

Table 1

Gas Phase Tests

Catalyst	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/Zr/SiO ₂	8466-55	4.1	6.8	7743-16-55	300	220	1000	1.0	0.44	33	20	46	21.0	0.16
					300	240	1000	1.0	0.44	67	42	91	42.5	0.31
					300	260	1000	1.1	0.61	74	53	96	49.9	0.45
					300	205	2000	0.35	0.49	11	13	10	13.5	0.11
					300	220	1500	0.53	0.48	25	23	26	23.7	0.18
Co/Zr/SiO ₂	8466-58	11.0	7.4	7743-27-58	300	205	2000	0.35	0.42	25	28	23	38.9	0.10
					300	220	1500	0.52	0.42	64	56	68	79.1	0.21
					300	220	1000	1.0	0.47	52	33	70	43.4	0.12
					300	240	1000	1.0	0.45	68	43	93	54.2	0.15
					300	260	1000	1.0	0.58	76	56	96	64.3	0.21
Co/Zr/SiO ₂	8466-63	14.4	10.2	7743-39-63	300	220	1050	1.0	0.51	39	26	53	20.8	0.05
					300	240	1050	1.0	0.54	56	38	74	29.8	0.07
					300	260	1050	1.0	0.56	67	40	80	36.0	0.09

Table 1 (Cont'd)

Gas Phase Tests

<u>Catalyst</u>	<u>Batch #</u>	<u>Gas Phase Run #</u>	<u>Selectivity, Wt%</u>						
			<u>C₁</u>	<u>C₂₋₄</u>	<u>C₅₋₁₁</u>	<u>C₁₂₋₁₈</u>	<u>C₁₉₋₂₃</u>	<u>C₂₄⁺</u>	<u>C₅₋₂₃</u>
Co/Zr/SiO ₂	0466-55	7743-16-55	10	25	30	15	6	6	59
			13	17	36	22	8	4	66
			17	14	23	21	10	14	54
			27	28	32	9	3	0.6	44
			17	19	23	13	11	17	47
Co/Zr/SiO ₂	0466-58	7743-27-50	20	19	20	13	11	10	44
			18	12	23	20	9	17	52
			9	12	22	22	12	24	56
			18	16	27	18	0	13	53
			22	17	22	15	10	13	47
Co/Zr/SiO ₂	0466-63	7743-39-63	17	22	29	14	11	0	54
			14	16	37	22	5	5	64
			18	17	28	18	9	9	55

Table 2

Effects of Surface Area - Gas Phase Tests

Surface Area:	210 m ² /g			209 m ² /g			316 m ² /g		
Batch No.:	Co/Zr/SiO ₂ (8466-55)			Co/Zr/Al ₂ O ₃ (8466-4)			Co/Zr/SiO ₂ (8466-18)		
% Co:	4.1			4.0			3.5		
% Zr:	<u>6.8</u>			<u>6.4</u>			<u>6.6</u>		
Co/Zr:	0.60			0.62			0.53		
Conditions:	All runs used 1:1 CO/H ₂ at 300 psig.								
GHSV, Hr ⁻¹ :	<u>1000</u>		<u>1068</u>	<u>1157</u>			<u>1000</u>		
Temp, °C:	<u>220</u>	<u>240</u>	<u>260</u>	<u>220</u>	<u>240</u>	<u>260</u>	<u>220</u>	<u>240</u>	<u>260</u>
Bulk Activity: (mol syngas/kg cat/hr)	21	42	50	13	26	34	31	55	74
Spec Activity: (mol CO/mol Co/min)	0.16	0.31	0.45	0.10	0.21	0.29	0.31	0.51	0.62
X _{CO + H₂} (%)	33	67	74	27	54	69	28	49	65
X _{CO}	20	42	53	16	33	46	20	33	40
X _{H₂}	46	91	96	37	76	94	35	63	88
Wt% Selectivity:									
C ₁	10	13	17	16	11	14	10	10	15
C ₂₋₄	25	17	14	31	16	13	23	15	16
C ₅₋₁₁	38	36	23	32	29	25	49	39	30
C ₁₂₋₁₈	15	22	21	8	22	23	16	25	21
C ₁₉₋₂₃	6	8	10	7	10	12	2	8	7
C ₂₄ ⁺	6	4	14	6	13	14	0.2	3	12
C ₅₋₂₃	59	66	54	47	61	60	67	72	58

TABLE 3

Effect of Metal Loading - Gas Phase Tests - 11.0% Co

BATCH NO.:	Co/Zr/SiO ₂ (8466-58)					Co/Zr/SiO ₂ (8466-18)			Co/Zr/Al ₂ O ₃ (8466)		
% Co :	11.0					3.5			10.8		
% Zr :	7.4					6.6			8.5		
Catalyst Charge, g:	5.64					3.94			7.73		
Activation:	HYDROGEN					HYDROGEN			HYDROGEN		
CO/H ₂ Feed:	0.35	0.52	1.0	1.0	1.0	1.0			1.0		
Pressure, psig:	300					300			300		
GHSV, hr ⁻¹ :	2000	1500	1000	1000	1000	1000			1043		
Temp., °C :	205	220	220	240	260	220	240	260	220	240	260
Bulk Activity: (mol syngas/kg cat/hr)	39	79	43	54	64	31	55	74	18	39	4
Specific Activity: (mol CO/mol Co/min)	0.10	0.21	0.12	0.15	0.21	.31	.51	.62	0.06	0.14	0.1
X CO+H ₂ , %	25	64	52	68	76	28	49	65	29	65	7
X CO	28	56	33	43	55	20	33	40	22	49	5
X H ₂	23	68	70	93	96	35	63	88	37	82	6
Wt.% Selectivity:											
C ₁	20	18	9	18	22	10	10	15	16	8	1
C ₂₋₄	19	12	12	16	17	23	15	16	22	12	1
C ₅₋₁₁	20	23	22	26	22	49	39	30	31	29	7
C ₁₂₋₁₈	13	20	22	18	15	16	25	21	14	24	1
C ₁₉₋₂₃	11	9	12	8	10	2	8	7	8	13	
C ₂₄₊	18	17	24	13	13	0.2	3	12	9	14	
C ₅₋₂₃	44	52	56	52	47	67	72	58	53	66	

TABLE 4

Effect of Metal Loading - Gas Phase Tests - 14.4% Co

Catalyst (No.):	Co/Zr/SiO ₂ (8466-63)			Co/Zr/SiO ₂ (8466-58)			Co/Zr/SiO ₂ (8466-18)		
% Co:	14.4			11.0			3.5		
% Zr:	10.2			7.4			6.6		
Charge, grams:	8.83			5.64			3.94		
Activation:	HYDROGEN			HYDROGEN			HYDROGEN		
CO/H ₂ Feed:	1.0			1.0			1.0		
Pressure, psig:	300			300			300		
GHSV, hr ⁻¹ :	1056			1000			1000		
Temp, °C:	<u>220</u>	<u>240</u>	<u>260</u>	<u>220</u>	<u>240</u>	<u>260</u>	<u>220</u>	<u>240</u>	<u>260</u>
Bulk Activity: (mol syngas/kg cat/hr)	21	30	36	43	54	64	31	55	74
Spec Activity: (mol CO/mol Co/min)	0.05	0.07	0.09	0.12	0.15	0.21	.31	.51	.62
X _{CO + H₂} (%)	39	56	67	52	68	76	28	49	65
X _{CO}	26	38	48	33	43	56	20	33	40
X _{H₂}	52	74	88	70	93	96	35	63	88
Wt% Selectivity:									
C ₁	17	14	12	9	18	22	10	10	15
C ₂₋₄	22	16	17	12	16	17	23	15	16
C ₅₋₁₁	29	37	28	22	26	22	49	39	30
C ₁₂₋₁₈	14	22	18	22	18	15	16	25	21
C ₁₉₋₂₃	11	5	9	12	8	10	2	8	7
C ₂₄₊	8	5	9	24	13	13	0.2	3	12
C ₅₋₂₃	53	64	56	56	52	47	67	72	58

TABLE 5

Analysis of Slurry-Phase Fischer-Tropsch Synthetic Diesel Fuel

		<u>Slurry-Phase Diesel Fuel Oil</u>		<u>ASTM Spec. for No. 1-D Diesel Fuel Oil</u>	
		<u>Sample HWB466-60</u> 260°C, CO/H ₂ =1.0 SV=2.0 L/G cat/hr	<u>Sample HWB466-54</u> 240°C, CO/H ₂ =0.5, SV=1.8 L/g ² cat/hr		
Reactor Conditions (both at 300 psig)				-	
Flash Point, PMCC	ASTM D93	176°F	178°F	100°F	(min.)
Visc/@100°F SUS	ASTM D88	35.1 sec	35.7 sec	34.4 sec	(max.)
Water & Sediment	ASTM D2709	trace	trace	0.05 vol-%	(max.)
Sulfur Content	ASTM D1552	0.03%	0.04%	0.5%	(max.)
Cloud Point	ASTM D2500	16°F	14°F	14°F	(max.)
Ash	ASTM D482	0.001%	0.002%	0.01%	(max.)
²⁷ Car. Res. Con on 10%	ASTM D189	0.010%	.020%	0.15%	(max.)
Corrosion 3 Hrs @ 212°F	ASTM D130	1A	1A	3	(max.)
Distillation:	ASTM D86				
Int. B. P.		385°F	400°F		
10% @		417°F	418°F		
50% @		465°F	461°F		
90% @		550°F	550°F	550°F	(max.)
End Point		580°F	576°F		
Recovery		98%	99%		
Cetane Index	ASTM D976	74.0	75.2	40	(min.)
Density @ 15°C	ASTM D1298	0.7695	0.7654		

TABLE 6

COMPARATIVE CATALYST TEST DATA - SLURRY TESTS

Catalyst/ Run No.	Composition ³ Mole %		P, psia	SV, L/g/hr	Feed CO/H ₂	Usage CO/H ₂	Conv. H ₂ /g	Conv. H ₂	Conv. CO	Bulk Activity mol syngas/ kg cat/hr	Specific Activity mol CO/ mol metal/min	Hydrocarbon Selectivity, %					Fuels			
	C ₁	C ₂ -C ₄										C ₅ -C ₁₁	C ₁₂ -C ₁₆	C ₁₉ -C ₂₁	C ₂₄	C ₅₋₂₃				
¹ Co ₂ (CO) ₈ / Zr(OPr) ₄ /Al ₂ O ₃ 7595-60-C48.4	Co	Zr	309	220.9	1.65	1.05	0.57	17.8	23.2	12.6	13.1	0.17	13.6	23.9	33.2	14.3	7.6	6.4	55.1	
			305	250.0	1.64	1.57	0.67	25.3	36.9	16.6	16.5	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	24.2	0.22	20.6	20.2	30.4	12.1	3.9	4.0	46.4	
¹ Ru ₃ (CO) ₁₂ / Zr(OPr) ₄ /Al ₂ O ₃ 7887-36-47B	Ru	Zr	316	241.1	2.04	1.67	0.95	7.5	10.6	5.7	6.8	0.20	9.7	11.5	12.2	20.5	16.5	27.6	51.2	
			607	281.6	2.04	1.77	0.67	25.4	45.4	14.2	23.2	0.51	14.6	13.6	37.1	20.1	9.1	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		300	239.4	2.06	1.50	0.67	16.7	25.1	11.1	15.4	6.13	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	10.4	10.7	64.0	
¹ FeCo ₃ (CO) ₁₂ / Al ₂ O ₃ 8385-22-677	Fe	Co	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	15.6	63.1	
			320	261.1	1.09	2.14	0.40	17.5	39.0	7.4	8.5	0.07	13.0	15.7	31.5	21.2	10.6	5.8	69.7	
			308	261.0	1.92	2.02	0.60	24.5	46.2	13.8	21.0	0.27	16.9	15.8	32.6	19.3	7.9	4.5	67.8	
¹ Co ₂ (CO) ₈ / Ti(OPr) ₄ /Al ₂ O ₃ 7888-1-589	Co	Ti	300	239	0.90	2.02	0.60	24.0	46.0	13.1	9.6	0.10	7.1	12.1	30.4	22.8	12.6	14.3	65.8	
			600	256	1.07	1.57	0.46	26.2	42.5	14.4	21.9	0.20	15.4	15.5	34.1	18.8	7.9	8.1	61.0	
			310	282	1.02	1.51	0.56	20.7	34.3	11.7	16.8	0.16	24.0	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	Zr	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	0.90	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 8385-60-707	Fe	Co	k	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	12.5	14.5	0.18	10.0	11.6	34.1	24.9	12.3	7.1	71.1
				296	262	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 8523-1-4	Co	Zr	302	241	2.0	0.99	0.51	42.5	56.0	29.0	35.1	0.29	7.9	13.7	32.0	23.4	8.9	9.1	69.3	
			307	298	2.0	1.48	0.53	34.5	56.0	19.9	28.7	0.24	7.2	10.8	34.1	27.9	8.6	11.4	70.6	
			302	260	1.0	1.67	0.5h	37.6	68.3	21.2	15.8	0.14	4.9	7.1	31.2	26.2	17.2	13.3	69.6	

¹Synthesis Gas Activation²H₂ Activation³-after activation

TABLE 6
 COMPARATIVE CATALYST TEST DATA
 (H₂ ACTIVATED CATALYSTS)

Catalyst/ Run No.	Composition, P,		P, psia	L _v , °C	SV, L/g/hr	Feed CO/H ₂	Usage CO/H ₂	Conv. H ₂ (CO)	Conv. H ₂	Conv. CO	Bulk Activity mol syngas/ kg cat/hr	Specific Activity mol CO/ mol metal/min	Hydrocarbon Selectivity H ₂ , RI						Fuels	
	Co wt.	Zr wt.											C ₁	C ₂ -C ₄	C ₅ -C ₁₁	C ₁₂ -C ₁₆	C ₁₉ -C ₂₃	C ₂₄ -C ₂₉	C ₃₀ -C ₃₃	
Co(NO ₃) ₂ /Zr(OPr) ₄ / Al ₂ O ₃ 7888-05-2	4.25	7.10	310	241	1.0	2.00	0.54	20.0	40.6	10.9	11.4	0.09	5.7	4.2	11.2	16.9	23.7	30.0	51.0	
			310	20	2.0	1.58	0.60	24.0	39.9	15.3	27.7	0.24	12.0	9.1	22.7	25.0	14.1	16.1	67.6	
			310	281	2.0	1.60	0.50	33.4	57.2	10.2	37.2	0.30	14.9	11.2	23.7	10.9	13.4	17.9	56.0	
Co ₂ (CO) ₈ /Zr(OPr) ₄ / Al ₂ O ₃ 8523-41-9	Co	Zr																		
	10.0	8.5	303	239	2.0	1.00	0.43	32.7	45.7	19.7	30.7	0.07	7.7	15.0	22.0	22.6	14.9	18.8	58.5	
			310	239	2.0	2.00	0.44	14.5	30.3	6.7	13.5	0.03	8.3	13.0	22.2	21.0	15.7	19.0	50.9	
Co ₂ (CO) ₈ /Zr(OPr) ₄ / SiO ₂ 8670-11-18	Co	Zr																		
	4.9	9.3	310	240	2.0	1.00	0.47	40.0	55.5	26.2	36.5	0.23	8.1	14.5	37.4	24.9	0.2	6.9	70.5	
			310	261	1.0	1.50	0.43	42.9	75.1	21.4	19.1	0.12	11.0	12.9	37.4	23.3	0.0	7.4	60.7	
Co ₂ (CO) ₈ /Zr(OPr) ₄ / Al ₂ O ₃ 8523-1-4	Co	Zr																		
	5.0	7.02	302	241	2.0	0.99	0.51	42.5	55.0	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	56.0	19.9	20.7	0.24	7.2	10.0	34.1	27.9	8.6	11.4	70.6	
Co ₂ (CO) ₈ /Fe ₃ (CO) ₁₂ / Zr(OPr) ₄ /SiO ₂ 8670-12-23	Co	Fe	Zr																	
	4.51	0.93	9.09	300	241	2.0	1.6	0.55	37.3	61.6	21.7	34.1	0.20	4.0	9.7	29.4	29.0	14.5	13.1	72.9
				300	261	2.0	1.0	0.30	33.9	46.4	21.4	30.3	0.16	13.1	19.0	39.7	17.1	5.5	4.0	62.3
			315	200	2.0	2.0	0.59	27.3	52.0	15.2	24.4	0.15	15.0	19.4	41.0	10.2	3.6	1.2	63.6	

TABLE 6 (CONTINUED)
COMPARATIVE CATALYST TEST DATA
(H₂ ACTIVATED CATALYSTS)

Catalyst/ Run No.	Composition, Wt.:	P, psig	T, °C	LV, L/g/hr	Feed CO/H ₂	Usage CO/H ₂	Σ Conv. H ₂ +CO	Σ Conv. H ₂	Σ Conv. CO	Bulk Activity mol syngas/ kg cat/hr	Specific Activity mol CO/ mol metal/min	Hydrocarbon Selectivity, HET						
												C ₁	C ₂ -C ₄	C ₅ -C ₁₁	C ₁₂ -C ₁₈	C ₁₉ -C ₂₃	C ₂₄ ⁺	C ₅ -23
Co ₂ (CO) ₈ /Zr(OPr) ₄ /HgO-3.6SiO ₂ 8670-60-25	<u>Co</u> <u>Zr</u>	301	240	2.0	1.0	0.45	24.4	33.7	15.1	21.8	0.138	10.5	19.4	28.9	24.8	8.3	8.1	62.0
	4.8 9.4	302	261	2.0	1.5	0.52	22.8	37.6	13.0	20.4	0.143	19.1	27.2	34.5	12.0	4.2	3.0	50.7
		300	260	2.0	2.0	0.52	18.0	35.8	9.2	16.0	0.112	17.8	27.4	33.9	14.3	4.9	1.7	53.1
Co ₂ (CO) ₈ /Ti (OPr) ₄ /SiO ₂ 8670-57-27	<u>Co</u> <u>Ti</u>	298	240	2.0	1.0	0.32	20.0	30.2	9.8	17.9	0.083	12.6	26.5	37.1	16.4	5.2	2.2	58.7
	5.2 4.8	300	261	2.0	1.0	0.58	33.0	41.8	24.2	29.5	0.206	15.3	13.7	29.6	21.3	10.6	9.6	61.5
		300	282	2.0	1.0	0.54	41.1	53.3	28.8	36.7	0.245	23.5	17.3	34.3	15.2	6.0	3.7	55.5
Co ₂ (CO) ₈ /Zr (OPr) ₄ /SiO ₂ Extended Test 8862-1-31	<u>Co</u> <u>Zr</u>	300	242	1.8	0.52	0.49	65.8	67.1	63.2	52.9	0.323	20.6	26.7	38.0	10.7	2.5	1.4	51.2
	5.3 10.2	300	260	2.0	1.0	0.53	53.9	70.4	37.4	48.1	0.312	13.2	14.4	41.7	18.9	7.5	4.2	68.1
		300	260	2.0	1.0	0.55	23.6	30.4	16.8	21.1	0.140	45.3	27.4	23.3	3.3	0.5	0.3	27.1
Ru ₃ (CO) ₁₂ /Zr (OPr) ₄ /SiO ₂ 8862-16-37	<u>Ru</u> <u>Zr</u>	300	240	2.0	1.0	0.25	5.8	9.4	2.3	5.2	0.042	11.1	7.3	13.9	20.4	20.5	26.7	54.8
	4.1 4.7	305	260	2.0	1.0	0.44	9.3	12.9	5.7	8.3	0.104	19.4	10.6	19.8	11.2	14.9	24.1	45.9
		300	262	1.0	1.0	0.21	6.8	11.3	2.3	3.0	0.021	25.4	15.6	19.0	7.7	11.2	21.1	37.9
Co ₂ (CO) ₈ /Zr (OPr) ₄ /SiO ₂ 8862-41-46	<u>Co</u> <u>Zr</u>	305	241	2.0	1.0	0.56	20.5	26.8	14.5	18.3	0.134	13.3	13.2	42.5	15.8	8.2	7.0	66.5
	4.8 2.7	295	262	2.0	0.96	0.45	39.8	53.7	25.2	35.5	0.223	15.5	11.6	36.0	19.5	8.7	8.7	64.2
		300	260	1.0	1.0	0.54	40.1	52.3	28.0	17.9	0.128	15.3	13.8	35.6	17.8	8.8	8.8	62.2

TABLE D (CONTINUED)
 COMPARATIVE CATALYST TEST DATA
 (H₂ ACTIVATED CATALYSTS)

Catalyst/ Run No.	Composition, Mts.	P, psia	T, °C	LV, L/g/hr	Feed CO/H ₂	Usage CO/H ₂	Z Conv. H ₂ +CO	X Conv. H ₂	Y Conv. CO	Dulk. Activity mol syngas/ kg cat/hr	Specific Activity mol CO/ mol metal/min	Hydrocarbon Selectivity, Wt%						
												C ₁	C ₂ -C ₄	C ₅ -C ₁₁	C ₁₂ -C ₁₈	C ₁₉ -C ₂₃	C ₂₄ ^a	C ₅₋₂₃
Co ₂ (CO) ₈ /SiO ₂ 8862-80-49	Co	300	241	2.0	1.1	0.53	8.6	11.6	5.8	7.7	0.053	14.7	16.7	38.6	21.5	7.9	0.5	68.0
		300	260	2.0	1.0	0.48	24.4	33.0	15.8	21.8	0.141	17.5	14.5	37.0	21.3	6.4	3.2	64.7
		290	260	1.0	1.0	0.52	23.3	37.2	19.4	12.6	0.087	11.0	16.5	39.7	18.0	4.9	10.0	62.6
Co ₂ (CO) ₈ /Zr (OPr) ₄ /SiO ₂ 9093-10-58	Co Zr	295	242	2.0	0.9	0.40	23.5	32.1	14.0	21.0	0.036	10.4	14.4	32.6	21.6	10.0	11.0	64.2
		290	261	2.0	1.0	0.54	35.1	46.8	25.4	32.2	0.068	11.6	11.8	34.2	22.8	0.2	11.4	65.2
		290	263	2.0	0.5	0.45	41.1	42.4	38.4	36.7	0.068	24.3	18.7	35.1	14.3	5.3	2.3	54.7

^aLast data point after 4417 hours of operation.

