.22	1.99	1.17	0.95	0.55
11	2.12	1.12	1.44	0.77	1.20	0.63
12	2.10	1.02	1.24	0.61	0.87	0.42
13	2.13	0.95	1.09	0.49	0.89	0.40
14	2.19	0.91	0.93	0.39	0.90	0.38
15	2.95	1.14	0.00	0.00	1.04	0.40
16	2.95	1.08	0.00	0.00	1.10	0.40
17	2.96	1.02	0.00	0.00	1.19	0.41
18	2.48	0.81	0.00	0.00	0.84	0.27
19	1.92	0.59	0.00	0.00	0.32	0.10
20	1.62	0.47	0.00	0.00	0.16	0.05
21	1.50	0.42	0.00	0.00	0.12	0.03
22	1.42	0.38	0.00	0.00	0.12	0.03

Table 116 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523+1+4

SAMPLE NO. 29

CONTAINS POTENTIALLY
FALSIFIABLE DATA.
NOT FOR PUBLICATION

CARBON NO.	N ^o TALKANES		1 ^o ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.34	0.34	0.00	0.00	0.12	0.03
24	1.31	0.32	0.00	0.00	0.10	0.02
25	1.22	0.28	0.00	0.00	0.10	0.02
26	1.12	0.25	0.00	0.00	0.09	0.02
27	1.01	0.22	0.00	0.00	0.08	0.02
28	0.89	0.19	0.00	0.00	0.08	0.02
29	0.78	0.16	0.00	0.00	0.07	0.01
30	0.68	0.13	0.00	0.00	0.07	0.01
31	0.62	0.12	0.00	0.00	0.05	0.01
32	0.52	0.10	0.00	0.00	0.03	0.01
33	0.46	0.08	0.00	0.00	0.03	0.00
34	0.45	0.08	0.00	0.00	0.03	0.00
35	0.41	0.07	0.00	0.00	0.00	0.00
36	0.35	0.06	0.00	0.00	0.00	0.00
37	0.28	0.04	0.00	0.00	0.00	0.00
38	0.22	0.03	0.00	0.00	0.00	0.00
39	0.19	0.03	0.00	0.00	0.00	0.00
40	0.13	0.02	0.00	0.00	0.00	0.00

TABLE 117

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE NO: 8523+1+4+32

REACTOR LOADING, MLS :	470.0	T, C :	258.2	FEED RATIO,	
CATALYST LOADING, WT% :	16.0	P, PSIG :	310	CO/H ₂ :	1.44
TIME ON STREAM, HRS :	359.1	SV, L/G/HR:	0.95		

USAGE RATIO, CO/H ₂ :	0.55	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	43.87	MOL SYNGAS/KG CAT/HR:	18.520
%CO CONV. :	26.51	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	68.83	MOL CO/MOL METAL/MIN:	0.128

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	10.19	H ₂ O:	13.60
OXYGENATES :	0.18	CO :	72.03
CO ₂ :	2.48	H ₂ :	1.52

HYDROCARBON SELECTIVITY, WT%:

C1 :	6.33	C4+ENE :	3.01
C2+ANE :	1.22	C5+C11 :	30.62
C2+ENE :	0.25	C12+C18:	27.66
C3+ANE :	0.67	C19+C23:	12.62
C3+ENE :	3.28	C24+34 :	11.72
C4 ISO+ANE:	0.97	C35+ :	1.64

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	30.62
DIESEL (C9+C25) :	58.15