TABLE 7

Slurry Screening Summary

8862 - 80 - 49

17.8 wt% (80.1%) $\text{Co}_2(\text{CO})_8/\text{SiO}_2$

Sample No.	Time on Stream h	P psig	T °C	SV, NL/g cat/hr	$\Sigma \text{CO} + \text{H}_2$	ΣCO	ΣH_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 metal/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	41	300	240	2.0	35.4	32.6	36.8	0.49	0.44	31.6	0.192	12.3	11.1	28.5	25.2	11.1	11.8	64.8
6	136	300	241	1.0	36.5	33.5	38.0	0.49	0.43	16.3	0.099	15.1	15.4	48.1	18.8	1.8	0.9	68.7
9	208	295	240	1.0	13.6	8.1	19.0	1.0	0.42	6.1	0.036	8.8	12.3	42.4	32.6	3.3	0.7	75.0
12	304	300	241	2.0	8.6	5.8	11.6	1.1	0.53	7.7	0.053	14.7	16.7	38.6	21.5	7.9	0.5	68.0
15	376	300	260	2.0	24.4	15.8	33.0	1.0	0.48	21.8	0.141	17.5	14.5	37.0	21.3	6.4	3.2	64.7
18	472	290	260	1.0	28.3	19.4	37.2	1.0	0.52	12.6	0.087	11.0	16.5	39.7	18.0	4.9	10.0	62.6
21	544	300	262	1.0	30.1	28.6	30.8	0.49	0.46	13.4	0.084	13.2	19.1	38.5	20.3	4.8	4.1	67.7
23	664	300	262	2.0	20.2	18.8	21.0	0.49	0.44	18.1	0.111	13.6	18.3	43.4	18.8	4.5	1.3	66.7
27	737	290	242	1.0	29.5	30.9	28.8	0.49	0.53	13.2	0.091	17.3	29.2	25.3	11.8	8.2	8.2	45.3
30	809	290	281	1.0	31.2	20.9	41.5	1.0	0.50	13.9	0.093	14.9	23.5	31.2	16.2	7.1	7.1	54.5

TABLE 8

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/SILICA
SAMPLE No: 8862+80+49+3

REACTOR LOADING, MLS : 450.0 T, C : 240.0 FEED RATIO,
CATALYST LOADING, WT% : 17.8 P, PSIG : 300 CO/H2: 0.49
TIME ON STREAM, HRS : 41.0 SV, L/G/HR: 2.00

USAGE RATIO, CO/H2 : 0.44 BULK ACTIVITY,
%OVERALL CONV., CO+H2: 35.37 MOL SYNGAS/KG CAT/HR: 31.580
%CO CONV. : 32.56 SPECIFIC ACTIVITY,
%H2 CONV. : 36.75 MOL CO/MOL METAL/MIN: 0.192

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 15.57 H2O: 17.12
OXYGENATES : 0.38 CO : 56.80
CO2 : 2.40 H2 : 7.72

HYDROCARBON SELECTIVITY, WT%:

C1 : 12.31 C4+ENE : 2.26
C2+ANE : 1.57 C5+C11 : 28.52
C2+ENE : 0.00 C12+C18: 25.22
C3+ANE : 1.83 C19+C23: 11.11
C3+ENE : 2.74 C24+34 : 10.07
C4 ISO+ANE: 2.68 C35+ : 1.70

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 28.52
DIESEL (C9+C25) : 51.41

% ELEMENTAL RECOVERY: CARBON : 105.80
HYDROGEN: 100.33
OXYGEN : 102.97

TABLE 9

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 3

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	12.31	52.03	0.00	0.00	0.00	0.00
2	1.57	3.55	0.00	0.00	0.00	0.00
3	1.83	2.82	2.74	4.41	0.00	0.00
4	2.64	3.08	2.26	2.73	0.04	0.04
5	2.98	2.79	2.33	2.25	0.11	0.11
6	4.41	3.47	0.00	0.00	0.00	0.00
7	2.09	1.41	0.53	0.36	0.46	0.31
8	1.98	1.17	0.61	0.37	0.73	0.43
9	2.84	1.50	0.66	0.36	0.80	0.42
10	2.87	1.37	0.52	0.25	0.80	0.38
11	2.68	1.16	0.33	0.15	0.79	0.34
12	2.67	1.06	0.19	0.08	0.79	0.31
13	2.76	1.01	0.00	0.00	0.78	0.29
14	2.77	0.95	0.00	0.00	0.72	0.25
15	2.97	0.95	0.02	0.01	0.63	0.20
16	3.12	0.93	0.14	0.04	0.53	0.16
17	3.19	0.90	0.25	0.07	0.46	0.13
18	2.81	0.75	0.17	0.05	0.25	0.07
19	2.49	0.63	0.00	0.00	0.31	0.08
20	2.21	0.53	0.00	0.00	0.24	0.06
21	1.97	0.45	0.00	0.00	0.21	0.05
22	1.75	0.38	0.00	0.00	0.19	0.04

TABLE 9

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 3

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.56	0.33	0.00	0.00	0.17	0.03
24	1.37	0.27	0.00	0.00	0.11	0.02
25	1.23	0.24	0.00	0.00	0.07	0.01
26	1.08	0.20	0.00	0.00	0.00	0.00
27	1.10	0.20	0.00	0.00	0.00	0.00
28	1.06	0.18	0.00	0.00	0.00	0.00
29	0.69	0.11	0.00	0.00	0.05	0.01
30	0.60	0.10	0.00	0.00	0.04	0.01
31	0.61	0.09	0.00	0.00	0.15	0.02
32	0.44	0.07	0.00	0.00	0.11	0.02
33	0.48	0.07	0.00	0.00	0.11	0.02
34	0.62	0.09	0.00	0.00	0.13	0.02
35	0.56	0.08	0.00	0.00	0.00	0.00
36	0.45	0.06	0.00	0.00	0.00	0.00
37	0.34	0.04	0.00	0.00	0.00	0.00
38	0.13	0.02	0.00	0.00	0.00	0.00
39	0.11	0.01	0.00	0.00	0.00	0.00
40	0.11	0.01	0.00	0.00	0.00	0.00

TABLE 10

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

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CATALYST : Co/SILICA
SAMPLE NO: 8862+80+49+6

REACTOR LOADING, MLS :	450.0	T, C :	241.0	FEED RATIO,	
CATALYST LOADING, WT%:	17.8	P, PSIG :	300	CO/H2:	0.49
TIME ON STREAM, HRS :	136.0	SV, L/G/HR:	1.00		

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USAGE RATIO, CO/H2 :	0.43	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	36.51	MOL SYNGAS/KG CAT/HR:	16.308
%CO CONV-	33.52	SPECIFIC ACTIVITY,	
%H2 CONV-	37.99	MOL CO/MOL METAL/MIN:	0.099

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WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS :	13.69	H2O :	18.30
OXYGENATES :	0.32	CO :	58.58
CO2 :	1.19	H2 :	7.92

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HYDROCARBON SELECTIVITY, WT%:

C1 :	15.05	C4+ENE :	3.72
C2+ANE :	2.11	C5+C11 :	48.10
C2+ENE :	0.26	C12+C18:	18.76
C3+ANE :	1.90	C19+C23:	1.78
C3+ENE :	4.43	C24+34 :	0.81
C4 ISO+ANE:	2.98	C35+ :	0.12

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FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	48.10
DIESEL (C9+C25) :	37.84

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% ELEMENTAL RECOVERY:	CARBON :	97.91
	HYDROGEN:	96.45
	OXYGEN :	100.73

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TABLE II

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 6

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	15.05	50.49	0.00	0.00	0.00	0.00
2	2.11	3.77	0.26	0.51	0.00	0.00
3	1.90	2.32	4.43	5.66	0.00	0.00
4	2.94	2.73	3.72	3.57	0.03	0.03
5	3.44	2.57	4.07	3.12	0.21	0.16
6	10.25	6.40	0.00	0.00	0.00	0.00
7	4.47	2.40	1.67	0.91	0.75	0.40
8	3.41	1.61	1.47	0.70	1.29	0.61
9	4.33	1.82	1.51	0.64	1.29	0.54
10	3.66	1.38	1.03	0.40	1.10	0.42
11	2.73	0.94	0.53	0.19	0.86	0.30
12	2.49	0.79	0.32	0.10	0.80	0.25
13	2.48	0.72	0.00	0.00	0.73	0.21
14	2.25	0.61	0.00	0.00	0.67	0.18
15	2.13	0.54	0.00	0.00	0.60	0.15
16	2.16	0.51	0.01	0.00	0.54	0.13
17	1.85	0.41	0.04	0.01	0.45	0.10
18	1.03	0.22	0.03	0.01	0.16	0.03
19	0.58	0.12	0.00	0.00	0.07	0.01
20	0.40	0.08	0.00	0.00	0.03	0.01
21	0.28	0.05	0.00	0.00	0.02	0.00
22	0.21	0.04	0.00	0.00	0.02	0.00

TABLE 11

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 6

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.16	0.03	0.00	0.00	0.01	0.00
24	0.12	0.02	0.00	0.00	0.01	0.00
25	0.11	0.02	0.00	0.00	0.00	0.00
26	0.10	0.01	0.00	0.00	0.00	0.00
27	0.08	0.01	0.00	0.00	0.00	0.00
28	0.06	0.01	0.00	0.00	0.01	0.00
29	0.05	0.01	0.00	0.00	0.01	0.00
30	0.05	0.01	0.00	0.00	0.01	0.00
31	0.04	0.01	0.00	0.00	0.01	0.00
32	0.03	0.00	0.00	0.00	0.01	0.00
33	0.03	0.00	0.00	0.00	0.01	0.00
34	0.03	0.00	0.00	0.00	0.01	0.00
35	0.04	0.00	0.00	0.00	0.01	0.00
36	0.02	0.00	0.00	0.00	0.00	0.00
37	0.02	0.00	0.00	0.00	0.00	0.00
38	0.01	0.00	0.00	0.00	0.00	0.00
39	0.01	0.00	0.00	0.00	0.00	0.00
40	0.01	0.00	0.00	0.00	0.00	0.00

TABLE 12

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

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CATALYST : Co/SILICA
SAMPLE No: 8862+80+49+9

REACTOR LOADING, MLS :	450.0	T, C :	240.0	FEED RATIO,	
CATALYST LOADING, WT%:	17.8	P, PSIG :	295	CO/H2:	1.00
TIME ON STREAM, HRS :	208.0	SV, L/G/HR:	1.00		

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USAGE RATIO, CO/H2 :	0.42	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	13.55	MOL SYNGAS/KG CAT/HR:	6.055
%CO CONV.	8.08	SPECIFIC ACTIVITY,	
%H2 CONV.	19.01	MOL CO/MOL METAL/MIN:	0.036

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WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	5.49	H2O:	6.22
OXYGENATES :	0.07	CO :	82.61
CO2 :	0.42	H2 :	5.20

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HYDROCARBON SELECTIVITY, WT%:

C1 :	8.75	C4+ENE :	4.07
C2+ANE :	0.95	C5+C11 :	42.44
C2+ENE :	0.60	C12+C18:	32.58
C3+ANE :	0.85	C19+C23:	3.29
C3+ENE :	4.24	C24+34 :	0.63
C4 ISO+ANE:	1.55	C35+ :	0.07

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FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 42.44
DIESEL (C9+C25) : 54.80

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% ELEMENTAL RECOVERY: CARBON : 104.27
HYDROGEN: 105.66
OXYGEN : 103.33

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TABLE 13

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 9

CARBON NO.	N-ALKANES		1-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	8.75	39.18	0.00	0.00	0.00	0.00
2	0.95	2.27	0.60	1.54	0.00	0.00
3	0.85	1.38	4.24	7.24	0.00	0.00
4	1.55	1.91	4.07	5.20	0.00	0.00
5	1.85	1.85	4.27	4.37	0.13	0.12
6	7.07	5.90	0.00	0.00	0.23	0.19
7	3.11	2.23	2.04	1.50	0.00	0.00
8	2.35	1.48	1.74	1.11	0.95	0.60
9	2.82	1.58	2.16	1.23	1.10	0.62
10	2.90	1.46	1.92	0.99	1.49	0.75
11	3.27	1.50	1.50	0.70	1.55	0.71
12	3.37	1.42	1.17	0.50	1.29	0.54
13	3.22	1.25	0.79	0.31	1.21	0.47
14	3.65	1.32	0.00	0.00	1.14	0.41
15	3.50	1.18	0.00	0.00	1.07	0.36
16	3.51	1.11	0.00	0.00	0.94	0.30
17	3.54	1.06	0.00	0.00	0.89	0.27
18	2.65	0.75	0.00	0.00	0.65	0.18
19	1.39	0.37	0.00	0.00	0.31	0.08
20	0.64	0.16	0.00	0.00	0.08	0.02
21	0.37	0.09	0.00	0.00	0.03	0.01
22	0.25	0.06	0.00	0.00	0.02	0.00

TABLE 13
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862:80+49

SAMPLE NO. 9

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.18	0.04	0.00	0.00	0.01	0.00
24	0.13	0.03	0.00	0.00	0.01	0.00
25	0.09	0.02	0.00	0.00	0.01	0.00
26	0.08	0.01	0.00	0.00	0.00	0.00
27	0.06	0.01	0.00	0.00	0.01	0.00
28	0.04	0.01	0.00	0.00	0.01	0.00
29	0.03	0.01	0.00	0.00	0.01	0.00
30	0.03	0.00	0.00	0.00	0.01	0.00
31	0.02	0.00	0.00	0.00	0.01	0.00
32	0.02	0.00	0.00	0.00	0.01	0.00
33	0.02	0.00	0.00	0.00	0.01	0.00
34	0.02	0.00	0.00	0.00	0.01	0.00
35	0.01	0.00	0.00	0.00	0.01	0.00
36	0.01	0.00	0.00	0.00	0.00	0.00
37	0.01	0.00	0.00	0.00	0.00	0.00
38	0.01	0.00	0.00	0.00	0.00	0.00
39	0.01	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 14

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

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CATALYST : CO/SILICA
SAMPLE No: 8862+80+49+12

REACTOR LOADING, MLS :	450.0	T, C :	241.0	FEED RATIO,	
CATALYST LOADING, WT%:	17.8	P, PSIG :	300	CO/H2:	1.06
TIME ON STREAM, HRS :	304.0	SV, L/G/HR:	2.00		

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USAGE RATIO, CO/H2 :	0.53	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	8.61	MOL SYNGAS/KG CAT/HR:	7.695
%CO CONV. :	5.78	SPECIFIC ACTIVITY,	
%H2 CONV. :	11.62	MOL CO/MOL METAL/MIN:	0.053

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WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	2.61	H2O:	2.16
OXYGENATES :	0.01	CO :	89.34
CO2 :	0.24	H2 :	5.64

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HYDROCARBON SELECTIVITY, WT%:

C1 :	14.69	C4+ENE :	5.03
C2+ANE :	1.28	C5+C11 :	38.64
C2+ENE :	1.11	C12+C18:	21.50
C3+ANE :	1.17	C19+C23:	7.94
C3+ENE :	6.22	C24+34 :	0.48
C4 ISO+ANE:	1.92	C35+ :	0.03

+++++

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	38.64
DIESEL (C9+C25) :	39.99

+++++

% ELEMENTAL RECOVERY:	CARBON :	99.75
	HYDROGEN:	98.97
	OXYGEN :	98.10

+++++

TABLE 15

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 12

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	14.69	50.11	0.00	0.00	0.00	0.00
2	1.28	2.32	1.11	2.16	0.00	0.00
3	1.17	1.45	6.22	8.09	0.00	0.00
4	1.92	1.80	5.03	4.90	0.00	0.00
5	2.23	1.69	5.38	4.20	0.17	0.13
6	9.59	6.09	0.00	0.00	0.00	0.00
7	2.98	1.63	3.32	1.85	0.00	0.00
8	2.06	0.99	2.15	1.05	0.44	0.21
9	1.66	0.71	1.72	0.74	0.43	0.19
10	1.62	0.62	1.45	0.57	0.67	0.26
11	1.27	0.45	0.89	0.32	0.62	0.22
12	1.57	0.50	0.95	0.31	0.70	0.23
13	1.73	0.51	0.82	0.25	0.78	0.23
14	1.80	0.50	0.61	0.17	0.79	0.22
15	2.24	0.58	0.00	0.00	0.75	0.19
16	2.09	0.50	0.00	0.00	0.67	0.16
17	2.13	0.48	0.00	0.00	0.66	0.15
18	2.50	0.54	0.00	0.00	0.69	0.15
19	2.64	0.54	0.00	0.00	0.75	0.15
20	2.01	0.39	0.00	0.00	0.63	0.12
21	0.96	0.18	0.00	0.00	0.33	0.06
22	0.34	0.06	0.00	0.00	0.08	0.01

TABLE 15

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 12

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.18	0.03	0.00	0.00	0.01	0.00
24	0.12	0.02	0.00	0.00	0.01	0.00
25	0.08	0.01	0.00	0.00	0.01	0.00
26	0.06	0.01	0.00	0.00	0.00	0.00
27	0.04	0.01	0.00	0.00	0.00	0.00
28	0.03	0.00	0.00	0.00	0.00	0.00
29	0.03	0.00	0.00	0.00	0.00	0.00
30	0.02	0.00	0.00	0.00	0.00	0.00
31	0.01	0.00	0.00	0.00	0.01	0.00
32	0.01	0.00	0.00	0.00	0.01	0.00
33	0.01	0.00	0.00	0.00	0.01	0.00
34	0.01	0.00	0.00	0.00	0.01	0.00
35	0.01	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	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 16

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/SILICA
SAMPLE No: 8862+80+49+15

REACTOR LOADING, MLS :	450-0	T, C :	260-0	FEED RATIO,	
CATALYST LOADING, WT%:	17.8	P, PSIG :	300	CO/H2:	1.00
TIME ON STREAM, HRS :	376-0	SV, L/G/HR:	2.00		

USAGE RATIO, CO/H2 :	0-48	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	24.41	MOL SYNGAS/KG CAT/HR:	21-808
%CO CONV.	15.82	SPECIFIC ACTIVITY,	
%H2 CONV.	33.00	MOL CO/MOL METAL/MIN:	0.141

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	7.15	H2O:	10.45
OXYGENATES :	0.18	CO :	76.75
CO2 :	1.11	H2 :	4.36

HYDROCARBON SELECTIVITY, WT%:

C1 :	17.52	C4+ENE :	4.38
C2+ANE :	1.81	C5+C11 :	37.05
C2+ENE :	0.68	C12+C18:	21.30
C3+ANE :	1.00	C19+C23:	6.39
C3+ENE :	5.12	C24+34 :	2.90
C4 ISO+ANE:	1.54	C35+ :	0.29

FUEL FRACTIONS, wt%:

GASOLINE (C5+C11): 37.05
DIESEL (C9+C25) : 42.76

% ELEMENTAL RECOVERY: CARBON : 100.38
HYDROGEN: 103.81
OXYGEN : 103.68

TABLE 17

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 15

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	17.52	56.73	0.00	0.00	0.00	0.00
2	1.81	3.13	0.68	1.25	0.00	0.00
3	1.00	1.17	5.12	6.32	0.00	0.00
4	1.54	1.38	4.38	4.05	0.00	0.00
5	1.95	1.40	4.83	3.58	0.16	0.12
6	6.85	4.12	0.00	0.00	0.00	0.00
7	2.23	1.15	1.92	1.01	0.93	0.48
8	1.93	0.88	1.72	0.80	0.48	0.22
9	2.00	0.81	1.50	0.62	0.60	0.24
10	2.48	0.90	1.77	0.65	1.06	0.39
11	2.21	0.73	1.26	0.43	1.19	0.39
12	2.19	0.67	1.00	0.31	1.02	0.31
13	2.12	0.60	0.71	0.20	0.95	0.27
14	2.12	0.56	0.43	0.11	0.86	0.22
15	2.29	0.56	0.02	0.00	0.69	0.17
16	2.07	0.47	0.02	0.01	0.58	0.13
17	1.81	0.39	0.00	0.00	0.51	0.11
18	1.58	0.32	0.00	0.00	0.33	0.07
19	1.54	0.30	0.00	0.00	0.25	0.05
20	1.50	0.28	0.00	0.00	0.18	0.03
21	1.19	0.21	0.00	0.00	0.11	0.02
22	0.86	0.14	0.00	0.00	0.06	0.01

TABLE 17
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 15

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.66	0.11	0.00	0.00	0.04	0.01
24	0.52	0.08	0.00	0.00	0.03	0.00
25	0.43	0.06	0.00	0.00	0.02	0.00
26	0.35	0.05	0.00	0.00	0.02	0.00
27	0.28	0.04	0.00	0.00	0.02	0.00
28	0.23	0.03	0.00	0.00	0.03	0.00
29	0.19	0.02	0.00	0.00	0.03	0.00
30	0.16	0.02	0.00	0.00	0.03	0.00
31	0.14	0.02	0.00	0.00	0.03	0.00
32	0.11	0.01	0.00	0.00	0.03	0.00
33	0.10	0.01	0.00	0.00	0.03	0.00
34	0.09	0.01	0.00	0.00	0.03	0.00
35	0.07	0.01	0.00	0.00	0.02	0.00
36	0.05	0.01	0.00	0.00	0.01	0.00
37	0.04	0.00	0.00	0.00	0.01	0.00
38	0.03	0.00	0.00	0.00	0.01	0.00
39	0.02	0.00	0.00	0.00	0.01	0.00
40	0.01	0.00	0.00	0.00	0.01	0.00

TABLE 18

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/SILICA
SAMPLE No: 8862+80+49+18

REACTOR LOADING, MLS :	450.0	T, C :	260.0	FEED RATIO,	
CATALYST LOADING, WT%:	17.8	P, PSIG :	290	CO/H2:	1.00
TIME ON STREAM, HRS :	472.0	SV, L/G/HR:	1.00		

USAGE RATIO, CO/H2 :	0.52	BULK ACTIVITY,	
%OVERALL CONV-, CO+H2:	28.30	MOL SYNGAS/KG CAT/HR:	12.651
%CO CONV- :	19.42	SPECIFIC ACTIVITY,	
%H2 CONV- :	37.19	MOL CO/MOL METAL/MIN:	0.087

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	8.85	H2O:	10.44
OXYGENATES :	0.16	CO :	74.59
CO2 :	1.81	H2 :	4.15

HYDROCARBON SELECTIVITY, WT%:

C1 :	10.96	C4+ENE :	5.04
C2+ANE :	1.86	C5+C11 :	39.69
C2+ENE :	0.71	C12+C18:	17.95
C3+ANE :	1.18	C19+C23:	4.91
C3+ENE :	5.96	C24+34 :	7.95
C4 ISO+ANE:	1.75	C35+ :	2.06

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	39.69
DIESEL (C9+C25) :	39.70

% ELEMENTAL RECOVERY:	CARBON :	100.70
	HYDROGEN:	102.50
	OXYGEN :	100.71

TABLE 19

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 18

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	10.96	43.20	0.00	0.00	0.00	0.00
2	1.86	3.90	0.71	1.59	0.00	0.00
3	1.18	1.69	5.96	8.94	0.00	0.00
4	1.71	1.86	5.04	5.68	0.04	0.05
5	2.15	1.89	5.54	4.99	0.18	0.16
6	7.57	5.55	0.10	0.08	0.00	0.00
7	2.47	1.56	1.77	1.14	0.32	0.20
8	1.72	0.95	1.57	0.89	0.81	0.45
9	2.34	1.15	1.93	0.97	1.29	0.64
10	2.25	1.00	1.58	0.71	1.40	0.62
11	2.30	0.93	1.11	0.46	1.25	0.51
12	2.16	0.80	0.81	0.30	0.89	0.33
13	2.06	0.71	0.53	0.18	0.80	0.28
14	2.31	0.74	0.00	0.00	0.71	0.23
15	2.00	0.60	0.00	0.00	0.57	0.17
16	1.68	0.47	0.02	0.01	0.43	0.12
17	1.33	0.35	0.03	0.01	0.28	0.07
18	1.09	0.27	0.05	0.01	0.18	0.05
19	0.97	0.23	0.00	0.00	0.21	0.05
20	0.91	0.20	0.00	0.00	0.17	0.04
21	0.83	0.18	0.00	0.00	0.16	0.03
22	0.72	0.15	0.00	0.00	0.16	0.03

TABLE 19

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 18

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.62	0.12	0.00	0.00	0.15	0.03
24	0.55	0.10	0.00	0.00	0.16	0.03
25	0.58	0.10	0.00	0.00	0.10	0.02
26	0.58	0.10	0.00	0.00	0.13	0.02
27	0.53	0.09	0.00	0.00	0.23	0.04
28	0.52	0.08	0.00	0.00	0.29	0.05
29	0.48	0.07	0.00	0.00	0.32	0.05
30	0.46	0.07	0.00	0.00	0.35	0.05
31	0.43	0.06	0.00	0.00	0.34	0.05
32	0.37	0.05	0.00	0.00	0.34	0.05
33	0.34	0.05	0.00	0.00	0.30	0.04
34	0.32	0.04	0.00	0.00	0.25	0.03
35	0.29	0.04	0.00	0.00	0.22	0.03
36	0.24	0.03	0.00	0.00	0.18	0.02
37	0.20	0.02	0.00	0.00	0.17	0.02
38	0.16	0.02	0.00	0.00	0.14	0.02
39	0.14	0.02	0.00	0.00	0.11	0.01
40	0.12	0.01	0.00	0.00	0.10	0.01

TABLE 20

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/SILICA
SAMPLE No: 8862+80+49+21

REACTOR LOADING, MLS :	450.0	T, C :	262.0	FEED RATIO,	
CATALYST LOADING, WT%:	17.8	P, PSIG :	300	CO/H ₂ :	0.49
TIME ON STREAM, HRS :	544.0	SV, L/G/HR:	1.00		

USAGE RATIO, CO/H ₂ :	0.46	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	30.07	MOL SYNGAS/KG CAT/HR:	13.430
%CO CONV.	28.62	SPECIFIC ACTIVITY,	
%H ₂ CONV.	30.78	MOL CO/MOL METAL/MIN:	0.084

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	14.58	H ₂ O:	16.18
OXYGENATES :	0.32	CO :	58.58
CO ₂ :	2.11	H ₂ :	8.24

HYDROCARBON SELECTIVITY, WT%:

C1 :	13.18	C4+ENE :	4.84
C2+ANE :	2.88	C5+C11 :	38.50
C2+ENE :	0.71	C12+C18:	20.30
C3+ANE :	1.94	C19+C23:	4.84
C3+ENE :	6.27	C24+34 :	3.45
C4 ISO+ANE:	2.46	C35+ :	0.63

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	38.50
DIESEL (C9+C25) :	41.89

% ELEMENTAL RECOVERY:	CARBON :	108.03
	HYDROGEN:	105.10
	OXYGEN :	105.55

TABLE 21

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 21

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	13.18	46.46	0.00	0.00	0.00	0.00
2	2.88	5.42	0.71	1.43	0.00	0.00
3	1.94	2.48	6.27	8.42	0.00	0.00
4	2.38	2.31	4.84	4.87	0.09	0.08
5	2.49	1.95	4.55	3.66	0.23	0.18
6	7.56	4.96	0.13	0.09	0.00	0.00
7	2.26	1.28	1.34	0.77	0.72	0.41
8	1.56	0.77	1.01	0.51	0.83	0.41
9	2.30	1.01	1.34	0.60	1.23	0.54
10	2.60	1.03	1.48	0.60	1.68	0.67
11	2.59	0.93	1.03	0.38	1.57	0.57
12	2.34	0.78	0.70	0.24	1.09	0.36
13	2.18	0.67	0.43	0.13	0.93	0.29
14	2.32	0.66	0.00	0.00	0.82	0.23
15	2.19	0.58	0.02	0.00	0.71	0.19
16	1.99	0.50	0.04	0.01	0.58	0.14
17	1.70	0.40	0.00	0.00	0.53	0.12
18	1.33	0.30	0.00	0.00	0.41	0.09
19	1.05	0.22	0.00	0.00	0.32	0.07
20	0.89	0.18	0.00	0.00	0.24	0.05
21	0.75	0.14	0.00	0.00	0.20	0.04
22	0.60	0.11	0.00	0.00	0.17	0.03

TABLE 21

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 21

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.48	0.08	0.00	0.00	0.14	0.02
24	0.38	0.06	0.00	0.00	0.13	0.02
25	0.31	0.05	0.00	0.00	0.12	0.02
26	0.26	0.04	0.00	0.00	0.12	0.02
27	0.23	0.03	0.00	0.00	0.12	0.02
28	0.21	0.03	0.00	0.00	0.13	0.02
29	0.18	0.02	0.00	0.00	0.13	0.02
30	0.16	0.02	0.00	0.00	0.13	0.02
31	0.14	0.02	0.00	0.00	0.12	0.02
32	0.12	0.01	0.00	0.00	0.11	0.01
33	0.11	0.01	0.00	0.00	0.09	0.01
34	0.10	0.01	0.00	0.00	0.08	0.01
35	0.09	0.01	0.00	0.00	0.07	0.01
36	0.07	0.01	0.00	0.00	0.06	0.01
37	0.06	0.01	0.00	0.00	0.05	0.01
38	0.05	0.01	0.00	0.00	0.04	0.00
39	0.04	0.00	0.00	0.00	0.03	0.00
40	0.04	0.00	0.00	0.00	0.03	0.00

TABLE 22

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

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CATALYST : Co/SILICA
SAMPLE No: 8852+80+49+23

REACTOR LOADING, MLS :	450.0	T, C :	262.0	FEED RATIO,	
CATALYST LOADING, WT%:	17.8	P, PSIG :	300	CO/H2:	0.49
TIME ON STREAM, HRS :	664.0	SV, L/G/HR:	2.00		

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USAGE RATIO, CO/H2 :	0.44	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	20.25	MOL SYNGAS/KG CAT/HR:	18.083
%CO CONV-	18.80	SPECIFIC ACTIVITY,	
%H2 CONV-	20.96	MOL CO/MOL METAL/MIN:	0.111

+++++

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS :	10.26	H2O:	10.07
OXYGENATES :	0.14	CO :	68.59
CO2 :	1.26	H2 :	9.68

+++++

HYDROCARBON SELECTIVITY, WT%:

C1 :	13.63	C4+ENE :	4.80
C2+ANE :	2.52	C5+C11 :	43.45
C2+ENE :	0.88	C12+C18:	18.81
C3+ANE :	1.57	C19+C23:	4.50
C3+ENE :	6.39	C24+34 :	1.25
C4 ISO+ANE:	2.15	C35+ :	0.06

+++++

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	43.45
DIESEL (C9+C25) :	41.45

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% ELEMENTAL RECOVERY:	CARBON :	105.97
	HYDROGEN:	102.29
	OXYGEN :	101.75

+++++

TABLE 23

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862:80+49

SAMPLE NO. 23

CARBON NO.	N ⁺ ALKANES		I ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	13.63	46.95	0.00	0.00	0.00	0.00
2	2.52	4.63	0.88	1.74	0.00	0.00
3	1.57	1.97	6.39	8.38	0.00	0.00
4	2.07	1.97	4.80	4.72	0.08	0.07
5	2.28	1.75	4.88	3.85	0.20	0.15
6	8.08	5.18	0.00	0.00	0.00	0.00
7	2.82	1.56	1.90	1.07	0.73	0.40
8	2.13	1.03	1.73	0.85	1.06	0.51
9	2.66	1.15	1.99	0.87	1.46	0.63
10	3.08	1.19	1.92	0.76	1.58	0.61
11	2.50	0.88	1.33	0.48	1.10	0.39
12	2.23	0.72	0.96	0.31	0.98	0.32
13	2.02	0.60	0.64	0.19	0.84	0.25
14	1.81	0.51	0.39	0.11	0.71	0.20
15	1.86	0.48	0.00	0.00	0.60	0.16
16	1.62	0.40	0.00	0.00	0.51	0.12
17	1.46	0.34	0.01	0.00	0.45	0.10
18	1.31	0.28	0.00	0.00	0.38	0.08
19	1.17	0.24	0.00	0.00	0.31	0.06
20	0.90	0.18	0.00	0.00	0.19	0.04
21	0.72	0.13	0.00	0.00	0.13	0.02
22	0.53	0.09	0.00	0.00	0.11	0.02

TABLE 23
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 23

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.37	0.06	0.00	0.00	0.07	0.01
24	0.25	0.04	0.00	0.00	0.06	0.01
25	0.16	0.03	0.00	0.00	0.05	0.01
26	0.12	0.02	0.00	0.00	0.04	0.01
27	0.09	0.01	0.00	0.00	0.05	0.01
28	0.07	0.01	0.00	0.00	0.05	0.01
29	0.05	0.01	0.00	0.00	0.04	0.01
30	0.04	0.00	0.00	0.00	0.03	0.00
31	0.03	0.00	0.00	0.00	0.03	0.00
32	0.02	0.00	0.00	0.00	0.02	0.00
33	0.01	0.00	0.00	0.00	0.01	0.00
34	0.01	0.00	0.00	0.00	0.01	0.00
35	0.01	0.00	0.00	0.00	0.01	0.00
36	0.01	0.00	0.00	0.00	0.01	0.00
37	0.00	0.00	0.00	0.00	0.01	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 24

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co₂(CO)₈/SiO₂
SAMPLE NO: 8862+80+49+27

REACTOR LOADING, MLS :	450.0	T, C :	242.0	FEED RATIO,	
CATALYST LOADING, WT%:	17.8	P, PSIG :	290	CO/H ₂ :	0.49
TIME ON STREAM, HRS :	737.0	SV, L/G/HR:	1.00		

USAGE RATIO, CO/H ₂ :	0.53	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	29.50	MOL SYNGAS/KG CAT/HR:	13.175
%CO CONV-	30.93	SPECIFIC ACTIVITY,	
%H ₂ CONV-	28.79	MOL CO/MOL METAL/MIN:	0.091

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	6.73	H ₂ O:	8.07
OXYGENATES :	0.20	CO :	72.85
CO ₂ :	1.27	H ₂ :	10.89

HYDROCARBON SELECTIVITY, WT%:

C ₁ :	17.26	C ₄ +ENE :	6.68
C ₂ +ANE :	4.63	C ₅ +C ₁₁ :	25.29
C ₂ +ENE :	1.70	C ₁₂ +C ₁₈ :	11.84
C ₃ +ANE :	2.84	C ₁₉ +C ₂₃ :	8.19
C ₃ +ENE :	10.08	C ₂₄ +34 :	7.76
C ₄ ISO+ANE:	3.27	C ₃₅ +	0.45

FUEL FRACTIONS, WT%:

GASOLINE (C ₅ +C ₁₁):	25.29
DIESEL (C ₉ +C ₂₅) :	28.68

% ELEMENTAL RECOVERY:	CARBON :	82.40
	HYDROGEN:	84.76
	OXYGEN :	82.60

TABLE 25

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 27

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	17.26	50.00	0.00	0.00	0.00	0.00
2	4.63	7.15	1.70	2.82	0.00	0.00
3	2.84	2.99	10.08	11.12	0.00	0.00
4	3.27	2.62	6.68	5.53	0.00	0.00
5	2.91	1.88	5.11	3.39	0.55	0.35
6	5.41	2.91	0.00	0.00	0.00	0.00
7	1.26	0.58	0.81	0.38	1.03	0.48
8	0.75	0.30	0.53	0.22	0.80	0.33
9	0.72	0.26	0.41	0.15	0.69	0.25
10	1.00	0.33	0.49	0.16	0.67	0.22
11	1.12	0.33	0.42	0.13	0.60	0.18
12	1.22	0.33	0.36	0.10	0.47	0.13
13	1.17	0.29	0.26	0.07	0.39	0.10
14	1.29	0.30	0.21	0.05	0.11	0.02
15	1.24	0.27	0.01	0.00	0.27	0.06
16	1.25	0.26	0.02	0.00	0.26	0.05
17	1.32	0.25	0.04	0.01	0.27	0.05
18	1.37	0.25	0.00	0.00	0.33	0.06
19	1.39	0.24	0.00	0.00	0.32	0.06
20	1.39	0.23	0.00	0.00	0.29	0.05
21	1.39	0.22	0.00	0.00	0.29	0.05
22	1.32	0.20	0.00	0.00	0.31	0.05

TABLE 25
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO- 27

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.18	0.17	0.00	0.00	0.30	0.04
24	1.04	0.14	0.00	0.00	0.29	0.04
25	0.89	0.12	0.00	0.00	0.29	0.04
26	0.77	0.10	0.00	0.00	0.31	0.04
27	0.64	0.08	0.00	0.00	0.34	0.04
28	0.52	0.06	0.00	0.00	0.32	0.04
29	0.39	0.04	0.00	0.00	0.30	0.03
30	0.30	0.03	0.00	0.00	0.26	0.03
31	0.22	0.02	0.00	0.00	0.20	0.02
32	0.15	0.02	0.00	0.00	0.16	0.02
33	0.11	0.01	0.00	0.00	0.11	0.01
34	0.08	0.01	0.00	0.00	0.08	0.01
35	0.06	0.01	0.00	0.00	0.06	0.01
36	0.05	0.00	0.00	0.00	0.05	0.00
37	0.04	0.00	0.00	0.00	0.04	0.00
38	0.03	0.00	0.00	0.00	0.03	0.00
39	0.02	0.00	0.00	0.00	0.03	0.00
40	0.02	0.00	0.00	0.00	0.02	0.00

TABLE 26

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

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CATALYST : Co₂(CO)₈/SiO₂
SAMPLE No: 8862+80+49+30

REACTOR LOADING, MLS :	450.0	T, C :	281.0	FEED RATIO,	
CATALYST LOADING, WT%:	17.8	P, PSIG :	290	CO/H ₂ :	1.00
TIME ON STREAM, HRS :	809.0	SV, L/G/HR:	1.00		

+++++

USAGE RATIO, CO/H ₂ :	0.50	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	31.19	MOL SYNGAS/KG CAT/HR:	13.944
%CO CONV.	20.87	SPECIFIC ACTIVITY,	
%H ₂ CONV.	41.52	MOL CO/MOL METAL/MIN:	0.093

+++++

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	8.46	H ₂ O:	17.31
OXYGENATES :	0.26	CO :	65.40
CO ₂ :	5.11	H ₂ :	3.45

+++++

HYDROCARBON SELECTIVITY, WT%:

C1 :	14.88	C4+ENE :	6.65
C2+ANE :	3.70	C5+C11 :	31.22
C2+ENE :	1.17	C12+C18:	16.22
C3+ANE :	1.73	C19+C23:	7.11
C3+ENE :	8.03	C24+34 :	6.65
C4 ISO+ANE:	2.20	C35+ :	0.46

+++++

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	31.22
DIESEL (C9+C25) :	34.35

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% ELEMENTAL RECOVERY:	CARBON :	103.32
	HYDROGEN:	115.79
	OXYGEN :	119.78

+++++

TABLE 27
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 30

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	14.88	47.95	0.00	0.00	0.00	0.00
2	3.70	6.35	1.17	2.15	0.00	0.00
3	1.73	2.03	8.03	9.85	0.00	0.00
4	2.20	1.95	6.65	6.13	0.00	0.00
5	2.70	1.94	6.51	4.80	0.27	0.19
6	6.44	3.86	0.11	0.07	0.00	0.00
7	3.19	1.65	0.26	0.14	0.36	0.19
8	2.29	1.04	0.19	0.09	0.34	0.16
9	2.24	0.90	0.16	0.06	0.43	0.18
10	2.22	0.81	0.16	0.06	0.48	0.18
11	2.11	0.70	0.13	0.04	0.61	0.20
12	2.36	0.72	0.01	0.00	0.79	0.24
13	2.18	0.61	0.01	0.00	0.80	0.22
14	1.88	0.49	0.00	0.00	0.70	0.18
15	1.60	0.39	0.06	0.02	0.53	0.13
16	1.41	0.32	0.00	0.00	0.51	0.12
17	1.28	0.28	0.00	0.00	0.45	0.10
18	1.23	0.25	0.00	0.00	0.42	0.09
19	1.16	0.22	0.00	0.00	0.40	0.08
20	1.07	0.20	0.00	0.00	0.36	0.07
21	1.03	0.18	0.00	0.00	0.34	0.06
22	1.03	0.17	0.00	0.00	0.34	0.06

TABLE 27
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+80+49

SAMPLE NO. 30

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.02	0.16	0.00	0.00	0.36	0.06
24	0.96	0.15	0.00	0.00	0.38	0.06
25	0.80	0.12	0.00	0.00	0.34	0.05
26	0.68	0.10	0.00	0.00	0.33	0.05
27	0.53	0.07	0.00	0.00	0.28	0.04
28	0.40	0.05	0.00	0.00	0.24	0.03
29	0.30	0.04	0.00	0.00	0.19	0.02
30	0.22	0.03	0.00	0.00	0.15	0.02
31	0.17	0.02	0.00	0.00	0.12	0.01
32	0.13	0.02	0.00	0.00	0.09	0.01
33	0.11	0.01	0.00	0.00	0.08	0.01
34	0.09	0.01	0.00	0.00	0.06	0.01
35	0.11	0.01	0.00	0.00	0.05	0.01
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	0.06	0.01	0.00	0.00	0.00	0.00
39	0.05	0.00	0.00	0.00	0.00	0.00
40	0.02	0.00	0.00	0.00	0.00	0.00