% ELEMENTAL RECOVERY:	CARBON :	95.75
	HYDROGEN:	95.62
	OXYGEN :	98.41

Table 118

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523+1+4

SAMPLE NO. 32

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	6.33	35.67	0.00	0.00	0.00	0.00
2	1.22	3.68	0.25	0.81	0.00	0.00
3	0.67	1.37	3.28	7.04	0.00	0.00
4	0.94	1.46	3.01	4.85	0.04	0.06
5	1.37	1.72	3.36	4.33	0.14	0.18
6	4.27	4.48	0.28	0.30	0.00	0.00
7	1.73	1.56	1.26	1.16	0.39	0.35
8	1.71	1.35	1.32	1.06	0.64	0.51
9	2.16	1.52	1.80	1.29	1.08	0.76
10	1.91	1.22	1.70	1.09	0.96	0.61
11	2.00	1.16	1.30	0.76	1.25	0.72
12	1.97	1.05	1.16	0.63	0.94	0.50
13	1.99	0.98	1.03	0.51	0.92	0.45
14	2.15	0.98	0.72	0.33	1.01	0.46
15	2.83	1.21	0.00	0.00	1.02	0.43
16	2.90	1.16	0.00	0.00	1.03	0.41
17	3.22	1.21	0.00	0.00	1.04	0.39
18	2.89	1.03	0.00	0.00	0.83	0.29
19	2.62	0.88	0.00	0.00	0.31	0.10
20	2.45	0.78	0.00	0.00	0.31	0.10
21	2.25	0.69	0.00	0.00	0.30	0.09
22	2.04	0.59	0.00	0.00	0.27	0.08

Table 11c (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523-1+4

SAMPLE NO. 32

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N*ALKANES		1*ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.83	0.51	0.00	0.00	0.24	0.07
24	1.76	0.47	0.00	0.00	0.20	0.05
25	1.58	0.41	0.00	0.00	0.17	0.04
26	1.35	0.33	0.00	0.00	0.14	0.04
27	1.17	0.28	0.00	0.00	0.12	0.03
28	0.99	0.23	0.00	0.00	0.11	0.02
29	0.83	0.18	0.00	0.00	0.09	0.02
30	0.74	0.16	0.00	0.00	0.08	0.02
31	0.65	0.14	0.00	0.00	0.06	0.01
32	0.56	0.11	0.00	0.00	0.04	0.01
33	0.53	0.10	0.00	0.00	0.03	0.01
34	0.50	0.09	0.00	0.00	0.02	0.00
35	0.47	0.09	0.00	0.00	0.00	0.00
36	0.40	0.07	0.00	0.00	0.00	0.00
37	0.30	0.05	0.00	0.00	0.00	0.00
38	0.22	0.04	0.00	0.00	0.00	0.00
39	0.16	0.03	0.00	0.00	0.00	0.00
40	0.10	0.02	0.00	0.00	0.00	0.00

TABLE 119

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

+++++
CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE No: 8523+1+4+34

REACTOR LOADING, MLS : 470.0 T, C : 259.9 FEED RATIO,
CATALYST LOADING, WT%: 16.9 P, PSIG : 302 CO/H₂: 1.87
TIME ON STREAM, HRS : 384.1 SV, L/G/HR: 0.94

+++++
USAGE RATIO, CO/H₂ : 0.58 BULK ACTIVITY,
%OVERALL CONV., CO+H₂: 37.61 MOL SYNGAS/KG CAT/HR: 15.798
%CO CONV. : 21.23 SPECIFIC ACTIVITY,
%H₂ CONV. : 68.30 MOL CO/MOL METAL/MIN: 0.113
+++++

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 8.12 H₂O: 10.53
OXYGENATES : 0.12 CO : 78.02
CO₂ : 2.01 H₂ : 1.20
+++++

HYDROCARBON SELECTIVITY, WT%:

C₁ : 4.90 C₄+ENE : 2.56
C₂+ANE : 0.68 C₅+C₁₁ : 26.15
C₂+ENE : 0.36 C₁₂+C₁₈: 26.21
C₃+ANE : 0.33 C₁₉+C₂₃: 17.17
C₃+ENE : 2.74 C₂₄+34 : 16.23
C₄ ISO+ANE: 0.50 C₃₅+ : 2.18
+++++

FUEL FRACTIONS, WT%:

GASOLINE (C₅+C₁₁): 26.15
DIESEL (C₉+C₂₅) : 60.49
+++++

% ELEMENTAL RECOVERY: CARBON : 96.37
 HYDROGEN: 96.38
 OXYGEN : 97.97
+++++

Table 120

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523-1+4

SAMPLE NO. 34

CONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	4.90	32.47	0.00	0.00	0.00	0.00
2	0.68	2.41	0.36	1.36	0.00	0.00
3	0.33	0.80	2.74	6.90	0.00	0.00
4	0.50	0.92	2.56	4.84	0.00	0.00
5	0.80	1.18	2.93	4.44	0.09	0.13
6	3.40	4.19	0.24	0.30	0.00	0.00
7	1.27	1.34	1.46	1.58	0.39	0.41
8	1.40	1.30	1.46	1.38	0.64	0.60
9	1.38	1.14	1.98	1.66	1.06	0.88
10	1.29	0.96	1.79	1.35	1.14	0.85
11	1.27	0.87	1.23	0.85	0.93	0.63
12	1.31	0.82	1.11	0.70	0.69	0.43
13	1.38	0.80	1.05	0.61	0.71	0.41
14	1.55	0.83	0.97	0.53	0.75	0.40
15	1.97	0.99	0.63	0.32	0.87	0.44
16	2.93	1.37	0.00	0.00	0.95	0.45
17	3.61	1.59	0.00	0.00	1.08	0.48
18	3.61	1.51	0.00	0.00	1.02	0.43
19	3.50	1.38	0.00	0.00	0.38	0.15
20	3.31	1.25	0.00	0.00	0.40	0.15
21	3.08	1.10	0.00	0.00	0.41	0.15
22	2.82	0.96	0.00	0.00	0.38	0.13

Table 120

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523-1+4

SAMPLE NO. 34

CONTAINS POTENTIALLY
ERRONEOUS DATA -
NOT FOR PUBLICATION

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.55	0.83	0.00	0.00	0.34	0.11
24	2.29	0.72	0.00	0.00	0.29	0.09
25	2.22	0.67	0.00	0.00	0.24	0.07
26	1.88	0.55	0.00	0.00	0.20	0.06
27	1.63	0.45	0.00	0.00	0.17	0.05
28	1.39	0.37	0.00	0.00	0.15	0.04
29	1.19	0.31	0.00	0.00	0.13	0.03
30	1.05	0.26	0.00	0.00	0.11	0.03
31	0.92	0.22	0.00	0.00	0.08	0.02
32	0.79	0.19	0.00	0.00	0.05	0.01
33	0.71	0.16	0.00	0.00	0.04	0.01
34	0.66	0.15	0.00	0.00	0.03	0.01
35	0.61	0.13	0.00	0.00	0.00	0.00
36	0.54	0.11	0.00	0.00	0.00	0.00
37	0.39	0.08	0.00	0.00	0.00	0.00
38	0.29	0.06	0.00	0.00	0.00	0.00
39	0.21	0.04	0.00	0.00	0.00	0.00
40	0.14	0.03	0.00	0.00	0.00	0.00

TABLE 121

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CATALYST : Co₂(CO)₈/Zr(OPr)₄/Al₂O₃
SAMPLE No: 8523+1+4+38

REACTOR LOADING, MLS :	470.0	T, C :	279.4	FEED RATIO,	
CATALYST LOADING, WT%:	16.9	P, PSIG :	310	CO/H ₂ :	1.88
TIME ON STREAM, HRS :	480.1	SV, L/G/HR:	0.94		

USAGE RATIO, CO/H ₂ :	0.62	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	40.76	MOL SYNGAS/KG CAT/HR:	17.103
%CO CONV. :	23.83	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	72.58	MOL CO/MOL METAL/MIN:	0.126

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	10.60	H ₂ O:	10.05
OXYGENATES :	0.14	CO :	73.69
CO ₂ :	4.50	H ₂ :	1.01

HYDROCARBON SELECTIVITY, WT%:

C1 :	8.31	C4+ENE :	2.91
C2+ANE :	1.31	C5+C11 :	24.41
C2+ENE :	0.38	C12+C18:	23.65
C3+ANE :	0.49	C19+C23:	16.48
C3+ENE :	3.38	C24+34 :	15.62
C4 ISO+ANE:	0.65	C35+ :	2.41

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	24.41
DIESEL (C9+C25) :	55.37