TABLE 29

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+HIGH LOAD
SAMPLE No: 9093+10+58+2

REACTOR LOADING, MLS : 460.0 T, C : 244-0 FEED RATIO,
CATALYST LOADING, WT%: 19.6 P, PSIG : 295 CO/H2: 0.49
TIME ON STREAM, HRS : 66-0 SV, L/G/HR: 2.00

USAGE RATIO, CO/H2 : 0.46 BULK ACTIVITY,
%OVERALL CONV-, CO+H2: 31.87 MOL SYNGAS/KG CAT/HR: 28.456
%CO CONV- : 30.49 SPECIFIC ACTIVITY,
%H2 CONV- : 32.54 MOL CO/MOL METAL/MIN: 0.054

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 12.42 H2O: 18.74
OXYGENATES : 0.49 CO : 59.55
CO2 : 0.42 H2 : 8.38

HYDROCARBON SELECTIVITY, WT%:

C1 : 15.71 C4+ENE : 2.88
C2+ANE : 2.78 C5+C11 : 30.80
C2+ENE : 0.00 C12+C18: 17.72
C3+ANE : 3.55 C19+C23: 6.26
C3+ENE : 3.10 C24+34 : 10.62
C4 ISO+ANE: 4.62 C35+ : 1.95

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 30.80
DIESEL (C9+C25) : 37.47

% ELEMENTAL RECOVERY: CARBON : 98.46
HYDROGEN: 101.83
OXYGEN : 104.58

TABLE 30
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 9093+10+58

SAMPLE NO. 2

CARBON NO.	N ⁺ ALKANES		I ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	15.71	54.31	0.00	0.00	0.00	0.00
2	2.78	5.13	0.00	0.00	0.00	0.00
3	3.55	4.46	3.10	4.08	0.00	0.00
4	4.52	4.31	2.88	2.84	0.10	0.10
5	4.66	3.58	2.23	1.76	0.28	0.21
6	5.97	3.84	0.00	0.00	0.00	0.00
7	3.01	1.66	0.20	0.11	0.07	0.04
8	2.19	1.06	0.16	0.08	0.13	0.06
9	3.63	1.57	0.00	0.00	0.20	0.09
10	3.94	1.53	0.00	0.00	0.39	0.15
11	3.34	1.18	0.00	0.00	0.40	0.14
12	2.80	0.91	0.20	0.07	0.35	0.11
13	2.57	0.77	0.15	0.04	0.31	0.09
14	2.47	0.69	0.00	0.00	0.27	0.07
15	2.24	0.58	0.00	0.00	0.23	0.06
16	2.00	0.49	0.00	0.00	0.21	0.05
17	1.83	0.42	0.00	0.00	0.23	0.05
18	1.65	0.36	0.00	0.00	0.21	0.05
19	1.49	0.31	0.00	0.00	0.26	0.05
20	1.22	0.24	0.00	0.00	0.20	0.04
21	0.98	0.18	0.00	0.00	0.21	0.04
22	0.81	0.14	0.00	0.00	0.22	0.04

TABLE 30
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 9093+10+58

SAMPLE NO. 2

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.66	0.11	0.00	0.00	0.22	0.04
24	0.56	0.09	0.00	0.00	0.23	0.04
25	0.53	0.08	0.00	0.00	0.27	0.04
26	0.54	0.08	0.00	0.00	0.34	0.05
27	0.57	0.08	0.00	0.00	0.43	0.06
28	0.61	0.09	0.00	0.00	0.48	0.07
29	0.58	0.08	0.00	0.00	0.52	0.07
30	0.55	0.07	0.00	0.00	0.58	0.08
31	0.55	0.07	0.00	0.00	0.51	0.06
32	0.46	0.06	0.00	0.00	0.49	0.06
33	0.42	0.05	0.00	0.00	0.40	0.05
34	0.67	0.08	0.00	0.00	0.34	0.04
35	0.55	0.06	0.00	0.00	0.00	0.00
36	0.48	0.05	0.00	0.00	0.00	0.00
37	0.36	0.04	0.00	0.00	0.00	0.00
38	0.26	0.03	0.00	0.00	0.00	0.00
39	0.20	0.02	0.00	0.00	0.00	0.00
40	0.11	0.01	0.00	0.00	0.00	0.00

TABLE 31

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+HIGH LOAD
SAMPLE No: 9093+10+58+4

REACTOR LOADING, MLS :	460.0	T, C :	242.0	FEED RATIO,	
CATALYST LOADING, WT%:	19.6	P, PSIG :	295	CO/H2:	0.90
TIME ON STREAM, HRS :	189.0	SV, L/G/HR:	2.00		

USAGE RATIO, CO/H2 :	0.40	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	23.53	MOL SYNGAS/KG CAT/HR:	21.021
%CO CONV.	14.04	SPECIFIC ACTIVITY,	
%H2 CONV.	32.12	MOL CO/MOL METAL/MIN:	0.036

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS :	4.34	H2O:	8.47
OXYGENATES :	0.11	CO :	81.74
CO2 :	0.25	H2 :	5.09

HYDROCARBON SELECTIVITY, WT%:

C1 :	10.35	C4+ENE :	4.45
C2+ANE :	1.92	C5+C11 :	32.61
C2+ENE :	0.00	C12+C18:	21.58
C3+ANE :	1.43	C19+C23:	9.96
C3+ENE :	4.43	C24+34 :	9.38
C4 ISO+ANE:	2.22	C35+ :	1.67

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	32.61
DIESEL (C9+C25) :	46.60

% ELEMENTAL RECOVERY:	CARBON :	95.16
	HYDROGEN:	90.01
	OXYGEN :	100.22

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 9093+10+58

SAMPLE NO. 4

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	10.35	44.39	0.00	0.00	0.00	0.00
2	1.92	4.40	0.00	0.00	0.00	0.00
3	1.43	2.23	4.43	7.24	0.00	0.00
4	2.22	2.63	4.45	5.46	0.00	0.00
5	2.41	2.30	4.20	4.12	0.24	0.23
6	6.03	4.81	0.07	0.05	0.00	0.00
7	2.75	1.89	0.80	0.56	0.10	0.07
8	2.15	1.29	0.74	0.45	0.17	0.10
9	3.04	1.63	0.67	0.37	0.49	0.26
10	4.09	1.98	0.00	0.00	0.60	0.29
11	2.63	1.16	1.00	0.44	0.42	0.19
12	2.39	0.96	0.96	0.39	0.40	0.16
13	2.28	0.85	0.84	0.32	0.38	0.14
14	2.21	0.77	0.69	0.24	0.36	0.12
15	2.13	0.69	0.54	0.18	0.32	0.10
16	2.23	0.68	0.38	0.12	0.18	0.06
17	2.26	0.65	0.21	0.06	0.18	0.05
18	2.22	0.60	0.09	0.02	0.33	0.09
19	2.18	0.56	0.00	0.00	0.43	0.11
20	1.95	0.47	0.00	0.00	0.35	0.08
21	1.67	0.39	0.00	0.00	0.33	0.08
22	1.38	0.31	0.00	0.00	0.31	0.07

TABLE 32

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 9093+10+58

SAMPLE NO. 4

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	1.11	0.23	0.00	0.00	0.26	0.06
24	0.89	0.18	0.00	0.00	0.25	0.05
25	0.74	0.14	0.00	0.00	0.24	0.05
26	0.65	0.12	0.00	0.00	0.26	0.05
27	0.62	0.11	0.00	0.00	0.30	0.05
28	0.57	0.10	0.00	0.00	0.33	0.06
29	0.52	0.09	0.00	0.00	0.34	0.06
30	0.49	0.08	0.00	0.00	0.35	0.06
31	0.47	0.07	0.00	0.00	0.31	0.05
32	0.40	0.06	0.00	0.00	0.30	0.05
33	0.38	0.06	0.00	0.00	0.25	0.04
34	0.52	0.07	0.00	0.00	0.21	0.03
35	0.45	0.06	0.00	0.00	0.00	0.00
36	0.39	0.05	0.00	0.00	0.00	0.00
37	0.33	0.04	0.00	0.00	0.00	0.00
38	0.26	0.03	0.00	0.00	0.00	0.00
39	0.17	0.02	0.00	0.00	0.00	0.00
40	0.07	0.01	0.00	0.00	0.00	0.00

TABLE 33

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+HIGH LOAD
SAMPLE NO: 9093+10+58+7

REACTOR LOADING, MLS :	460.0	T, C :	261.0	FEED RATIO,	
CATALYST LOADING, WT%:	19.6	P, PSIG :	290	CO/H2:	1.00
TIME ON STREAM, HRS :	260.0	SV, L/G/HR:	2.00		

USAGE RATIO, CO/H2 :	0.54	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	36.08	MOL SYNGAS/KG CAT/HR:	32.233
%CO CONV-	25.40	SPECIFIC ACTIVITY,	
%H2 CONV-	46.76	MOL CO/MOL METAL/MIN:	0.068

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	9.51	H2O:	13.04
OXYGENATES :	0.24	CO :	72.80
CO2 :	0.70	H2 :	3.71

HYDROCARBON SELECTIVITY, WT%:

C1 :	11.60	C4+ENE :	3.00
C2+ANE :	1.88	C5+C11 :	34.20
C2+ENE :	0.00	C12+C18:	22.78
C3+ANE :	1.56	C19+C23:	8.17
C3+ENE :	3.23	C24+34 :	9.35
C4 ISO+ANE:	2.11	C35+ :	2.12

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	34.20
DIESEL (C9+C25) :	46.75

% ELEMENTAL RECOVERY:	CARBON :	94.30
	HYDROGEN:	96.95
	OXYGEN :	96.47

TABLE 34
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 9093+10+58

SAMPLE NO. 7

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	11.60	48.64	0.00	0.00	0.00	0.00
2	1.88	4.20	0.00	0.00	0.00	0.00
3	1.56	2.38	3.23	5.16	0.00	0.00
4	2.07	2.39	3.00	3.59	0.04	0.05
5	2.45	2.29	3.14	3.01	0.00	0.00
6	7.23	5.64	0.14	0.11	0.00	0.00
7	3.16	2.12	0.70	0.48	0.22	0.15
8	2.42	1.43	0.60	0.36	0.31	0.18
9	3.96	2.08	0.00	0.00	0.75	0.39
10	4.09	1.93	0.00	0.00	0.84	0.40
11	2.74	1.18	0.83	0.30	0.62	0.27
12	2.52	0.99	0.78	0.31	0.64	0.25
13	2.41	0.88	0.66	0.24	0.60	0.22
14	2.36	0.80	0.51	0.18	0.60	0.20
15	2.27	0.72	0.36	0.12	0.58	0.18
16	2.23	0.66	0.20	0.06	0.57	0.17
17	2.21	0.62	0.13	0.04	0.49	0.14
18	2.11	0.56	0.00	0.00	0.55	0.15
19	1.84	0.46	0.00	0.00	0.44	0.11
20	1.50	0.36	0.00	0.00	0.36	0.09
21	1.24	0.28	0.00	0.00	0.31	0.07
22	1.05	0.23	0.00	0.00	0.28	0.06

TABLE 34

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO- 9093+10+58

SAMPLE NO- 7

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.91	0.19	0.00	0.00	0.24	0.05
24	0.80	0.16	0.00	0.00	0.23	0.05
25	0.72	0.14	0.00	0.00	0.22	0.04
26	0.66	0.12	0.00	0.00	0.23	0.04
27	0.64	0.11	0.00	0.00	0.28	0.05
28	0.62	0.11	0.00	0.00	0.28	0.05
29	0.57	0.09	0.00	0.00	0.29	0.05
30	0.53	0.08	0.00	0.00	0.30	0.05
31	0.51	0.08	0.00	0.00	0.29	0.04
32	0.46	0.07	0.00	0.00	0.27	0.04
33	0.43	0.06	0.00	0.00	0.23	0.03
34	0.56	0.08	0.00	0.00	0.20	0.03
35	0.50	0.07	0.00	0.00	0.00	0.00
36	0.45	0.06	0.00	0.00	0.00	0.00
37	0.38	0.05	0.00	0.00	0.00	0.00
38	0.32	0.04	0.00	0.00	0.00	0.00
39	0.28	0.03	0.00	0.00	0.00	0.00
40	0.19	0.02	0.00	0.00	0.00	0.00

TABLE 35

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+HIGH LOAD
SAMPLE No: 9093+10+58+10

REACTOR LOADING, MLS :	460.0	T, C :	263.0	FEED RATIO,	
CATALYST LOADING, WT% :	19.6	P, PSIG :	290	CC/H2 :	0.50
TIME ON STREAM, HRS :	354.0	SV, L/G/HR :	2.00		

USAGE RATIO, CO/H2 :	0.45	BULK ACTIVITY,	
%OVERALL CONV., CO+H2 :	41.08	MOL SYNGAS/KG CAT/HR :	36.674
%CO CONV. :	38.35	SPECIFIC ACTIVITY,	
%H2 CONV. :	42.45	MOL CO/MOL METAL/MIN :	0.058

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS :	15.66	H2O :	20.78
OXYGENATES :	0.69	CO :	54.51
CO2 :	1.09	H2 :	7.28

HYDROCARBON SELECTIVITY, WT%.

C1 :	24.25	C4+ENE :	2.45
C2+ANE :	3.84	C5+C11 :	35.14
C2+ENE :	0.00	C12+C18 :	14.34
C3+ANE :	4.67	C19+C23 :	5.30
C3+ENE :	2.26	C24+34 :	2.17
C4 ISO+ANE :	5.44	C35+ :	0.12

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11) :	35.14
DIESEL (C9+C25) :	32.54

% ELEMENTAL RECOVERY:	CARBON :	97.05
	HYDROGEN :	99.00
	OXYGEN :	100.37

TABLE 36

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 9093+10+58

SAMPLE NO. 10

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	24.25	63.30	0.00	0.00	0.00	0.00
2	3.84	5.35	0.00	0.00	0.00	0.00
3	4.67	4.43	2.26	2.25	0.00	0.00
4	5.35	3.85	2.45	1.83	0.09	0.07
5	5.44	3.16	1.74	1.04	0.33	0.19
6	8.32	4.04	0.11	0.05	0.00	0.00
7	3.99	1.67	0.20	0.08	0.00	0.00
8	2.72	1.00	0.13	0.05	0.19	0.07
9	4.16	1.36	0.00	0.00	0.51	0.17
10	3.47	1.02	0.00	0.00	0.57	0.17
11	2.77	0.74	0.00	0.00	0.50	0.13
12	2.43	0.60	0.00	0.00	0.45	0.11
13	2.13	0.48	0.00	0.00	0.40	0.09
14	1.84	0.39	0.00	0.00	0.34	0.07
15	1.61	0.32	0.00	0.00	0.29	0.06
16	1.46	0.27	0.00	0.00	0.24	0.04
17	1.39	0.24	0.00	0.00	0.22	0.04
18	1.33	0.22	0.00	0.00	0.23	0.04
19	1.21	0.19	0.00	0.00	0.23	0.04
20	1.04	0.15	0.00	0.00	0.22	0.03
21	0.86	0.12	0.00	0.00	0.19	0.03
22	0.69	0.09	0.00	0.00	0.17	0.02

TABLE 36
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 9093+10+58

SAMPLE NO. 10

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.54	0.07	0.00	0.00	0.14	0.02
24	0.41	0.05	0.00	0.00	0.11	0.01
25	0.31	0.04	0.00	0.00	0.09	0.01
26	0.23	0.03	0.00	0.00	0.07	0.01
27	0.18	0.02	0.00	0.00	0.06	0.01
28	0.13	0.01	0.00	0.00	0.06	0.01
29	0.10	0.01	0.00	0.00	0.05	0.00
30	0.07	0.01	0.00	0.00	0.04	0.00
31	0.06	0.01	0.00	0.00	0.03	0.00
32	0.04	0.00	0.00	0.00	0.02	0.00
33	0.04	0.00	0.00	0.00	0.02	0.00
34	0.04	0.00	0.00	0.00	0.01	0.00
35	0.03	0.00	0.00	0.00	0.00	0.00
36	0.03	0.00	0.00	0.00	0.00	0.00
37	0.02	0.00	0.00	0.00	0.00	0.00
38	0.02	0.00	0.00	0.00	0.00	0.00
39	0.01	0.00	0.00	0.00	0.00	0.00
40	0.01	0.00	0.00	0.00	0.00	0.00

TABLE 37

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+HIGH LOAD
SAMPLE No: 9093+10+58+12

REACTOR LOADING, MLS :	460-0	T, C :	240-0	FEED RATIO,	
CATALYST LOADING, WT% :	19.6	P, PSIG :	290	CO/H2:	0-50
TIME ON STREAM, HRS :	426-0	SV, L/G/HR:	2-00		

USAGE RATIO, CO/H2 :	0-43	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	19-69	MOL SYNGAS/KG CAT/HR:	17-574
%CU CONV. :	17-72	SPECIFIC ACTIVITY,	
%H2 CONV. :	20-67	MOL CU/MOL METAL/MIN:	0-032

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	6-27	H2O:	10-66
OXYGENATES :	0-29	CO :	72-50
CO2 :	0-29	H2 :	10-00

HYDROCARBON SELECTIVITY, WT%:

C1 :	17-81	C4+ENE :	4-08
C2+ANE :	2-76	C5+C11 :	27-82
C2+ENE :	0-00	C12+C18:	21-81
C3+ANE :	3-19	C19+C23:	8-20
C3+ENE :	4-28	C24+34 :	4-68
C4 ISO+ANE:	4-69	C35+ :	0-67

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	27-82
DIESEL (C9+C25) :	40-91

% ELEMENTAL RECOVERY:	CARBON :	96-55
	HYDROGEN:	97-62
	OXYGEN :	101-77

TABLE 38
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 9093+10+58

SAMPLE NO. 12

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	17.81	56.46	0.00	0.00	0.00	0.00
2	2.76	4.67	0.00	0.00	0.00	0.00
3	3.19	3.68	4.28	5.17	0.00	0.00
4	4.69	4.10	4.08	3.69	0.00	0.00
5	4.89	3.44	3.41	2.47	0.36	0.25
6	4.76	2.81	0.00	0.00	0.00	0.00
7	2.63	1.33	0.22	0.12	0.06	0.03
8	1.91	0.85	0.15	0.07	0.05	0.02
9	2.04	0.81	0.13	0.05	0.05	0.02
10	3.27	1.17	0.00	0.00	0.14	0.05
11	3.42	1.11	0.00	0.00	0.31	0.10
12	3.34	1.00	0.00	0.00	0.35	0.11
13	3.10	0.86	0.00	0.00	0.33	0.09
14	2.93	0.75	0.00	0.00	0.32	0.08
15	2.81	0.67	0.00	0.00	0.32	0.08
16	2.65	0.59	0.00	0.00	0.34	0.08
17	2.44	0.52	0.00	0.00	0.33	0.07
18	2.22	0.44	0.00	0.00	0.33	0.07
19	1.97	0.37	0.00	0.00	0.33	0.06
20	1.64	0.29	0.00	0.00	0.28	0.05
21	1.36	0.23	0.00	0.00	0.25	0.04
22	1.10	0.18	0.00	0.00	0.22	0.04

TABLE 38
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 9093+10+58

SAMPLE NO. 12

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.88	0.14	0.00	0.00	0.18	0.03
24	0.69	0.10	0.00	0.00	0.16	0.02
25	0.55	0.08	0.00	0.00	0.13	0.02
26	0.45	0.06	0.00	0.00	0.11	0.02
27	0.38	0.05	0.00	0.00	0.11	0.02
28	0.32	0.04	0.00	0.00	0.11	0.01
29	0.27	0.03	0.00	0.00	0.10	0.01
30	0.23	0.03	0.00	0.00	0.09	0.01
31	0.21	0.02	0.00	0.00	0.08	0.01
32	0.18	0.02	0.00	0.00	0.07	0.01
33	0.16	0.02	0.00	0.00	0.06	0.01
34	0.18	0.02	0.00	0.00	0.05	0.01
35	0.16	0.02	0.00	0.00	0.00	0.00
36	0.14	0.01	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	0.06	0.01	0.00	0.00	0.00	0.00

TABLE 39

Extended Slurry Test Summary
 8862-1-31
 21.1 wtz (91.4g) $\text{Co}_2(\text{CO})_8/\text{Zr}(\text{OPr})_4/\text{SiO}_2$