% ELEMENTAL RECOVERY:	CARBON :	100.82
	HYDROGEN:	104.10
	OXYGEN :	98.34

Table 12L

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA
NOT FOR PUBLICATION

RUN NO. 8523-1+4

SAMPLE NO. 38

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	8.31	43.98	0.00	0.00	0.00	0.00
2	1.31	3.69	0.38	1.16	0.00	0.00
3	0.49	0.94	3.38	6.82	0.00	0.00
4	0.62	0.91	2.91	4.41	0.02	0.03
5	0.97	1.15	3.10	3.76	0.10	0.12
6	3.67	3.61	0.35	0.35	0.00	0.00
7	1.24	1.05	1.31	1.13	0.44	0.37
8	0.95	0.70	1.19	0.90	0.68	0.50
9	1.03	0.68	1.35	0.91	1.15	0.76
10	1.03	0.62	1.30	0.79	1.40	0.84
11	0.89	0.48	0.95	0.52	1.32	0.72
12	1.14	0.57	0.86	0.43	1.31	0.65
13	1.17	0.54	0.74	0.34	1.01	0.46
14	1.26	0.54	0.62	0.27	0.98	0.42
15	1.43	0.57	0.48	0.19	0.93	0.37
16	2.24	0.84	0.00	0.00	0.97	0.36
17	3.09	1.09	0.00	0.00	1.13	0.40
18	3.23	1.08	0.00	0.00	1.07	0.36
19	3.28	1.04	0.00	0.00	0.38	0.12
20	3.15	0.95	0.00	0.00	0.42	0.13
21	2.92	0.84	0.00	0.00	0.44	0.13
22	2.67	0.73	0.00	0.00	0.42	0.11

Table 122 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
REPERFICLE DATA -
NOT FOR PUBLICATION

RUN NO. 8523-1+4

~~SAMPLE NO. 38~~

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.42	0.63	0.00	0.00	0.38	0.10
24	2.17	0.54	0.00	0.00	0.35	0.09
25	1.99	0.48	0.00	0.00	0.30	0.07
26	1.75	0.40	0.00	0.00	0.24	0.05
27	1.52	0.34	0.00	0.00	0.21	0.05
28	1.31	0.28	0.00	0.00	0.20	0.04
29	1.14	0.24	0.00	0.00	0.16	0.03
30	1.00	0.20	0.00	0.00	0.13	0.03
31	0.88	0.17	0.00	0.00	0.09	0.02
32	0.75	0.14	0.00	0.00	0.06	0.01
33	0.66	0.12	0.00	0.00	0.04	0.01
34	0.66	0.12	0.00	0.00	0.02	0.00
35	0.57	0.10	0.00	0.00	0.00	0.00
36	0.57	0.10	0.00	0.00	0.00	0.00
37	0.45	0.07	0.00	0.00	0.00	0.00
38	0.35	0.06	0.00	0.00	0.00	0.00
39	0.28	0.04	0.00	0.00	0.00	0.00
40	0.18	0.03	0.00	0.00	0.00	0.00

TABLE 123

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

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CATALYST : Co₂(CO)₈/Zr(OPr)₄/AL₂O₃
SAMPLE No: 852311440

REACTOR LOADING, MLS :	470.0	T, C :	281.8	FEED RATIO,	
CATALYST LOADING, WT% :	16.9	P, PSIG :	310	CO/H ₂ :	1.43
TIME ON STREAM, HRS :	504.1	SV, L/G/HR :	0.95		

+++++

USAGE RATIO, CO/H ₂ :	0.62	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	42.90	MOL SYNGAS/KG CAT/HR:	18.129
%CO CONV. :	27.78	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	64.58	MOL CO/MOL METAL/MIN:	0.134

+++++

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	12.32	H ₂ O:	12.47
OXYGENATES :	0.20	CO :	69.83
CO ₂ :	3.47	H ₂ :	1.71

+++++

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	10.21	C ₄ +ENE :	2.96
C ₂ +ANE :	1.63	C ₅ +C ₁₁ :	27.81
C ₂ +ENE :	0.30	C ₁₂ +C ₁₈ :	21.33
C ₃ +ANE :	0.82	C ₁₉ +C ₂₃ :	14.64
C ₃ +ENE :	3.42	C ₂₄ +34 :	13.73
C ₄ ISO+ANE:	0.99	C ₃₅ +	2.16