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 metal/min	Selectivity HET						
												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	21	305	241	1.0	65.6	62.1	67.3	0.50	0.46	52.7	0.310	19.2	24.2	30.4	11.4	2.6	2.2	51.4
6	94	305	242	1.0	65.8	63.2	67.1	0.52	0.49	52.9	0.321	20.6	26.7	38.0	10.7	2.5	1.4	51.2
9	118	300	244	1.8	66.1	63.9	67.3	0.51	0.40	53.2	0.323	22.2	26.6	36.0	10.2	2.8	1.3	49.8
11	166	305	243	1.8	65.6	63.0	67.0	0.50	0.47	52.7	0.315	20.6	24.7	37.1	11.8	3.9	1.9	52.8
14	262	305	241	1.8	52.1	48.0	54.0	0.47	0.42	41.9	0.232	18.0	26.6	40.0	11.2	2.9	1.4	54.1
	359	310	241	1.8	59.0	55.7	60.5	0.50	0.46	47.4	0.276	NO	MASS	BALANCE				
16	526	300	239	1.8	58.8	54.7	60.9	0.50	0.45	47.3	0.273	17.9	25.3	37.0	11.0	3.1	1.1	53.7
20	580	295	243	1.8	61.3	58.3	62.0	0.50	0.46	49.2	0.292	20.8	25.4	38.0	10.7	3.1	2.0	51.0
23	628	300	241	1.8	61.3	57.0	63.4	0.50	0.45	49.2	0.285	19.4	24.9	39.3	11.3	3.2	1.8	51.9
31	748	300	241	1.8	59.9	56.2	61.7	0.50	0.46	48.2	0.282	19.1	25.0	40.0	10.6	3.1	2.1	53.7
34	940	300	241	1.8	58.9	55.2	60.7	0.49	0.45	47.3	0.273	18.1	23.8	44.7	9.8	2.5	1.0	57.0
38	1012	300	240	1.8	58.4	53.9	60.6	0.49	0.44	46.9	0.267	18.6	25.9	40.5	11.1	2.6	1.3	54.2
41	1108	300	262	2.0	56.0	39.3	72.0	1.0	0.54	50.1	0.327	11.7	16.0	38.6	21.3	6.9	5.4	66.0
44	1180	300	260	2.0	55.0	30.4	71.5	1.0	0.54	49.1	0.321	12.5	16.4	39.1	20.4	6.5	5.0	66.0
47	1327	300	260	2.0	53.9	37.4	70.4	1.0	0.53	48.1	0.312	13.2	14.4	41.7	18.9	7.5	4.2	68.1
50	1444	300	260	2.0	53.4	16.7	70.2	1.0	0.52	47.7	0.306	14.5	15.8	41.8	18.5	5.9	3.8	71.0
53	1516	300	259	2.0	53.6	37.0	70.4	1.0	0.53	47.9	0.308	10.0	13.8	44.6	19.2	7.2	5.2	67.5
56	1613	300	260	2.0	53.3	36.0	70.0	1.0	0.53	47.6	0.307	11.3	15.6	39.7	20.1	7.7	5.7	68.4

TABLE 39 (CONTINUED)
 Extended Slurry Test Summary
 8862-1-31

Sample No.	Time on Stream h	P psig	T °C	SV, NL/g cat/hr	x%CO+H ₂	x%CO	x%H ₂	Feed CO/H ₂	Usage ΔCO/ΔH ₂	Bulk Activity mol syngas/kg cat/h	Specific Activity mol CO/mol metal/min	Selectivity Wt%						
												C ₁	C ₂ -C ₄	C ₅ -C ₁₁	C ₁₂ -C ₁₈	C ₁₉ -C ₂₃	C ₂₄ ⁺	C ₅ -C ₂₃
59	1684	300	260	2.0	51.8	35.6	68.1	1.0	0.52	46.3	0.297	10.6	15.5	39.8	20.9	7.7	5.6	60.4
62	1780	"	261	"	52.3	35.9	68.8	"	0.52	46.8	0.299	12.9	15.2	43.2	17.5	7.0	4.2	67.7
65	1828	"	261	"	52.1	35.7	68.5	"	0.52	46.5	0.298	13.8	16.1	43.9	16.6	6.1	3.6	66.6
68	1951	"	262	"	51.9	35.8	68.1	"	0.52	46.4	0.298	11.0	15.2	39.5	17.7	9.4	7.3	66.6
71	2020	"	260	"	49.8	33.6	66.0	"	0.51	44.5	0.280	11.0	15.3	45.6	17.5	6.5	4.1	69.6
74	2117	"	261	"	50.2	34.3	66.0	"	0.52	44.8	0.286	14.6	15.6	42.6	17.2	6.2	3.9	66.0
77	2188	"	260	"	49.4	33.3	65.6	"	0.51	44.2	0.278	15.4	14.3	46.2	15.2	5.3	3.6	66.7
80	2308	"	261	1.8	65.9	62.9	67.4	0.49	0.46	53.0	0.312	26.6	28.2	37.6	4.9	2.2	0.5	44.7
83	2356	"	262	"	63.7	60.2	65.5	0.49	0.45	51.2	0.298	25.1	30.1	35.9	5.9	2.4	0.6	44.2
85	2452	"	261	1.0	70.6	68.0	71.9	0.49	0.47	31.6	0.187	25.6	28.2	37.9	6.4	1.5	0.4	45.8
89	2475	295	260	"	70.2	68.0	71.3	0.49	0.47	31.4	0.187	27.1	28.4	35.2	6.2	2.0	1.1	43.4
91	2596	"	260	"	54.1	35.8	72.4	1.0	0.49	24.2	0.149	15.6	15.8	39.5	18.8	4.8	5.4	63.1

TABLE 39 (CONTINUED)
Extended Slurry Test Summary
8862-1-31

Sample No.	Time on Stream h	P psig	T °C	SV, NL/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 metal/min	Selectivity Wt%						
												C ₁	C ₂ -C ₄	C ₅ -C ₁₁	C ₁₂ -C ₁₈	C ₁₉ -C ₂₃	C ₂₄ ⁺	C ₅ -C ₂₃
94	2620	300	261	1.0	51.9	34.1	69.7	1.0	0.49	23.2	0.142	11.1	15.0	44.8	19.2	4.8	5.2	68.8
98	2692	295	260	1.0	55.1	37.4	72.7	1.0	0.51	24.6	0.156	12.3	14.6	43.8	18.4	5.6	5.2	67.8
100	2788	295	261	1.5	54.4	40.6	64.8	0.75	0.47	36.5	0.217	17.2	17.8	46.0	13.5	3.6	1.9	63.1
104	2812	295	260	1.5	55.4	41.1	66.0	0.75	0.47	37.1	0.220	14.0	17.6	50.6	13.3	3.2	1.3	67.1
107	2861	300	261	1.5	55.0	40.8	65.5	0.75	0.47	36.8	0.219	15.3	19.4	46.4	14.6	3.1	1.2	64.0
109	2932	300	261	1.5	54.2	39.9	64.9	0.75	0.46	35.3	0.214	15.1	17.5	49.8	13.3	3.2	1.1	66.3
112	2980 ^a	295	261	2.0	43.2	29.0	57.4	1.0	0.50	38.6	0.242	17.7	15.0	50.1	12.8	3.6	0.9	65.5
115	3028 ^a	300	261	2.0	43.7	29.0	58.4	1.0	0.50	39.1	0.242	12.3	12.6	52.8	15.8	4.2	1.3	72.8
118	3100 ^a	300	260	2.0	43.8	28.3	59.3	1.0	0.48	39.1	0.236	15.6	16.7	49.0	13.5	3.6	1.6	65.1
121 ^a	3140 ^a	300	261	2.0	43.1	29.3	56.9	1.0	0.51	38.5	0.244	17.6	17.4	47.2	13.1	3.9	0.8	64.2
124 ^a	3196 ^a	300	261	2.0	42.8	27.8	57.8	1.0	0.48	38.3	0.232	15.7	15.8	48.5	14.5	3.7	1.8	66.7
128 ^b	3268 ^a	300	261	2.0	42.4	26.6	58.3	1.0	0.46	37.9	0.222	15.9	15.6	47.3	13.9	4.7	2.5	65.9
131 ^b	3316	300	261	1.0	67.7	63.8	69.6	0.49	0.45	30.3	0.176	20.6	26.9	39.0	9.0	3.2	1.2	51.2

TABLE 39 (CONTINUED)
 Extended Slurry Test Summary
 8862-1-31

Sample No.	Time on Stream h	P psig	T °C	SV, ml/g cat/hr	x%CO+H ₂	x%CO	x%H ₂	Feed CO/H ₂	Usage ΔCO/ΔH ₂	Bulk Activity mol syngas/kg cat/h	Specific Activity mol CO/mol metal/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	
134 ^b	3364	300	261	1.0	65.7	61.5	67.8	0.49	0.45	29.4	0.169	22.1	27.6	30.8	8.2	2.5	0.8	49.5	
136 ^d	3436	300	261	1.0	65.0	60.2	67.3	0.49	0.44	29.0	0.166	23.3	27.5	30.6	8.1	1.9	0.5	48.6	
140 ^a	3484	300	261	1.0	63.9	59.2	66.2	0.49	0.44	28.6	0.163	18.4	25.9	43.2	9.0	2.5	1.0	54.7	
142	3532	445	261	1.0	63.5	59.2	65.6	0.49	0.44	28.4	0.163	25.8	20.9	37.0	5.6	1.6	0.6	44.2	
148	3676	500	260	1.0	74.3	76.4	73.3	0.49	0.51	33.2	0.210	45.4	25.6	23.1	2.2	1.5	2.6	26.8	
151	3773	500	260	1.0	48.9	45.3	50.7	0.49	0.44	21.9	0.125	35.6	31.0	25.3	5.4	0.9	1.8	31.6	
153	3844	305	261	1.0	38.9	33.9	41.4	0.49	0.40	17.4	0.093	42.7	30.5	18.4	3.0	1.1	4.4	22.5	
155	3868	305	261	1.0	40.5	36.0	42.7	0.49	0.41	18.1	0.099	42.1	27.7	22.8	3.9	0.8	2.6	27.5	
158	3964	305	281	2.0	40.8	31.2	50.4	1.0	0.62	36.4	0.260	37.2	24.0	27.5	7.1	1.8	2.5	36.4	
162	4036	310	281	1.8	44.6	42.5	45.6	0.49	0.46	35.8	0.211	56.4	24.1	17.8	0.5	0.1	1.0	18.4	
164	4108	300	200	1.0	58.7	53.9	61.0	0.49	0.44	26.2	0.149	55.2	22.8	17.4	3.3	0.3	1.0	21.0	
167	4204	305	283	1.0	49.3	35.5	62.2	0.93	0.53	22.0	0.142	42.3	20.1	25.6	9.5	1.7	0.9	36.8	
171	4276	300	280	2.0	33.5	24.8	42.2	1.0	0.59	29.9	0.207	44.3	24.8	25.5	4.0	0.8	0.6	30.3	
173	4340 ^a	305	261	2.0	23.7	17.0	30.4	1.0	0.56	21.2	0.142	44.1	28.0	23.2	3.8	0.8	0.2	27.8	
176	4417 ^a	300	261	2.0	23.6	16.8	30.4	1.0	0.55	21.1	0.140	45.3	27.4	23.3	3.3	0.5	0.3	27.1	
*Return to extended test conditions - part 2; ^a stirrer speed = 800 rpm; ^b 1600 rpm																			

TABLE 40

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SiO2+Ext. TEST
SAMPLE No: 8862+1+31+94

REACTOR LOADING, MLS :	450.0	T, C :	261.0	FEED RATIO,	
CATALYST LOADING, WT%:	21.1	P, PSIG :	300	CO/H2:	1.00
TIME ON STREAM, HRS :	2620.0	SV, L/G/HR:	1.00		

USAGE RATIO, CO/H2 :	0.49	BULK ACTIVITY,	
%OVERALL CONV-, CO+H2:	51.91	MOL SYNGAS/KG CAT/HR:	23.185
%CO CONV-	34.14	SPECIFIC ACTIVITY,	
%H2 CONV-	69.68	MOL CO/MOL METAL/MIN:	0.142

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	16.16	H2O:	19.66
OXYGENATES :	0.35	CO :	58.76
CO2 :	3.14	H2 :	1.93

HYDROCARBON SELECTIVITY, WT%:

C1 :	11.07	C4+ENE :	3.10
C2+ANE :	2.38	C+C11 :	44.82
C2+ENE :	0.09	C12+C18:	19.16
C3+ANE :	3.02	C19+C23:	4.79
C3+ENE :	2.85	C24+34 :	4.82
C4 ISO+ANE:	3.52	C35+ :	0.38

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	44.82
DIESEL (C9+C25) :	41.10

% ELEMENTAL RECOVERY:	CARBON :	103.75
	HYDROGEN:	107.70
	OXYGEN :	104.87

TABLE 41

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862*1+31

SAMPLE NO. 94

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	11.07	43.37	0.00	0.00	0.00	0.00
2	2.38	4.97	0.09	0.20	0.00	0.00
3	3.02	4.29	2.85	4.25	0.00	0.00
4	3.48	3.76	3.10	3.46	0.04	0.04
5	4.27	3.72	2.99	2.68	0.35	0.30
6	9.42	6.87	0.28	0.21	0.00	0.00
7	5.29	3.31	0.51	0.33	0.59	0.37
8	4.08	2.24	0.48	0.27	0.93	0.51
9	4.88	2.39	0.00	0.00	1.24	0.61
10	4.11	1.82	0.00	0.00	1.32	0.58
11	2.96	1.19	0.00	0.00	1.10	0.44
12	2.64	0.97	0.00	0.00	1.08	0.40
13	2.36	0.81	0.00	0.00	0.99	0.34
14	2.11	0.67	0.00	0.00	0.91	0.29
15	1.88	0.56	0.04	0.01	0.79	0.23
16	1.70	0.47	0.00	0.00	0.75	0.21
17	1.54	0.40	0.00	0.00	0.68	0.18
18	1.28	0.31	0.00	0.00	0.41	0.10
19	1.02	0.24	0.00	0.00	0.31	0.07
20	0.80	0.18	0.00	0.00	0.22	0.05
21	0.68	0.14	0.00	0.00	0.17	0.04
22	0.65	0.13	0.00	0.00	0.15	0.03

TABLE 41

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO- 8862+1+31

SAMPLE NO- 94

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.66	0.13	0.00	0.00	0.14	0.03
24	0.65	0.12	0.00	0.00	0.13	0.02
25	0.62	0.11	0.00	0.00	0.12	0.02
26	0.55	0.09	0.00	0.00	0.12	0.02
27	0.48	0.08	0.00	0.00	0.10	0.02
28	0.41	0.06	0.00	0.00	0.09	0.01
29	0.34	0.05	0.00	0.00	0.07	0.01
30	0.28	0.04	0.00	0.00	0.06	0.01
31	0.23	0.03	0.00	0.00	0.05	0.01
32	0.18	0.03	0.00	0.00	0.04	0.01
33	0.15	0.02	0.00	0.00	0.03	0.00
34	0.12	0.02	0.00	0.00	0.02	0.00
35	0.09	0.01	0.00	0.00	0.01	0.00
36	0.07	0.01	0.00	0.00	0.01	0.00
37	0.05	0.01	0.00	0.00	0.00	0.00
38	0.06	0.01	0.00	0.00	0.00	0.00
39	0.05	0.01	0.00	0.00	0.00	0.00
40	0.04	0.00	0.00	0.00	0.00	0.00

TABLE 42

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SiO2+Ext- TEST
SAMPLE No: 8862+1+31+98

REACTOR LOADING, MLS :	450.0	T, C :	260.0	FEED RATIO,	
CATALYST LOADING, WT%:	21.1	P, PSIG :	295	CO/H2:	1.00
TIME ON STREAM, HRS :	2692.0	SV, L/G/HR:	1.00		

USAGE RATIO, CO/H2 :	0.51	BULK ACTIVITY,	
%OVERALL CONV-, CO+H2:	55.09	MOL SYNGAS/KG CAT/HR:	24.603
%CO CONV.	37.45	SPECIFIC ACTIVITY,	
%H2 CONV.	72.73	MOL CO/MOL METAL/MIN:	0.156

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	16.78	H2O:	20.53
OXYGENATES :	0.42	CO :	56.77
CO2 :	3.74	H2 :	1.77

HYDROCARBON SELECTIVITY, WT%:

C1 :	12.31	C4+ENE :	3.02
C2+ANE :	2.35	C5+C11 :	43.83
C2+ENE :	0.09	C12+C18:	18.42
C3+ANE :	2.94	C19+C23:	5.62
C3+ENE :	2.78	C24+34 :	4.96
C4 ISO+ANE:	3.42	C35+ :	0.27

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	43.83
DIESEL (C9+C25) :	39.91

% ELEMENTAL RECOVERY:	CARBON :	101.60
	HYDROGEN:	106.84
	OXYGEN :	103.29

TABLE 43

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 98

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	12.31	46.34	0.00	0.00	0.00	0.00
2	2.35	4.71	0.09	0.20	0.00	0.00
3	2.94	4.02	2.78	3.98	0.00	0.00
4	3.36	3.49	3.02	3.25	0.06	0.06
5	4.44	3.72	3.29	2.83	0.36	0.30
6	9.29	6.51	0.37	0.26	0.00	0.00
7	5.19	3.12	0.61	0.38	0.59	0.35
8	3.98	2.10	0.55	0.29	0.88	0.46
9	4.23	1.99	0.37	0.18	1.10	0.52
10	3.78	1.60	0.00	0.00	1.17	0.49
11	2.69	1.04	0.00	0.00	0.93	0.36
12	2.43	0.86	0.00	0.00	0.91	0.32
13	2.21	0.72	0.00	0.00	0.85	0.28
14	2.02	0.62	0.00	0.00	0.80	0.24
15	1.85	0.53	0.00	0.00	0.77	0.22
16	1.71	0.45	0.00	0.00	0.74	0.20
17	1.57	0.39	0.00	0.00	0.68	0.17
18	1.39	0.33	0.00	0.00	0.47	0.11
19	1.18	0.26	0.00	0.00	0.37	0.08
20	0.96	0.21	0.00	0.00	0.28	0.06
21	0.81	0.17	0.00	0.00	0.22	0.04
22	0.74	0.14	0.00	0.00	0.18	0.03

TABLE 43

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 98

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.71	0.13	0.00	0.00	0.16	0.03
24	0.68	0.12	0.00	0.00	0.15	0.03
25	0.63	0.11	0.00	0.00	0.14	0.02
26	0.56	0.09	0.00	0.00	0.12	0.02
27	0.49	0.08	0.00	0.00	0.11	0.02
28	0.42	0.06	0.00	0.00	0.09	0.01
29	0.35	0.05	0.00	0.00	0.08	0.01
30	0.29	0.04	0.00	0.00	0.06	0.01
31	0.23	0.03	0.00	0.00	0.05	0.01
32	0.18	0.02	0.00	0.00	0.04	0.01
33	0.14	0.02	0.00	0.00	0.03	0.00
34	0.11	0.01	0.00	0.00	0.02	0.00
35	0.08	0.01	0.00	0.00	0.01	0.00
36	0.06	0.01	0.00	0.00	0.01	0.00
37	0.04	0.00	0.00	0.00	0.01	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 44

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

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CATALYST : Co/Zr/SILICA+EXTENDED TE
SAMPLE No: 8862+1+31+100

REACTOR LOADING, MLS :	450.0	T, C :	261.0	FEED RATIO,	
CATALYST LOADING, WT% :	21.1	P, PSIG :	295	CO/H2:	0.75
TIME ON STREAM, HRS :	2788.0	SV, L/G/HR:	1.50		

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USAGE RATIO, CO/H2 :	0.47	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	54.45	MOL SYNGAS/KG CAT/HR:	36.461
%CO CONV. :	40.63	SPECIFIC ACTIVITY,	
%H2 CONV. :	64.79	MOL CO/MOL METAL/MIN:	0.217

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WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	20.23	H2O:	21.78
OXYGENATES :	0.60	CO :	51.57
CO2 :	2.90	H2 :	2.92

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HYDROCARBON SELECTIVITY, WT%:

C1 :	17.19	C4+ENE :	2.69
C2+ANE :	3.08	C5+C11 :	45.99
C2+ENE :	0.06	C12+C18:	13.54
C3+ANE :	4.67	C19+C23:	3.56
C3+ENE :	2.22	C24+34 :	1.84
C4 ISO+ANE:	5.06	C35+ :	0.08

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FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	45.99
DIESEL (C9+C25) :	31.48

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% ELEMENTAL RECOVERY:	CARBON :	107.11
	HYDROGEN:	108.06
	OXYGEN :	103.09

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TABLE 45

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 100

CARBON NO-	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	17.19	53.02	0.00	0.00	0.00	0.00
2	3.08	5.06	0.06	0.11	0.00	0.00
3	4.67	5.23	2.22	2.61	0.00	0.00
4	4.99	4.25	2.69	2.37	0.07	0.06
5	5.78	3.96	2.54	1.79	0.49	0.34
6	10.54	6.05	0.36	0.21	0.00	0.00
7	5.89	2.90	0.41	0.21	0.73	0.36
8	4.31	1.86	0.32	0.14	0.92	0.40
9	4.66	1.80	0.00	0.00	1.09	0.42
10	3.68	1.28	0.00	0.00	1.01	0.35
11	2.48	0.79	0.00	0.00	0.78	0.25
12	2.15	0.62	0.00	0.00	0.72	0.21
13	1.85	0.50	0.00	0.00	0.64	0.17
14	1.58	0.39	0.00	0.00	0.54	0.14
15	1.33	0.31	0.01	0.00	0.45	0.10
16	1.14	0.25	0.00	0.00	0.38	0.08
17	1.06	0.22	0.00	0.00	0.36	0.07
18	1.00	0.19	0.00	0.00	0.32	0.06
19	0.86	0.16	0.00	0.00	0.28	0.05
20	0.66	0.12	0.00	0.00	0.21	0.04
21	0.50	0.08	0.00	0.00	0.14	0.02
22	0.39	0.06	0.00	0.00	0.11	0.02