+++++

FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	27.81
DIESEL (C ₉ +C ₂₅) :	52.40

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% ELEMENTAL RECOVERY:	CARBON :	99.69
	HYDROGEN :	105.95
	OXYGEN :	96.97

+++++

Table 124
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523+1+4

SAMPLE NO. 40

CONTAINS POTENTIALLY
 PATENTABLE DATA -
 NOT FOR PUBLICATION

CARBON NO.	N ⁺ TALKANES,		I ⁺ TALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	10.21	47.98	0.00	0.00	0.00	0.00
2	1.53	4.10	0.30	0.80	0.00	0.00
3	0.82	1.40	3.42	6.12	0.00	0.00
4	0.99	1.29	2.96	3.97	0.00	0.00
5	1.40	1.46	3.16	3.39	0.14	0.14
6	3.65	3.19	0.48	0.43	0.00	0.00
7	1.56	1.17	1.02	0.78	0.66	0.50
8	1.48	0.97	1.12	0.75	0.93	0.61
9	1.50	0.88	1.50	0.90	1.27	0.75
10	1.45	0.77	1.37	0.74	1.75	0.93
11	1.37	0.66	0.88	0.43	1.12	0.54
12	1.30	0.57	0.74	0.33	0.77	0.34
13	1.31	0.53	0.60	0.25	0.73	0.30
14	1.38	0.53	0.47	0.18	0.74	0.28
15	1.87	0.66	0.00	0.00	0.75	0.27
16	2.10	0.70	0.00	0.00	0.80	0.27
17	2.82	0.88	0.00	0.00	0.96	0.30
18	2.94	0.87	0.00	0.00	1.07	0.32
19	2.91	0.82	0.00	0.00	0.37	0.11
20	2.77	0.74	0.00	0.00	0.40	0.11
21	2.57	0.65	0.00	0.00	0.41	0.10
22	2.34	0.57	0.00	0.00	0.39	0.10

Table 124 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA-
NOT FOR PUBLICATION

RUN NO. 8523+1+4

SAMPLE NO. 40

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	2.12	0.49	0.00	0.00	0.37	0.09
24	1.90	0.42	0.00	0.00	0.32	0.07
25	1.71	0.36	0.00	0.00	0.28	0.06
26	1.50	0.31	0.00	0.00	0.24	0.05
27	1.34	0.26	0.00	0.00	0.20	0.04
28	1.15	0.22	0.00	0.00	0.19	0.04
29	0.98	0.18	0.00	0.00	0.14	0.03
30	0.87	0.16	0.00	0.00	0.11	0.02
31	0.76	0.13	0.00	0.00	0.08	0.01
32	0.65	0.11	0.00	0.00	0.05	0.01
33	0.65	0.11	0.00	0.00	0.03	0.00
34	0.56	0.09	0.00	0.00	0.01	0.00
35	0.57	0.09	0.00	0.00	0.00	0.00
36	0.50	0.07	0.00	0.00	0.00	0.00
37	0.40	0.06	0.00	0.00	0.00	0.00
38	0.31	0.04	0.00	0.00	0.00	0.00
39	0.24	0.03	0.00	0.00	0.00	0.00
40	0.15	0.02	0.00	0.00	0.00	0.00

TABLE 125

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
SENSITIVE DATA -
USE FOR PUBLICATION

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CATALYST : Co2(CO)8/Zr(OPr)4/AL2O3
SAMPLE No: 8523+1+4+43

REACTOR LOADING, MLS :	470.0	T, C :	282.1	FEED RATIO,	
CATALYST LOADING, WT% :	16.9	P, PSIG :	310	CO/H2:	1.48
TIME ON STREAM, HRS :	528.1	SV, L/G/HR:	1.86		

+++++

USAGE RATIO, CO/H2 :	0.58	BULK ACTIVITY,	
%OVERALL CONV., CO+H2 :	34.30	MOL SYNGAS/KG CAT/HR:	28.528
%CO CONV. :	21.19	SPECIFIC ACTIVITY,	
%H2 CONV. :	53.70	MOL CO/MOL METAL/MIN:	0.204

+++++

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	8.38	H2O:	10.12
OXYGENATES :	0.12	CO :	77.39
CO2 :	1.80	H2 :	2.19

+++++

HYDROCARBON SELECTIVITY, WT%:

C1 :	12.01	C4+ENE :	4.03
C2+ANE :	1.95	C5+C11 :	35.16
C2+ENE :	0.45	C12+C18:	23.71
C3+ANE :	0.97	C19+C23:	8.49
C3+ENE :	4.64	C24+34 :	6.81
C4 ISO+ANE:	1.25	C35+ :	0.52

+++++

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	35.16
DIESEL (C9+C25) :	48.90

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% ELEMENTAL RECOVERY:	CARBON :	96.77
	HYDROGEN:	99.30
	OXYGEN :	97.25

+++++

Table 126

HYDROCARBON PRODUCT DISTRIBUTIONCONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

RUN NO. 8523+1+4

SAMPLE NO. 43

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	12.01	48.09	0.00	0.00	0.00	0.00
2	1.95	4.17	0.45	1.03	0.00	0.00
3	0.97	1.41	4.64	7.08	0.00	0.00
4	1.25	1.38	4.03	4.61	0.00	0.00
5	1.85	1.65	4.44	4.07	0.20	0.18
6	4.82	3.59	0.57	0.44	0.00	0.00
7	1.90	1.22	1.50	0.98	0.78	0.50
8	1.83	1.03	1.56	0.89	1.14	0.64
9	1.85	0.93	2.04	1.04	1.55	0.78
10	1.70	0.77	1.73	0.79	1.64	0.74
11	1.62	0.66	1.18	0.49	1.26	0.52
12	1.56	0.59	0.99	0.38	0.93	0.35
13	1.52	0.53	0.83	0.29	0.91	0.32
14	1.54	0.50	0.68	0.22	0.89	0.29
15	1.59	0.48	0.51	0.16	0.88	0.26
16	2.15	0.61	0.00	0.00	0.88	0.25
17	2.62	0.70	0.00	0.00	1.20	0.32
18	2.69	0.68	0.00	0.00	1.34	0.34
19	1.97	0.47	0.00	0.00	0.52	0.12
20	1.51	0.34	0.00	0.00	0.31	0.07
21	1.29	0.28	0.00	0.00	0.26	0.06
22	1.15	0.24	0.00	0.00	0.23	0.05

Table 126 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523-1-4

SAMPLE NO. 43

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.04	0.21	0.00	0.00	0.21	0.04
24	0.93	0.18	0.00	0.00	0.19	0.04
25	0.84	0.15	0.00	0.00	0.17	0.03
26	0.74	0.13	0.00	0.00	0.14	0.02
27	0.66	0.11	0.00	0.00	0.12	0.02
28	0.57	0.09	0.00	0.00	0.10	0.02
29	0.49	0.08	0.00	0.00	0.08	0.01
30	0.43	0.06	0.00	0.00	0.07	0.01
31	0.37	0.05	0.00	0.00	0.05	0.01
32	0.31	0.04	0.00	0.00	0.04	0.01
33	0.27	0.04	0.00	0.00	0.02	0.00
34	0.22	0.03	0.00	0.00	0.01	0.00
35	0.16	0.02	0.00	0.00	0.01	0.00
36	0.12	0.01	0.00	0.00	0.01	0.00
37	0.08	0.01	0.00	0.00	0.01	0.00
38	0.05	0.01	0.00	0.00	0.01	0.00
39	0.03	0.00	0.00	0.00	0.01	0.00
40	0.03	0.00	0.00	0.00	0.00	0.00

TABLE 127

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CONTAINS POTENTIALLY
FATEFUL DATA-
NOT FOR PUBLICATION

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CATALYST : Co2(CO)8/Zr(OPr)4/Al2O3
SAMPLE No: 8523+1+4+47