TABLE 45

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 100

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.33	0.05	0.00	0.00	0.08	0.01
24	0.28	0.04	0.00	0.00	0.07	0.01
25	0.28	0.04	0.00	0.00	0.06	0.01
26	0.21	0.03	0.00	0.00	0.05	0.01
27	0.17	0.02	0.00	0.00	0.04	0.00
28	0.14	0.02	0.00	0.00	0.03	0.00
29	0.12	0.01	0.00	0.00	0.03	0.00
30	0.09	0.01	0.00	0.00	0.02	0.00
31	0.08	0.01	0.00	0.00	0.02	0.00
32	0.06	0.01	0.00	0.00	0.01	0.00
33	0.04	0.00	0.00	0.00	0.01	0.00
34	0.03	0.00	0.00	0.00	0.01	0.00
35	0.02	0.00	0.00	0.00	0.00	0.00
36	0.02	0.00	0.00	0.00	0.00	0.00
37	0.01	0.00	0.00	0.00	0.00	0.00
38	0.01	0.00	0.00	0.00	0.00	0.00
39	0.01	0.00	0.00	0.00	0.00	0.00
40	0.01	0.00	0.00	0.00	0.00	0.00

TABLE 46

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/ZR/SILICA+EXTENDED TE
SAMPLE NO: 8862+1+31+104

REACTOR LOADING, MLS :	450.0	T, C :	260.0	FEED RATIO,	
CATALYST LOADING, WT% :	21.1	P, PSIG :	295	CO/H2:	0.75
TIME ON STREAM, HRS :	2812.0	SV, L/G/HR:	1.50		

USAGE RATIO, CO/H2 :	0.47	BULK ACTIVITY,	
%OVERALL CONV-, CO+H2:	55.38	MOL SYNGAS/KG CAT/HR:	37.084
%CO CONV-	41.11	SPECIFIC ACTIVITY,	
%H2 CONV-	66.05	MOL CO/MOL METAL/MIN:	0.220

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	20.45	H2O:	21.96
OXYGENATES :	0.48	CO :	51.18
CO2 :	3.12	H2 :	2.82

HYDROCARBON SELECTIVITY, WT%:

C1 :	14.03	C4+ENE :	2.61
C2+ANE :	3.17	C5+C11 :	50.65
C2+ENE :	0.00	C12+C18:	13.28
C3+ANE :	4.56	C19+C23:	3.16
C3+ENE :	2.17	C24+34 :	1.27
C4 ISO+ANE:	5.05	C35+ :	0.05

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	50.65
DIESEL (C9+C25) :	31.41

% ELEMENTAL RECOVERY:	CARBON :	107.23
	HYDROGEN:	106.63
	OXYGEN :	103.15

TABLE 47

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 104

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	14.03	46.97	0.00	0.00	0.00	0.00
2	3.17	5.66	0.00	0.00	0.00	0.00
3	4.56	5.55	2.17	2.76	0.00	0.00
4	4.95	4.57	2.61	2.49	0.10	0.09
5	5.64	4.20	2.49	1.90	0.50	0.37
6	13.01	8.11	0.00	0.00	0.00	0.00
7	7.43	3.98	0.83	0.45	0.00	0.00
8	4.89	2.30	0.35	0.17	1.03	0.49
9	4.98	2.08	0.00	0.00	1.19	0.50
10	3.83	1.45	0.00	0.00	1.28	0.48
11	2.43	0.83	0.00	0.00	0.77	0.26
12	2.10	0.66	0.00	0.00	0.72	0.23
13	1.80	0.52	0.00	0.00	0.64	0.19
14	1.55	0.42	0.00	0.00	0.57	0.15
15	1.31	0.33	0.01	0.00	0.47	0.12
16	1.12	0.27	0.00	0.00	0.40	0.09
17	1.01	0.23	0.00	0.00	0.35	0.08
18	0.92	0.19	0.00	0.00	0.30	0.06
19	0.79	0.16	0.00	0.00	0.27	0.05
20	0.60	0.11	0.00	0.00	0.20	0.04
21	0.43	0.08	0.00	0.00	0.13	0.02
22	0.32	0.06	0.00	0.00	0.09	0.02

TABLE 47

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO- 8862+1+31

SAMPLE NO- 104

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.26	0.04	0.00	0.00	0.07	0.01
24	0.21	0.03	0.00	0.00	0.05	0.01
25	0.18	0.03	0.00	0.00	0.04	0.01
26	0.15	0.02	0.00	0.00	0.03	0.00
27	0.12	0.02	0.00	0.00	0.03	0.00
28	0.10	0.01	0.00	0.00	0.02	0.00
29	0.08	0.01	0.00	0.00	0.02	0.00
30	0.06	0.01	0.00	0.00	0.01	0.00
31	0.05	0.01	0.00	0.00	0.01	0.00
32	0.04	0.00	0.00	0.00	0.01	0.00
33	0.03	0.00	0.00	0.00	0.01	0.00
34	0.02	0.00	0.00	0.00	0.00	0.00
35	0.01	0.00	0.00	0.00	0.00	0.00
36	0.01	0.00	0.00	0.00	0.00	0.00
37	0.01	0.00	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 48

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TE
SAMPLE No: 8852+1+31+107

REACTOR LOADING, MLS :	450.0	T, C :	261.0	FEED RATIO,	
CATALYST LOADING, WT%:	21.1	P, PSIG :	300	CO/H2:	0.75
TIME ON STREAM, HRS :	2861.0	SV, L/G/HR:	1.50		

USAGE RATIO, CO/H2 :	0.47	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	54.97	MOL SYNGAS/KG CAT/HR:	36.809
%CO CONV.	40.84	SPECIFIC ACTIVITY,	
%H2 CONV.	65.54	MOL CO/MOL METAL/MIN:	0.219

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	19.10	H2O:	22.19
OXYGENATES :	0.59	CO :	52.28
CO2 :	2.94	H2 :	2.91

HYDROCARBON SELECTIVITY, WT%:

C1 :	15.31	C4+ENE :	3.01
C2+ANE :	3.35	C5+C11 :	46.43
C2+ENE :	0.00	C12+C18:	14.48
C3+ANE :	5.00	C19+C23:	3.10
C3+ENE :	2.46	C24+34 :	1.20
C4 ISO+ANE:	5.61	C35+ :	0.04

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	46.43
DIESEL (C9+C25) :	33.35

% ELEMENTAL RECOVERY:	CARBON :	103.71
	HYDROGEN:	103.88
	OXYGEN :	102.89

TABLE 49
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO- 8862+1+31

SAMPLE NO- 107

CARBON NO-	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	15.31	49.22	0.00	0.00	0.00	0.00
2	3.35	5.74	0.00	0.00	0.00	0.00
3	5.00	5.85	2.46	3.02	0.00	0.00
4	5.49	4.87	3.01	2.76	0.11	0.10
5	6.10	4.36	2.63	1.93	0.54	0.39
6	8.82	5.27	0.35	0.21	0.00	0.00
7	5.65	2.91	0.38	0.20	0.59	0.30
8	4.72	2.13	0.41	0.19	0.92	0.42
9	5.03	2.02	0.26	0.10	1.22	0.49
10	4.21	1.52	0.00	0.00	1.07	0.39
11	2.75	0.91	0.00	0.00	0.78	0.26
12	2.38	0.72	0.00	0.00	0.73	0.22
13	2.06	0.57	0.00	0.00	0.64	0.18
14	1.77	0.46	0.00	0.00	0.54	0.14
15	1.52	0.37	0.01	0.00	0.45	0.11
16	1.30	0.30	0.00	0.00	0.39	0.09
17	1.12	0.24	0.00	0.00	0.34	0.07
18	0.96	0.19	0.01	0.00	0.28	0.06
19	0.78	0.15	0.00	0.00	0.25	0.05
20	0.59	0.11	0.00	0.00	0.19	0.03
21	0.43	0.07	0.00	0.00	0.13	0.02
22	0.31	0.05	0.00	0.00	0.09	0.02

TABLE 49

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 107

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.25	0.04	0.00	0.00	0.07	0.01
24	0.20	0.03	0.00	0.00	0.05	0.01
25	0.17	0.02	0.00	0.00	0.04	0.01
26	0.14	0.02	0.00	0.00	0.03	0.00
27	0.11	0.02	0.00	0.00	0.03	0.00
28	0.09	0.01	0.00	0.00	0.02	0.00
29	0.08	0.01	0.00	0.00	0.02	0.00
30	0.06	0.01	0.00	0.00	0.01	0.00
31	0.05	0.01	0.00	0.00	0.01	0.00
32	0.03	0.00	0.00	0.00	0.01	0.00
33	0.03	0.00	0.00	0.00	0.01	0.00
34	0.02	0.00	0.00	0.00	0.00	0.00
35	0.01	0.00	0.00	0.00	0.00	0.00
36	0.01	0.00	0.00	0.00	0.00	0.00
37	0.01	0.00	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 50

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+109

REACTOR LOADING, MLS : 450.0 T, C : 261.0 FEED RATIO,
CATALYST LOADING, WT%: 21.1 P, PSIG : 300 CO/H2: 0.75
TIME ON STREAM, HRS : 2932.0 SV, L/G/HR: 1.50

USAGE RATIO, CO/H2 : 0.46 BULK ACTIVITY,
%OVERALL CONV., CO+H2: 54.17 MOL SYNGAS/KG CAT/HR: 36.322
%CO CONV. : 39.87 SPECIFIC ACTIVITY,
%H2 CONV. : 64.87 MOL CO/MOL METAL/MIN: 0.214

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 20.21 H2O: 22.41
OXYGENATES : 0.61 CO : 51.24
CO2 : 2.67 H2 : 2.86

HYDROCARBON SELECTIVITY, WT%:

C1 : 15.13 C4+ENE : 2.61
C2+ANE : 3.53 C5+C11 : 49.79
C2+ENE : 0.00 C12+C18: 13.34
C3+ANE : 4.35 C19+C23: 3.18
C3+ENE : 2.14 C24+34 : 1.00
C4 ISO+ANE: 4.88 C35+ : 0.06

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 49.79
DIESEL (C9+C25) : 31.95

% ELEMENTAL RECOVERY: CARBON : 108.67
HYDROGEN: 109.80
OXYGEN : 105.51

TABLE 51

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 109

CARBON NO.	N ⁺ ALKANES		I ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	15.13	49.08	0.00	0.00	0.00	0.00
2	3.53	6.11	0.00	0.00	0.00	0.00
3	4.35	5.13	2.14	2.64	0.00	0.00
4	4.78	4.28	2.61	2.42	0.10	0.09
5	5.73	4.13	2.54	1.88	0.49	0.35
6	11.22	6.77	0.33	0.20	0.00	0.00
7	7.23	3.75	0.78	0.41	0.00	0.00
8	5.05	2.30	0.38	0.17	1.06	0.48
9	5.16	2.09	0.00	0.00	1.23	0.50
10	4.08	1.49	0.00	0.00	1.28	0.47
11	2.40	0.80	0.00	0.00	0.83	0.28
12	2.08	0.63	0.00	0.00	0.76	0.23
13	1.78	0.50	0.00	0.00	0.65	0.18
14	1.54	0.40	0.00	0.00	0.55	0.14
15	1.34	0.33	0.01	0.00	0.46	0.11
16	1.19	0.27	0.00	0.00	0.41	0.10
17	1.04	0.23	0.00	0.00	0.35	0.07
18	0.90	0.18	0.01	0.00	0.27	0.05
19	0.77	0.15	0.00	0.00	0.24	0.05
20	0.61	0.11	0.00	0.00	0.20	0.04
21	0.45	0.08	0.00	0.00	0.15	0.03
22	0.33	0.06	0.00	0.00	0.11	0.02

TABLE 51

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 109

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.25	0.04	0.00	0.00	0.08	0.01
24	0.19	0.03	0.00	0.00	0.06	0.01
25	0.15	0.02	0.00	0.00	0.04	0.01
26	0.11	0.02	0.00	0.00	0.03	0.00
27	0.09	0.01	0.00	0.00	0.02	0.00
28	0.07	0.01	0.00	0.00	0.01	0.00
29	0.05	0.01	0.00	0.00	0.01	0.00
30	0.04	0.01	0.00	0.00	0.01	0.00
31	0.03	0.00	0.00	0.00	0.01	0.00
32	0.03	0.00	0.00	0.00	0.00	0.00
33	0.02	0.00	0.00	0.00	0.00	0.00
34	0.02	0.00	0.00	0.00	0.00	0.00
35	0.01	0.00	0.00	0.00	0.00	0.00
36	0.01	0.00	0.00	0.00	0.00	0.00
37	0.01	0.00	0.00	0.00	0.00	0.00
38	0.01	0.00	0.00	0.00	0.00	0.00
39	0.01	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 52

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+112

REACTOR LOADING, MLS :	450.0	T, C :	261.0	FEED RATIO,	
CATALYST LOADING, WT%:	21.1	P, PSIG :	295	CO/H2:	1.00
TIME ON STREAM, HRS :	2980.0	SV, L/G/HR:	2.00		

USAGE RATIO, CO/H2 :	0.50	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	43.22	MOL SYNGAS/KG CAT/HR:	38.602
%CO CONV.	29.00	SPECIFIC ACTIVITY,	
%H2 CONV.	57.43	MOL CO/MOL METAL/HIN:	0.242

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	14.91	H2O:	15.20
OXYGENATES :	0.46	CO :	65.13
CO2 :	1.51	H2 :	2.79

HYDROCARBON SELECTIVITY, WT%:

C1 :	17.68	C4+ENE :	2.93
C2+ANE :	2.47	C5+C11 :	50.07
C2+ENE :	0.00	C12+C18:	12.83
C3+ANE :	3.04	C19+C23:	3.59
C3+ENE :	2.83	C24+34 :	0.83
C4 ISO+ANE:	3.68	C35+ :	0.03

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	50.07
DIESEL (C9+C25) :	30.57

% ELEMENTAL RECOVERY:	CARBON :	103.91
	HYDROGEN:	108.98
	OXYGEN :	99.21

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO- 8862+1+31

SAMPLE NO- 112

CARBON NO-	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	17.68	54.60	0.00	0.00	0.00	0.00
2	2.47	4.07	0.00	0.00	0.00	0.00
3	3.04	3.42	2.83	3.33	0.00	0.00
4	3.61	3.08	2.93	2.59	0.06	0.05
5	4.37	3.00	2.70	1.91	0.38	0.26
6	12.41	7.13	0.36	0.21	0.00	0.00
7	7.80	3.85	0.70	0.35	0.68	0.34
8	5.53	2.40	0.56	0.25	0.82	0.35
9	4.73	1.83	0.34	0.13	0.82	0.32
10	4.29	1.49	0.00	0.00	0.85	0.30
11	2.11	0.67	0.00	0.00	0.61	0.19
12	1.95	0.57	0.00	0.00	0.66	0.19
13	1.71	0.46	0.00	0.00	0.62	0.17
14	1.46	0.36	0.00	0.00	0.55	0.14
15	1.26	0.29	0.00	0.00	0.48	0.11
16	1.11	0.24	0.00	0.00	0.42	0.09
17	1.00	0.21	0.00	0.00	0.37	0.08
18	0.93	0.18	0.00	0.00	0.31	0.06
19	0.85	0.16	0.00	0.00	0.29	0.05
20	0.70	0.12	0.00	0.00	0.25	0.04
21	0.51	0.09	0.00	0.00	0.18	0.03
22	0.35	0.06	0.00	0.00	0.12	0.02

TABLE 53

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 112

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.24	0.04	0.00	0.00	0.08	0.01
24	0.17	0.03	0.00	0.00	0.05	0.01
25	0.13	0.02	0.00	0.00	0.04	0.01
26	0.09	0.01	0.00	0.00	0.03	0.00
27	0.07	0.01	0.00	0.00	0.02	0.00
28	0.05	0.01	0.00	0.00	0.01	0.00
29	0.04	0.00	0.00	0.00	0.01	0.00
30	0.03	0.00	0.00	0.00	0.01	0.00
31	0.03	0.00	0.00	0.00	0.01	0.00
32	0.02	0.00	0.00	0.00	0.00	0.00
33	0.01	0.00	0.00	0.00	0.00	0.00
34	0.01	0.00	0.00	0.00	0.00	0.00
35	0.01	0.00	0.00	0.00	0.00	0.00
36	0.01	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00
38	0.01	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 54

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+115

REACTOR LOADING, MLS :	450.0	T, C :	261.0	FEED RATIO,	
CATALYST LOADING, WT% :	21.1	P, PSIG :	300	CO/H2:	1.00
TIME ON STREAM, HRS :	3028.0	SV, L/G/HR:	2.00		

USAGE RATIO, CO/H2 :	0.50	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	43.74	MOL SYNGAS/KG CAT/HR:	39.067
%CO CONV. :	29.02	SPECIFIC ACTIVITY,	
%H2 CONV. :	58.45	MOL CO/MOL METAL/MIN:	0.242

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	15.67	H2O:	15.81
OXYGENATES :	0.45	CO :	63.83
CO2 :	1.58	H2 :	2.67

HYDROCARBON SELECTIVITY, WT%:

C1 :	12.31	C4+ENE :	2.76
C2+ANE :	2.35	C5+C11 :	52.78
C2+ENE :	0.00	C12+C18:	15.75
C3+ANE :	2.67	C19+C23:	4.20
C3+ENE :	2.58	C24+34 :	1.24
C4 ISO+ANE:	3.28	C35+ :	0.08

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 52.78
DIESEL (C9+C25) : 39.72

% ELEMENTAL RECOVERY: CARBON : 106.44
HYDROGEN: 110.95
OXYGEN : 100.89

TABLE 55

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 115

CARBON NO.	N ⁺ ALKANES		I ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	12.31	45.70	0.00	0.00	0.00	0.00
2	2.35	4.66	0.00	0.00	0.00	0.00
3	2.67	3.61	2.58	3.65	0.00	0.00
4	3.22	3.29	2.76	2.93	0.07	0.07
5	3.93	3.24	2.72	2.31	0.34	0.28
6	9.99	6.90	0.34	0.24	0.00	0.00
7	5.69	3.38	0.83	0.51	1.46	0.87
8	5.54	2.89	0.77	0.41	1.93	1.01
9	6.10	2.83	0.63	0.30	2.01	0.93
10	4.34	1.82	0.47	0.20	1.63	0.68
11	2.90	1.10	0.25	0.10	0.91	0.35
12	2.64	0.92	0.00	0.00	0.79	0.28
13	2.24	0.72	0.00	0.00	0.70	0.22
14	1.92	0.58	0.00	0.00	0.60	0.18
15	1.63	0.46	0.00	0.00	0.51	0.14
16	1.37	0.36	0.00	0.00	0.43	0.11
17	1.18	0.29	0.00	0.00	0.36	0.09
18	1.05	0.24	0.00	0.00	0.32	0.07
19	0.95	0.21	0.00	0.00	0.29	0.06
20	0.82	0.17	0.00	0.00	0.26	0.05
21	0.64	0.13	0.00	0.00	0.21	0.04
22	0.46	0.09	0.00	0.00	0.15	0.03

TABLE 55

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 115

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.32	0.06	0.00	0.00	0.10	0.02
24	0.24	0.04	0.00	0.00	0.07	0.01
25	0.18	0.03	0.00	0.00	0.05	0.01
26	0.14	0.02	0.00	0.00	0.03	0.01
27	0.11	0.02	0.00	0.00	0.03	0.00
28	0.08	0.01	0.00	0.00	0.02	0.00
29	0.07	0.01	0.00	0.00	0.01	0.00
30	0.05	0.01	0.00	0.00	0.01	0.00
31	0.05	0.01	0.00	0.00	0.01	0.00
32	0.03	0.00	0.00	0.00	0.01	0.00
33	0.03	0.00	0.00	0.00	0.00	0.00
34	0.02	0.00	0.00	0.00	0.00	0.00
35	0.02	0.00	0.00	0.00	0.00	0.00
36	0.01	0.00	0.00	0.00	0.00	0.00
37	0.02	0.00	0.00	0.00	0.00	0.00
38	0.01	0.00	0.00	0.00	0.00	0.00
39	0.01	0.00	0.00	0.00	0.00	0.00
40	0.01	0.00	0.00	0.00	0.00	0.00

TABLE 56

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE No: 8862+I+31+118

REACTOR LOADING, MLS :	450.0	T, C :	260.0	FEED RATIO,	
CATALYST LOADING, WT%:	21.1	P, PSIG :	300	CO/H2:	1.00
TIME ON STREAM, HRS :	3100.0	SV, L/G/HR:	2.00		

USAGE RATIO, CO/H2 :	0.48	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	43.81	MOL SYNGAS/KG CAT/HR:	39.131
%CO CONV. :	28.32	SPECIFIC ACTIVITY,	
%H2 CONV. :	59.30	MOL CO/MOL METAL/MIN:	0.236

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	13.96	H2O:	14.78
OXYGENATES :	0.40	CO :	66.38
CO2 :	1.80	H2 :	2.69

HYDROCARBON SELECTIVITY, WT%:

C1 :	15.62	C4+ENE :	3.44
C2+ANE :	2.79	C5+C11 :	48.95
C2+ENE :	0.12	C12+C18:	13.49
C3+ANE :	3.30	C19+C23:	3.63
C3+ENE :	3.08	C24+34 :	1.53
C4 ISO+ANE:	4.00	C35+ :	0.06

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	48.95
DIESEL (C9+C25) :	32.56

% ELEMENTAL RECOVERY:	CARBON :	102.50
	HYDROGEN:	102.69
	OXYGEN :	99.28

TABLE 57

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 118

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	15.62	50.62	0.00	0.00	0.00	0.00
2	2.79	4.81	0.12	0.22	0.00	0.00
3	3.30	3.89	3.08	3.80	0.00	0.00
4	3.97	3.55	3.44	3.18	0.03	0.02
5	4.70	3.39	3.23	2.39	0.41	0.29
6	10.62	6.40	0.33	0.20	0.00	0.00
7	6.10	3.17	0.87	0.46	1.02	0.53
8	4.79	2.18	0.71	0.33	1.36	0.62
9	4.80	1.94	0.48	0.20	1.33	0.54
10	4.04	1.47	0.00	0.00	1.02	0.37
11	2.46	0.82	0.00	0.00	0.70	0.23
12	2.18	0.67	0.00	0.00	0.67	0.21
13	1.92	0.54	0.00	0.00	0.62	0.17
14	1.66	0.44	0.00	0.00	0.54	0.14
15	1.41	0.34	0.00	0.00	0.46	0.11
16	1.19	0.27	0.00	0.00	0.38	0.09
17	1.01	0.22	0.00	0.00	0.31	0.07
18	0.87	0.18	0.00	0.00	0.26	0.05
19	0.77	0.15	0.00	0.00	0.23	0.04
20	0.68	0.13	0.00	0.00	0.20	0.04
21	0.57	0.10	0.00	0.00	0.17	0.03
22	0.45	0.07	0.00	0.00	0.13	0.02

TABLE 57

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 118

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.35	0.06	0.00	0.00	0.10	0.02
24	0.27	0.04	0.00	0.00	0.07	0.01
25	0.22	0.03	0.00	0.00	0.05	0.01
26	0.17	0.02	0.00	0.00	0.04	0.01
27	0.14	0.02	0.00	0.00	0.03	0.00
28	0.12	0.02	0.00	0.00	0.03	0.00
29	0.09	0.01	0.00	0.00	0.02	0.00
30	0.07	0.01	0.00	0.00	0.02	0.00
31	0.06	0.01	0.00	0.00	0.01	0.00
32	0.04	0.01	0.00	0.00	0.01	0.00
33	0.03	0.00	0.00	0.00	0.01	0.00
34	0.02	0.00	0.00	0.00	0.00	0.00
35	0.02	0.00	0.00	0.00	0.00	0.00
36	0.01	0.00	0.00	0.00	0.00	0.00
37	0.01	0.00	0.00	0.00	0.00	0.00
38	0.01	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 58

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : CO/ZR/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+121

REACTOR LOADING, MLS :	450.0	T, C :	261.0	FEED RATIO,	
CATALYST LOADING, WT% :	21.1	P, PSIG :	300	CO/H2:	1.00
TIME ON STREAM, HRS :	3148.0	SV, L/G/HR:	2.00		

USAGE RATIO, CO/H2 :	0.51	BULK ACTIVITY,	
%OVERALL CONV-, CO+H2:	43.08	MOL SYNGAS/KG CAT/HR:	38.485
%CO CONV- :	29.28	SPECIFIC ACTIVITY,	
%H2 CONV- :	56.88	MOL CO/MOL METAL/MIN:	0.244

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	13.51	H2O:	15.28
OXYGENATES :	0.37	CO :	66.26
CO2 :	1.70	H2 :	2.88

HYDROCARBON SELECTIVITY, WT%:

C1 :	17.61	C4+ENE :	3.56
C2+ANE :	2.81	C5+C11 :	47.20
C2+ENE :	0.00	C12+C18:	13.08
C3+ANE :	3.50	C19+C23:	3.89
C3+ENE :	3.35	C24+34 :	0.77
C4 ISO+ANE:	4.23	C35+ :	0.01

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	47.20
DIESEL (C9+C25) :	32.77

% ELEMENTAL RECOVERY:	CARBON :	100.08
	HYDROGEN:	104.37
	OXYGEN :	98.67

TABLE 59

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 121

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	17.61	53.90	0.00	0.00	0.00	0.00
2	2.81	4.58	0.00	0.00	0.00	0.00
3	3.50	3.89	3.35	3.91	0.00	0.00
4	4.16	3.51	3.56	3.11	0.06	0.05
5	4.67	3.17	3.27	2.29	0.42	0.28
6	9.28	5.28	0.35	0.21	0.00	0.00
7	5.36	2.63	0.85	0.42	1.04	0.51
8	4.58	1.97	0.69	0.30	1.35	0.58
9	4.75	1.82	0.50	0.19	1.37	0.52
10	4.10	1.41	0.00	0.00	1.23	0.43
11	2.32	0.73	0.23	0.07	0.84	0.26
12	2.12	0.61	0.00	0.00	0.63	0.18
13	1.82	0.48	0.00	0.00	0.55	0.15
14	1.58	0.39	0.00	0.00	0.47	0.12
15	1.37	0.32	0.01	0.00	0.40	0.09
16	1.21	0.26	0.00	0.00	0.35	0.07
17	1.07	0.22	0.00	0.00	0.30	0.06
18	0.96	0.19	0.00	0.00	0.24	0.05
19	0.87	0.16	0.00	0.00	0.23	0.04
20	0.77	0.13	0.00	0.00	0.19	0.03
21	0.64	0.11	0.00	0.00	0.17	0.03
22	0.47	0.07	0.00	0.00	0.14	0.02

TABLE 59

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 121

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.32	0.05	0.00	0.00	0.09	0.01
24	0.21	0.03	0.00	0.00	0.07	0.01
25	0.14	0.02	0.00	0.00	0.04	0.01
26	0.09	0.01	0.00	0.00	0.02	0.00
27	0.05	0.01	0.00	0.00	0.01	0.00
28	0.04	0.00	0.00	0.00	0.01	0.00
29	0.02	0.00	0.00	0.00	0.01	0.00
30	0.02	0.00	0.00	0.00	0.00	0.00
31	0.01	0.00	0.00	0.00	0.00	0.00
32	0.01	0.00	0.00	0.00	0.00	0.00
33	0.01	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	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 60

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+124

REACTOR LOADING, MLS :	450.0	T, C :	261.0	FEED RATIO,	
CATALYST LOADING, WT%:	21.1	P, PSIG :	300	CO/H2:	1.00
TIME ON STREAM, HRS :	3196.0	SV, L/G/HR:	2.00		

USAGE RATIO, CO/H2 :	0.48	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	42.83	MOL SYNGAS/KG CAT/HR:	38.261
%CO CONV-	27.84	SPECIFIC ACTIVITY,	
%H2 CONV-	57.82	MOL CO/MOL METAL/MIN:	0.232

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	14.01	H2O:	15.54
OXYGENATES :	0.39	CO :	65.76
CO2 :	1.56	H2 :	2.74

HYDROCARBON SELECTIVITY, WT%:

C1 :	15.74	C4+ENE :	3.34
C2+ANE :	2.61	C5+C11 :	48.48
C2+ENE :	0.00	C12+C18:	14.49
C3+ANE :	3.08	C19+C23:	3.74
C3+ENE :	2.98	C24+34 :	1.65
C4 ISO+ANE:	3.79	C35+ :	0.11

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	48.48
DIESEL (C9+C25) :	33.87

% ELEMENTAL RECOVERY:	CARBON :	103.41
	HYDROGEN:	106.61
	OXYGEN :	101.16

TABLE 61

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 124

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	15.74	51.45	0.00	0.00	0.00	0.00
2	2.61	4.55	0.00	0.00	0.00	0.00
3	3.08	3.66	2.98	3.71	0.00	0.00
4	3.73	3.36	3.34	3.12	0.06	0.06
5	4.55	3.30	3.23	2.42	0.39	0.28
6	10.58	6.43	0.00	0.00	0.00	0.00
7	6.67	3.49	0.00	0.00	1.16	0.60
8	4.73	2.17	0.72	0.34	1.45	0.66
9	4.79	1.96	0.51	0.21	1.42	0.58
10	4.00	1.47	0.00	0.00	1.07	0.39
11	2.48	0.83	0.00	0.00	0.73	0.24
12	2.20	0.68	0.00	0.00	0.71	0.22
13	1.95	0.56	0.00	0.00	0.67	0.19
14	1.71	0.45	0.00	0.00	0.60	0.16
15	1.50	0.37	0.01	0.00	0.53	0.13
16	1.30	0.30	0.09	0.02	0.38	0.09
17	1.13	0.25	0.01	0.00	0.40	0.09
18	0.97	0.20	0.01	0.00	0.31	0.06
19	0.83	0.16	0.00	0.00	0.25	0.05
20	0.69	0.13	0.00	0.00	0.20	0.04
21	0.57	0.10	0.00	0.00	0.16	0.03
22	0.46	0.08	0.00	0.00	0.13	0.02

TABLE 61

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO- 8862+1+31

SAMPLE NO- 124

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.36	0.06	0.00	0.00	0.10	0.02
24	0.28	0.04	0.00	0.00	0.07	0.01
25	0.23	0.03	0.00	0.00	0.05	0.01
26	0.18	0.03	0.00	0.00	0.04	0.01
27	0.15	0.02	0.00	0.00	0.03	0.00
28	0.12	0.02	0.00	0.00	0.03	0.00
29	0.10	0.01	0.00	0.00	0.02	0.00
30	0.08	0.01	0.00	0.00	0.02	0.00
31	0.07	0.01	0.00	0.00	0.01	0.00
32	0.05	0.01	0.00	0.00	0.01	0.00
33	0.04	0.00	0.00	0.00	0.01	0.00
34	0.03	0.00	0.00	0.00	0.00	0.00
35	0.03	0.00	0.00	0.00	0.00	0.00
36	0.02	0.00	0.00	0.00	0.00	0.00
37	0.01	0.00	0.00	0.00	0.00	0.00
38	0.02	0.00	0.00	0.00	0.00	0.00
39	0.01	0.00	0.00	0.00	0.00	0.00
40	0.01	0.00	0.00	0.00	0.00	0.00

TABLE 62

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : CO/ZR/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+128

REACTOR LOADING, MLS :	450.0	T, C :	261.0	FEED RATIO,	
CATALYST LOADING, WT%:	21.1	P, PSIG :	300	CO/H2:	1.00
TIME ON STREAM, HRS :	3268.0	SV, L/G/HR:	2.00		

USAGE RATIO, CO/H2 :	0.46	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	42.44	MOL SYNGAS/KG CAT/HR:	37.910
%CO CONV.	26.58	SPECIFIC ACTIVITY,	
%H2 CONV.	58.30	MOL CO/MOL METAL/MIN:	0.222

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	14.02	H2O:	16.15
OXYGENATES :	0.42	CO :	65.17
CO2 :	1.59	H2 :	2.64

HYDROCARBON SELECTIVITY, WT%:

C1 :	15.93	C4+ENE :	3.15
C2+ANE :	2.65	C5+C11 :	47.28
C2+ENE :	0.00	C12+C18:	13.88
C3+ANE :	3.16	C19+C23:	4.71
C3+ENE :	3.06	C24+34 :	2.43
C4 ISO+ANE:	3.61	C35+ :	0.14

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	47.28
DIESEL (C9+C25) :	35.18

% ELEMENTAL RECOVERY:	CARBON :	105.59
	HYDROGEN:	109.00
	OXYGEN :	104.33

TABLE 63

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 128

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	15.93	52.25	0.00	0.00	0.00	0.00
2	2.65	4.63	0.00	0.00	0.00	0.00
3	3.16	3.77	3.06	3.82	0.00	0.00
4	3.56	3.22	3.15	2.95	0.04	0.04
5	4.19	3.05	2.52	1.89	0.36	0.26
6	9.82	5.99	0.21	0.13	0.00	0.00
7	5.91	3.10	0.80	0.43	0.90	0.47
8	4.86	2.24	0.71	0.33	1.36	0.62
9	5.01	2.05	0.51	0.21	1.43	0.58
10	4.36	1.61	0.00	0.00	1.16	0.43
11	2.45	0.82	0.00	0.00	0.72	0.24
12	2.18	0.57	0.00	0.00	0.70	0.22
13	1.93	0.55	0.00	0.00	0.63	0.18
14	1.67	0.44	0.00	0.00	0.55	0.15
15	1.44	0.36	0.00	0.00	0.46	0.11
16	1.25	0.29	0.01	0.00	0.39	0.09
17	1.08	0.24	0.01	0.00	0.32	0.07
18	0.99	0.20	0.00	0.00	0.26	0.05
19	0.91	0.18	0.00	0.00	0.25	0.05
20	0.84	0.16	0.00	0.00	0.23	0.04
21	0.77	0.14	0.00	0.00	0.21	0.04
22	0.65	0.11	0.00	0.00	0.18	0.03

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 128

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.53	0.09	0.00	0.00	0.14	0.02
24	0.43	0.07	0.00	0.00	0.11	0.02
25	0.34	0.05	0.00	0.00	0.08	0.01
26	0.28	0.04	0.00	0.00	0.06	0.01
27	0.23	0.03	0.00	0.00	0.05	0.01
28	0.19	0.02	0.00	0.00	0.04	0.00
29	0.15	0.02	0.00	0.00	0.03	0.00
30	0.12	0.01	0.00	0.00	0.02	0.00
31	0.10	0.01	0.00	0.00	0.02	0.00
32	0.08	0.01	0.00	0.00	0.01	0.00
33	0.06	0.01	0.00	0.00	0.01	0.00
34	0.04	0.00	0.00	0.00	0.01	0.00
35	0.03	0.00	0.00	0.00	0.00	0.00
36	0.03	0.00	0.00	0.00	0.00	0.00
37	0.02	0.00	0.00	0.00	0.00	0.00
38	0.02	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 64

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE NO: 8862+1+31+131

REACTOR LOADING, MLS : 450.0 T, C : 261.0 FEED RATIO,
CATALYST LOADING, WT%: 21.1 P, PSIG : 295 CO/H2: 0.49
TIME ON STREAM, HRS : 3316.0 SV, L/G/HR: 1.00

USAGE RATIO, CO/H2 : 0.45 BULK ACTIVITY,
%OVERALL CONV., CO+H2: 67.70 MOL SYNGAS/KG CAT/HR: 30.258
%CO CONV. : 63.76 SPECIFIC ACTIVITY,
%H2 CONV. : 69.65 MOL CO/MOL METAL/MIN: 0.176

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 27.46 H2O: 32.45
OXYGENATES : 0.85 CO : 28.40
CO2 : 7.40 H2 : 3.45

HYDROCARBON SELECTIVITY, WT%:

C1 : 20.65 C4+ENE : 2.14
C2+ANE : 5.43 C5+C11 : 39.00
C2+ENE : 0.00 C12+C18: 9.00
C3+ANE : 9.34 C19+C23: 3.24
C3+ENE : 1.25 C24+34 : 1.17
C4 ISO+ANE: 8.74 C35+ : 0.05

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 39.00
DIESEL (C9+C25) : 24.36

% ELEMENTAL RECOVERY: CARBON : 110.41
HYDROGEN: 106.96
OXYGEN : 113.41

TABLE 65

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO- 8862+1+31

SAMPLE NO- 131

CARBON NO-	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	20.65	54.54	0.00	0.00	0.00	0.00
2	5.43	7.64	0.00	0.00	0.00	0.00
3	9.34	8.97	1.25	1.26	0.00	0.00
4	8.48	6.18	2.14	1.61	0.26	0.19
5	7.81	4.58	1.74	1.05	0.74	0.44
6	6.85	3.37	0.34	0.17	0.00	0.00
7	3.96	1.68	0.86	0.37	0.01	0.00
8	3.80	1.41	0.10	0.04	1.23	0.46
9	3.71	1.23	0.00	0.00	1.38	0.46
10	2.77	0.82	0.00	0.00	1.03	0.31
11	1.92	0.52	0.00	0.00	0.74	0.20
12	1.50	0.37	0.00	0.00	0.58	0.14
13	1.19	0.27	0.00	0.00	0.44	0.10
14	0.99	0.21	0.00	0.00	0.36	0.08
15	0.85	0.17	0.01	0.00	0.29	0.06
16	0.76	0.14	0.01	0.00	0.25	0.05
17	0.70	0.12	0.01	0.00	0.22	0.04
18	0.65	0.11	0.01	0.00	0.18	0.03
19	0.63	0.10	0.00	0.00	0.16	0.03
20	0.60	0.09	0.00	0.00	0.15	0.02
21	0.55	0.08	0.00	0.00	0.13	0.02
22	0.45	0.06	0.00	0.00	0.12	0.02

TABLE 65

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 131

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.34	0.04	0.00	0.00	0.09	0.01
24	0.25	0.03	0.00	0.00	0.07	0.01
25	0.20	0.02	0.00	0.00	0.05	0.01
26	0.14	0.02	0.00	0.00	0.03	0.00
27	0.10	0.01	0.00	0.00	0.02	0.00
28	0.08	0.01	0.00	0.00	0.01	0.00
29	0.06	0.01	0.00	0.00	0.01	0.00
30	0.04	0.00	0.00	0.00	0.01	0.00
31	0.03	0.00	0.00	0.00	0.01	0.00
32	0.03	0.00	0.00	0.00	0.00	0.00
33	0.02	0.00	0.00	0.00	0.00	0.00
34	0.01	0.00	0.00	0.00	0.00	0.00
35	0.01	0.00	0.00	0.00	0.00	0.00
36	0.01	0.00	0.00	0.00	0.00	0.00
37	0.01	0.00	0.00	0.00	0.00	0.00
38	0.01	0.00	0.00	0.00	0.00	0.00
39	0.01	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 66

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+ESTENDED TES
SAMPLE No: 8862+1+31+134

REACTOR LOADING, MLS : 450.0 T, C : 261.0 FEED RATIO,
CATALYST LOADING, WT% : 21.1 P, PSIG : 295 CG/H2: 0.49
TIME ON STREAM, HRS : 3364.0 SV, L/G/HR: 1.00

USAGE RATIO, CO/H2 : 0.45 BULK ACTIVITY,
%OVERALL CONV., CO+H2: 65.74 MOL SYNGAS/KG CAT/HR: 29.379
%CO CONV. : 61.53 SPECIFIC ACTIVITY,
%H2 CONV. : 67.81 MOL CO/MOL METAL/MIN: 0.169

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 26.41 H2O: 31.44
OXYGENATES : 0.90 CO : 30.60
CO2 : 6.94 H2 : 3.71

HYDROCARBON SELECTIVITY, WT%:

C1 : 22.06 C4+ENE : 2.11
C2+ANE : 5.72 C5+C11 : 38.81
C2+ENE : 0.00 C12+C18: 8.15
C3+ANE : 9.52 C19+C23: 2.50
C3+ENE : 1.29 C24+34 : 0.84
C4 ISO+ANE: 8.98 C35+ : 0.01

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 38.81
DIESEL (C9+C25) : 22.75

% ELEMENTAL RECOVERY: CARBON : 108.58
HYDROGEN: 105.49
OXYGEN : 111.82

TABLE 67

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 134

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	22.06	55.94	0.00	0.00	0.00	0.00
2	5.72	7.73	0.00	0.00	0.00	0.00
3	9.52	8.78	1.29	1.24	0.00	0.00
4	8.69	6.08	2.11	1.53	0.29	0.20
5	7.90	4.45	1.82	1.06	0.75	0.42
6	7.07	3.33	0.26	0.13	0.00	0.00
7	4.02	1.63	0.59	0.25	0.00	0.00
8	3.78	1.34	0.00	0.00	0.97	0.35
9	4.00	1.27	0.00	0.00	1.12	0.35
10	2.88	0.82	0.00	0.00	1.00	0.29
11	1.94	0.51	0.00	0.00	0.71	0.18
12	1.55	0.37	0.00	0.00	0.49	0.12
13	1.24	0.27	0.00	0.00	0.37	0.08
14	1.01	0.21	0.00	0.00	0.30	0.06
15	0.81	0.15	0.00	0.00	0.24	0.05
16	0.64	0.12	0.00	0.00	0.20	0.04
17	0.53	0.09	0.00	0.00	0.17	0.03
18	0.47	0.07	0.00	0.00	0.13	0.02
19	0.46	0.07	0.00	0.00	0.11	0.02
20	0.46	0.07	0.00	0.00	0.11	0.02
21	0.44	0.06	0.00	0.00	0.10	0.01
22	0.37	0.05	0.00	0.00	0.09	0.01

TABLE 67

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 134

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.28	0.04	0.00	0.00	0.07	0.01
24	0.21	0.03	0.00	0.00	0.05	0.01
25	0.15	0.02	0.00	0.00	0.04	0.00
26	0.11	0.01	0.00	0.00	0.03	0.00
27	0.07	0.01	0.00	0.00	0.02	0.00
28	0.05	0.01	0.00	0.00	0.01	0.00
29	0.03	0.00	0.00	0.00	0.01	0.00
30	0.02	0.00	0.00	0.00	0.00	0.00
31	0.02	0.00	0.00	0.00	0.00	0.00
32	0.01	0.00	0.00	0.00	0.00	0.00
33	0.01	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	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 68