REACTOR LOADING, MLS :	470.0	T, C :	282.0	FEED RATIO,	
CATALYST LOADING, WT%:	16.9	P, PSIG :	310	CO/H2:	1.95
TIME ON STREAM, HRS :	553.1	SV, L/G/HR:	1.85		

+++++

USAGE RATIO, CO/H2 :	0.56	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	27.33	MOL SYNGAS/KG CAT/HR:	22.582
%CO CONV.	14.80	SPECIFIC ACTIVITY,	
%H2 CONV.	51.62	MOL CO/MOL METAL/MIN:	0.157

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WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	5.90	H2O:	7.50
OXYGENATES :	0.07	CO :	83.29
CO2 :	1.51	H2 :	1.73

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HYDROCARBON SELECTIVITY, WT%:

C1 :	10.60	C4+ENE :	4.09
C2+ANE :	1.56	C5+C11 :	31.46
C2+ENE :	0.63	C12+C18:	26.51
C3+ANE :	0.63	C19+C23:	9.89
C3+ENE :	4.57	C24+34 :	8.09
C4 ISO+ANE:	0.86	C35+ :	1.12

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FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	31.46
DIESEL (C9+C25) :	52.56

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% ELEMENTAL RECOVERY:	CARBON :	97.97
	HYDROGEN:	98.46
	OXYGEN :	99.05

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Table 128
HYDROCARBON PRODUCT DISTRIBUTION

CONTAINS POTENTIALLY
 PATENTABLE DATA-
 NOT FOR PUBLICATION

RUN NO. 8523+1+4

SAMPLE NO. 47

CARBON NO.	N ^T ALKANES		1 ^T ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	10.60	46.09	0.00	0.00	0.00	0.00
2	1.56	3.62	0.63	1.56	0.00	0.00
3	0.63	1.00	4.57	7.57	0.00	0.00
4	0.86	1.03	4.09	5.08	0.00	0.00
5	1.32	1.28	4.45	4.43	0.06	0.06
6	1.34	3.51	0.44	0.36	0.00	0.00
7	1.47	1.03	1.48	1.05	0.57	0.40
8	1.40	0.85	1.44	0.89	0.83	0.51
9	1.40	0.76	1.96	1.08	1.24	0.68
10	1.38	0.68	1.89	0.94	1.57	0.77
11	1.22	0.54	1.46	0.66	1.54	0.69
12	1.50	0.62	1.29	0.53	1.50	0.61
13	1.51	0.57	1.12	0.43	1.17	0.44
14	1.52	0.53	0.97	0.34	1.14	0.40
15	1.55	0.51	0.79	0.26	1.12	0.37
16	2.27	0.70	0.00	0.00	1.14	0.35
17	2.53	0.73	0.00	0.00	1.15	0.33
18	2.85	0.78	0.00	0.00	1.37	0.37
19	2.28	0.59	0.00	0.00	0.76	0.20
20	1.73	0.43	0.00	0.00	0.32	0.08
21	1.50	0.35	0.00	0.00	0.25	0.06
22	1.35	0.30	0.00	0.00	0.23	0.05

Table 128 (Cont'd)

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8523+1+4

SAMPLE NO. 47

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.24	0.27	0.00	0.00	0.22	0.05
24	1.12	0.23	0.00	0.00	0.20	0.04
25	1.01	0.20	0.00	0.00	0.18	0.04
26	0.89	0.17	0.00	0.00	0.15	0.03
27	0.80	0.15	0.00	0.00	0.12	0.02
28	0.68	0.12	0.00	0.00	0.11	0.02
29	0.58	0.10	0.00	0.00	0.09	0.01
30	0.51	0.08	0.00	0.00	0.06	0.01
31	0.43	0.07	0.00	0.00	0.05	0.01
32	0.37	0.06	0.00	0.00	0.02	0.00
33	0.38	0.06	0.00	0.00	0.01	0.00
34	0.32	0.05	0.00	0.00	0.00	0.00
35	0.29	0.04	0.00	0.00	0.00	0.00
36	0.27	0.04	0.00	0.00	0.00	0.00
37	0.21	0.03	0.00	0.00	0.00	0.00
38	0.16	0.02	0.00	0.00	0.00	0.00
39	0.12	0.02	0.00	0.00	0.00	0.00
40	0.07	0.01	0.00	0.00	0.00	0.00

TABLE 129

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

POTENTIALLY
... DATA-
... ASSOCIATION

CATALYST : $\text{Co}_2(\text{CO})_8/\text{Zr}(\text{OPr})_4/\text{AL}_2\text{O}_3$
SAMPLE NO: 8523+1+4+50

REACTOR LOADING, MLS :	470.0	T, C :	221.6	FEED RATIO,	
CATALYST LOADING, WT%:	16.9	P, PSIG :	310	CO/H ₂ :	0.99
TIME ON STREAM, HRS :	625.6	SV, L/G/HR:	1.85		

USAGE RATIO, CO/H ₂ :	0.83	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	4.52	MOL SYNGAS/KG CAT/HR:	3.759
%CO CONV-	4.14	SPECIFIC ACTIVITY,	
%H ₂ CONV-	4.90	MOL CO/MOL METAL/MIN:	0.033

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	0.94	H ₂ O:	0.87
OXYGENATES :	0.01	CO :	91.52
CO ₂ :	0.10	H ₂ :	6.56

HYDROCARBON SELECTIVITY, WT%:

C1 :	15.73	C4+ENE :	4.70
C2+ANE :	2.45	C5+C11 :	21.25
C2+ENE :	0.00	C12+C18:	22.26
C3+ANE :	1.51	C19+C23:	23.48
C3+ENE :	6.28	C24+34 :	0.44
C4 ISO+ANE:	1.87	C35+ :	0.04

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	21.25
DIESEL (C9+C25) :	53.96

% ELEMENTAL RECOVERY:	CARBON :	97.86
	HYDROGEN:	98.80
	OXYGEN :	97.42

CONTAINS POTENTIALLY
PATENTABLE DATA -
NOT FOR PUBLICATION

Table 130

Gas Phase

Cobalt Source	Co(NO ₃) ₂		Co ₂ (CO) ₈
Wt% Co	4.25		3.55
Wt% Zr	7.07		6.19
Co/Zr Ratio	0.60		0.58
Batch No.	8466-2		7864-720-261
Conditions	← (1:1 CO/H ₂ , 300 psig) →		
GHSV, hr ⁻¹	1110	1100	1223
Temp., °C	263	240	240
Activation	<u>Syngas (1:1)</u>	<u>H₂</u>	<u>Syngas (1:1)</u>
Bulk Activity (mol syngas/kg cat/hr)	23.2	26.2	25.0
Specific Activity (mol CO/mol Co/min)	0.20	0.20	0.25
χ _{CO + H₂} (%)	34	38	42
χ _{CO} (%)	26	26	29
χ _{H₂} (%)	43	51	54
Wt% Selectivity			
C ₁	13	9	9
C ₂₋₄	9	8	12
C ₅₋₁₁	26	24	28
C ₁₂₋₁₈	26	24	29
C ₁₉₋₂₃	11	14	15
C ₂₄₊	15	20	7

Table 131

REPEATING POTENTIALLY
 INADEQUATE DATA -
 NOT FOR PUBLICATION

Chemisorption Data for Support Cobalt Catalysts

<u>Catalyst</u>	<u>B.E.T. Surface Area (m²/g)</u>	<u>Total H₂ Uptake (μmol/g)</u>	<u>Active Metal Surface Area (m²/g)</u>	<u>% Dispersion</u>
4.2% Co/Zr/Al ₂ O ₃ (ex. nitrate, batch # 8466-2)	219	9.1 @ 35°C 16.1 @ 100°	0.7 1.2	2.5 4.4
4.0% Co/Zr/Al ₂ O ₃ (ex. carbonyl, batch # 8466-4)	209	5.0 @ 35°	0.4	1.2
10.8% Co/Zr/Al ₂ O ₃ (ex. carbonyl, batch # 8466-9)	N.O.	82.7 @ 35° 101.3 @ 100° 96.3 @ 150°	5.0 5.4 4.1	7.9 9.7 9.2