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+ESTENDED TES
SAMPLE No: 8862+1+31+136

REACTOR LOADING, MLS : 450.0 T, C : 261.0 FEED RATIO,
CATALYST LOADING, WT%: 21.1 P, PSIG : 300 CO/H2: 0.49
TIME ON STREAM, HRS : 3436.0 SV, L/G/HR: 1.00

USAGE RATIO, CO/H2 : 0.44 BULK ACTIVITY,
%OVERALL CONV., CO+H2: 64.96 MOL SYNGAS/KG CAT/HR: 29.033
%CO CONV. : 60.19 SPECIFIC ACTIVITY,
%H2 CONV. : 67.31 MOL CO/MOL METAL/MIN: 0.166

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 27.01 H2O: 30.89
OXYGENATES : 0.98 CO : 30.45
CO2 : 7.05 H2 : 3.62

HYDROCARBON SELECTIVITY, WT%:

C1 : 23.31 C4+ENE : 2.13
C2+ANE : 5.46 C5+C11 : 38.64
C2+ENE : 0.00 C12+C18: 8.12
C3+ANE : 9.57 C19+C23: 1.88
C3+ENE : 1.20 C24+34 : 0.52
C4 ISO+ANE: 9.16 C35+ : 0.00

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 38.64
DIESEL (C9+C25) : 21.71

% ELEMENTAL RECOVERY: CARBON : 114.32
HYDROGEN: 10.2
OXYGEN : 115.23

TABLE 69

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 136

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	23.31	57.51	0.00	0.00	0.00	0.00
2	5.46	7.18	0.00	0.00	0.00	0.00
3	9.57	8.59	1.20	1.13	0.00	0.00
4	8.83	6.01	2.13	1.50	0.34	0.23
5	8.08	4.43	1.66	0.94	0.80	0.44
6	6.94	3.19	0.36	0.17	0.00	0.00
7	3.77	1.49	0.97	0.39	0.00	0.00
8	3.48	1.20	0.08	0.03	1.12	0.39
9	3.64	1.12	0.00	0.00	1.31	0.40
10	2.67	0.74	0.00	0.00	1.12	0.31
11	1.85	0.47	0.00	0.00	0.78	0.20
12	1.49	0.34	0.00	0.00	0.62	0.14
13	1.18	0.25	0.00	0.00	0.47	0.10
14	0.95	0.19	0.00	0.00	0.37	0.07
15	0.75	0.14	0.00	0.00	0.30	0.06
16	0.59	0.10	0.00	0.00	0.24	0.04
17	0.47	0.08	0.00	0.00	0.18	0.03
18	0.37	0.06	0.00	0.00	0.14	0.02
19	0.33	0.05	0.00	0.00	0.10	0.02
20	0.32	0.04	0.00	0.00	0.10	0.01
21	0.30	0.04	0.00	0.00	0.10	0.01
22	0.26	0.03	0.00	0.00	0.10	0.01

TABLE 69
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 136

CARBON NO.	N ⁺ TALKANES		1 ⁺ TALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.19	0.02	0.00	0.00	0.08	0.01
24	0.13	0.02	0.00	0.00	0.06	0.01
25	0.09	0.01	0.00	0.00	0.04	0.00
26	0.05	0.01	0.00	0.00	0.03	0.00
27	0.03	0.00	0.00	0.00	0.02	0.00
28	0.02	0.00	0.00	0.00	0.01	0.00
29	0.01	0.00	0.00	0.00	0.01	0.00
30	0.01	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	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 70

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+ESTENDED TES
SAMPLE No: 8862+1+31+140

REACTOR LOADING, MLS : 450.0 T, C : 261.0 FEED RATIO,
CATALYST LOADING, WT%: 21.1 P, PSIG : 300 CO/H2: 0.49
TIME ON STREAM, HRS : 3484.0 SV, L/G/HR: 1.00

USAGE RATIO, CO/H2 : 0.44 BULK ACTIVITY,
%OVERALL CONV., CO+H2: 63.89 MOL SYNGAS/KG CAT/HR: 28.554
%CO CONV. : 59.21 SPECIFIC ACTIVITY,
%H2 CONV. : 65.20 MOL CO/MOL METAL/MIN: 0.163

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 21.85 H2O: 31.25
OXYGENATES : 0.74 CO : 34.33
CO2 : 7.72 H2 : 4.12

HYDROCARBON SELECTIVITY, WT%:

C1 : 18.36 C4+ENE : 1.82
C2+ANE : 7.45 C5+C11 : 43.22
C2+ENE : 0.00 C12+C18: 9.05
C3+ANE : 7.82 C19+C23: 2.51
C3+ENE : 0.95 C24+34 : 0.99
C4 ISO+ANE: 7.83 C35+ : 0.01

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 43.22
DIESEL (C9+C25) : 26.10

% ELEMENTAL RECOVERY: CARBON : 97.28
HYDROGEN: 95.30
OXYGEN : 110.81

TABLE 71

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 140

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	18.36	50.87	0.00	0.00	0.00	0.00
2	7.45	11.01	0.00	0.00	0.00	0.00
3	7.82	7.88	0.95	1.00	0.00	0.00
4	7.54	5.77	1.82	1.44	0.28	0.22
5	6.71	4.13	1.28	0.81	0.68	0.42
6	8.02	4.13	0.38	0.20	0.00	0.00
7	4.87	2.16	0.12	0.06	1.06	0.47
8	4.63	1.80	0.00	0.00	1.52	0.59
9	4.73	1.64	0.00	0.00	1.55	0.54
10	3.37	1.05	0.00	0.00	1.25	0.39
11	2.20	0.62	0.00	0.00	0.84	0.24
12	1.75	0.46	0.00	0.00	0.66	0.17
13	1.37	0.33	0.00	0.00	0.51	0.12
14	1.06	0.24	0.16	0.04	0.24	0.05
15	0.82	0.17	0.00	0.00	0.31	0.07
16	0.64	0.13	0.01	0.00	0.24	0.05
17	0.51	0.09	0.01	0.00	0.19	0.03
18	0.41	0.07	0.01	0.00	0.14	0.02
19	0.37	0.06	0.00	0.00	0.11	0.02
20	0.39	0.06	0.00	0.00	0.11	0.02
21	0.41	0.06	0.00	0.00	0.13	0.02
22	0.39	0.06	0.00	0.00	0.14	0.02

TABLE 71

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 140

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.32	0.04	0.00	0.00	0.13	0.02
24	0.24	0.03	0.00	0.00	0.10	0.01
25	0.17	0.02	0.00	0.00	0.08	0.01
26	0.11	0.01	0.00	0.00	0.05	0.01
27	0.07	0.01	0.00	0.00	0.03	0.00
28	0.04	0.00	0.00	0.00	0.02	0.00
29	0.02	0.00	0.00	0.00	0.01	0.00
30	0.01	0.00	0.00	0.00	0.01	0.00
31	0.01	0.00	0.00	0.00	0.00	0.00
32	0.01	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	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

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+142

REACTOR LOADING, MLS : 450.0 T, C : 261.0 FEED RATIO,
CATALYST LOADING, WT%: 21.1 P, PSIG : 445 CO/H2: 0.49
TIME ON STREAM, HRS : 3532.0 SV, L/G/HR: 1.00

USAGE RATIO, CO/H2 : 0.44 BULK ACTIVITY,
%OVERALL CONV., CO+H2: 63.47 MOL SYNGAS/KG CAT/HR: 28.364
%CO CONV. SPECIFIC ACTIVITY,
%H2 CONV. MOL CO/MOL METAL/MIN: 0.163

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 26.60 H2O: 30.46
OXYGENATES : 0.81 CO : 31.37
CO2 : 6.92 H2 : 3.83

HYDROCARBON SELECTIVITY, WT%:

C1 : 25.85 C4+ENE : 2.00
C2+ANE : 5.79 C5+C11 : 37.05
C2+ENE : 0.00 C12+C18: 5.97
C3+ANE : 10.26 C19+C23: 1.65
C3+ENE : 1.17 C24+34 : 0.59
C4 ISO+ANE: 9.65 C35+ : 0.00

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 37.05
DIESEL (C9+C25) : 17.17

% ELEMENTAL RECOVERY: CARBON : 113.38
HYDROGEN: 110.55
OXYGEN : 114.72

TABLE 73

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO- 8862+1+31

SAMPLE NO. 142

CARBON NO-	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	25.85	59.77	0.00	0.00	0.00	0.00
2	5.79	7.15	0.00	0.00	0.00	0.00
3	10.26	8.63	1.17	1.03	0.00	0.00
4	9.32	5.94	2.00	1.32	0.34	0.21
5	7.55	3.88	1.40	0.74	0.76	0.39
6	8.60	3.70	0.19	0.08	0.00	0.00
7	4.67	1.73	0.71	0.27	0.00	0.00
8	3.09	1.00	0.07	0.02	0.83	0.27
9	3.07	0.89	0.00	0.00	0.91	0.26
10	2.28	0.60	0.00	0.00	0.95	0.25
11	1.37	0.33	0.00	0.00	0.60	0.14
12	1.08	0.23	0.00	0.00	0.47	0.10
13	0.85	0.17	0.00	0.00	0.39	0.08
14	0.67	0.13	0.15	0.03	0.13	0.02
15	0.53	0.09	0.00	0.00	0.22	0.04
16	0.42	0.07	0.00	0.00	0.17	0.03
17	0.34	0.05	0.00	0.00	0.14	0.02
18	0.28	0.04	0.00	0.00	0.11	0.02
19	0.25	0.03	0.00	0.00	0.09	0.01
20	0.25	0.03	0.00	0.00	0.09	0.01
21	0.26	0.03	0.00	0.00	0.09	0.01
22	0.24	0.03	0.00	0.00	0.10	0.01

TABLE 73

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 142

CARBON NO.	N ⁺ ALKANES		I ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.20	0.02	0.00	0.00	0.09	0.01
24	0.14	0.02	0.00	0.00	0.07	0.01
25	0.09	0.01	0.00	0.00	0.05	0.01
26	0.06	0.01	0.00	0.00	0.03	0.00
27	0.04	0.00	0.00	0.00	0.02	0.00
28	0.02	0.00	0.00	0.00	0.02	0.00
29	0.01	0.00	0.00	0.00	0.01	0.00
30	0.01	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	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

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+148

REACTOR LOADING, MLS :	450.0	T, C :	260.0	FEED RATIO,	
CATALYST LOADING, WT%:	21.1	P, PSIG :	500	CO/H2:	0.49
TIME ON STREAM, HRS :	3676.0	SV, L/G/HR:	1.00		

USAGE RATIO, CO/H2 :	0.51	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	74.34	MOL SYNGAS/KG CAT/HR:	33.223
%CO CONV.	76.43	SPECIFIC ACTIVITY,	
%H2 CONV.	73.31	MOL CO/MOL METAL/MIN:	0.210

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	31.78	H2O:	23.75
OXYGENATES :	0.14	CO :	18.23
CO2 :	23.11	H2 :	2.99

HYDROCARBON SELECTIVITY, WT%:

C1 :	45.37	C4+ENE :	2.04
C2+ANE :	7.33	C5+C11 :	22.81
C2+ENE :	0.00	C12+C18:	2.17
C3+ANE :	8.61	C19+C23:	1.54
C3+ENE :	1.42	C24+34 :	2.40
C4 ISO+ANE:	6.23	C35+ :	0.10

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	22.81
DIESEL (C9+C25) :	8.71

% ELEMENTAL RECOVERY:	CARBON :	118.97
	HYDROGEN:	108.52
	OXYGEN :	109.48

TABLE 75

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 148

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	45.37	76.11	0.00	0.00	0.00	0.00
2	7.33	6.56	0.00	0.00	0.00	0.00
3	8.61	5.25	1.42	0.91	0.00	0.00
4	5.99	2.77	2.04	0.98	0.24	0.11
5	4.52	1.69	1.22	0.47	0.65	0.24
6	6.01	1.88	0.20	0.06	0.00	0.00
7	2.91	0.78	0.14	0.04	0.70	0.19
8	1.77	0.42	0.09	0.02	0.64	0.15
9	1.42	0.30	0.00	0.00	0.57	0.12
10	0.88	0.17	0.00	0.00	0.50	0.09
11	0.36	0.06	0.00	0.00	0.21	0.04
12	0.30	0.05	0.00	0.00	0.16	0.03
13	0.26	0.04	0.00	0.00	0.14	0.02
14	0.23	0.03	0.05	0.01	0.06	0.01
15	0.19	0.02	0.00	0.00	0.10	0.01
16	0.17	0.02	0.00	0.00	0.08	0.01
17	0.14	0.02	0.01	0.00	0.07	0.01
18	0.12	0.01	0.01	0.00	0.06	0.01
19	0.12	0.01	0.00	0.00	0.05	0.00
20	0.14	0.01	0.00	0.00	0.05	0.00
21	0.21	0.02	0.00	0.00	0.06	0.01
22	0.31	0.03	0.00	0.00	0.09	0.01

TABLE 75

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 148

CARBON NO.	N ⁺ ALKANES		1 ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.39	0.03	0.00	0.00	0.13	0.01
24	0.40	0.03	0.00	0.00	0.15	0.01
25	0.36	0.03	0.00	0.00	0.15	0.01
26	0.27	0.02	0.00	0.00	0.13	0.01
27	0.20	0.01	0.00	0.00	0.10	0.01
28	0.14	0.01	0.00	0.00	0.07	0.00
29	0.09	0.01	0.00	0.00	0.05	0.00
30	0.07	0.00	0.00	0.00	0.04	0.00
31	0.05	0.00	0.00	0.00	0.03	0.00
32	0.03	0.00	0.00	0.00	0.02	0.00
33	0.03	0.00	0.00	0.00	0.01	0.00
34	0.02	0.00	0.00	0.00	0.01	0.00
35	0.02	0.00	0.00	0.00	0.01	0.00
36	0.02	0.00	0.00	0.00	0.00	0.00
37	0.02	0.00	0.00	0.00	0.00	0.00
38	0.01	0.00	0.00	0.00	0.00	0.00
39	0.01	0.00	0.00	0.00	0.00	0.00
40	0.01	0.00	0.00	0.00	0.00	0.00

TABLE 76

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+151

REACTOR LOADING, MLS : 450-0 T, C : 260-0 FEED RATIO,
CATALYST LOADING, WT%: 21-1 P, PSIG : 500 CO/H2: 0.49
TIME ON STREAM, HRS : 3773-0 SV, L/G/HR: 1-00

USAGE RATIO, CO/H2 : 0.44 BULK ACTIVITY,
%OVERALL CONV., CO+H2: 48.92 MOL SYNGAS/KG CAT/HR: 21.865
%CO CONV- SPECIFIC ACTIVITY,
%H2 CONV- MOL CO/MOL METAL/MIN: 0.125

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 17.88 H2O: 27.91
OXYGENATES : 0.49 CO : 42.75
CO2 : 5.40 H2 : 5.58

HYDROCARBON SELECTIVITY, WT%:

C1 : 35.56 C4+ENE : 3.75
C2+ANE : 7.86 C5+C11 : 25.31
C2+ENE : 0.00 C12+C18: 5.37
C3+ANE : 8.10 C19+C23: 0.91
C3+ENE : 3.28 C24+34 : 1.80
C4 ISO+ANE: 8.01 C35+ : 0.04

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 25.31
DIESEL (C9+C25) : 11.65

% ELEMENTAL RECOVERY: CARBON : 102.74
HYDROGEN: 108.05
OXYGEN : 119.53

TABLE 77

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 151

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	35.56	67.91	0.00	0.00	0.00	0.00
2	7.86	8.01	0.00	0.00	0.00	0.00
3	8.10	5.63	3.28	2.38	0.00	0.00
4	7.79	4.10	3.75	2.04	0.22	0.12
5	6.37	2.70	2.60	1.13	0.78	0.33
6	5.70	2.02	0.11	0.04	0.00	0.00
7	1.76	0.54	1.13	0.35	0.21	0.06
8	0.96	0.26	0.65	0.18	0.26	0.07
9	0.87	0.21	0.49	0.12	0.39	0.09
10	0.78	0.17	0.42	0.09	0.47	0.10
11	0.66	0.13	0.26	0.05	0.43	0.08
12	0.61	0.11	0.19	0.03	0.32	0.06
13	0.58	0.10	0.13	0.02	0.30	0.05
14	0.62	0.10	0.00	0.00	0.27	0.04
15	0.54	0.08	0.00	0.00	0.25	0.04
16	0.45	0.06	0.00	0.00	0.21	0.03
17	0.36	0.05	0.00	0.00	0.17	0.02
18	0.27	0.03	0.00	0.00	0.11	0.01
19	0.18	0.02	0.00	0.00	0.05	0.01
20	0.12	0.01	0.00	0.00	0.03	0.00
21	0.11	0.01	0.00	0.00	0.03	0.00
22	0.13	0.01	0.00	0.00	0.04	0.00

TABLE 77

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 151

CARBON NO.	N-ALKANES		I-ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.17	0.02	0.00	0.00	0.05	0.01
24	0.21	0.02	0.00	0.00	0.08	0.01
25	0.22	0.02	0.00	0.00	0.09	0.01
26	0.20	0.02	0.00	0.00	0.10	0.01
27	0.17	0.01	0.00	0.00	0.09	0.01
28	0.13	0.01	0.00	0.00	0.07	0.01
29	0.10	0.01	0.00	0.00	0.06	0.00
30	0.07	0.00	0.00	0.00	0.04	0.00
31	0.05	0.00	0.00	0.00	0.03	0.00
32	0.03	0.00	0.00	0.00	0.02	0.00
33	0.02	0.00	0.00	0.00	0.01	0.00
34	0.01	0.00	0.00	0.00	0.01	0.00
35	0.01	0.00	0.00	0.00	0.01	0.00
36	0.01	0.00	0.00	0.00	0.00	0.00
37	0.01	0.00	0.00	0.00	0.00	0.00
38	0.01	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 78

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : CO/ZR/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+153

REACTOR LOADING, MLS : 450.0 T, C : 261.0 FEED RATIO,
CATALYST LOADING, WT% : 21.1 P, PSIG : 305 CO/H2: 0.49
TIME ON STREAM, HRS : 3844.0 SV, L/G/HR: 1.00

USAGE RATIO, CO/H2 : 0.40 BULK ACTIVITY,
%OVERALL CONV., CO+H2 : 38.93 MOL SYNGAS/KG CAT/HR: 17.398
%CO CONV. : 33.93 SPECIFIC ACTIVITY,
%H2 CONV. : 41.39 MOL CO/MOL METAL/MIN: 0.093

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 14.76 H2O: 19.32
OXYGENATES : 0.40 CO : 54.54
CO2 : 3.97 H2 : 7.01

HYDROCARBON SELECTIVITY, WT%:

C1 : 42.71 C4+ENE : 3.81
C2+ANE : 8.01 C5+C11 : 18.39
C2+ENE : 0.00 C12+C18: 2.97
C3+ANE : 8.00 C19+C23: 1.07
C3+ENE : 3.37 C24+34 : 4.22
C4 ISO+ANE : 7.31 C35+ : 0.13

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 18.39
DIESEL (C9+C25) : 8.19

% ELEMENTAL RECOVERY: CARBON : 102.92
 HYDROGEN: 101.89
 OXYGEN : 108.96

TABLE 79

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 153

CARBON NO.	N ⁺ TALKANES		I ⁺ TALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	42.71	73.50	0.00	0.00	0.00	0.00
2	8.01	7.35	0.00	0.00	0.00	0.00
3	8.00	5.00	3.37	2.21	0.00	0.00
4	7.05	3.35	3.81	1.88	0.26	0.12
5	5.37	2.05	1.43	0.56	0.74	0.28
6	3.43	1.10	0.21	0.07	0.18	0.06
7	1.89	0.52	0.18	0.05	0.26	0.07
8	1.25	0.30	0.12	0.03	0.22	0.05
9	1.01	0.22	0.08	0.02	0.22	0.05
10	0.82	0.16	0.06	0.01	0.18	0.03
11	0.55	0.10	0.04	0.01	0.14	0.03
12	0.57	0.09	0.00	0.00	0.16	0.03
13	0.49	0.07	0.00	0.00	0.15	0.02
14	0.39	0.05	0.00	0.00	0.12	0.02
15	0.30	0.04	0.05	0.01	0.04	0.00
16	0.23	0.03	0.03	0.00	0.03	0.00
17	0.18	0.02	0.03	0.00	0.02	0.00
18	0.14	0.02	0.00	0.00	0.04	0.00
19	0.13	0.01	0.00	0.00	0.03	0.00
20	0.12	0.01	0.00	0.00	0.03	0.00
21	0.13	0.01	0.00	0.00	0.04	0.00
22	0.18	0.02	0.00	0.00	0.05	0.00

TABLE 79
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 153

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.26	0.02	0.00	0.00	0.09	0.01
24	0.34	0.03	0.00	0.00	0.13	0.01
25	0.41	0.03	0.00	0.00	0.17	0.01
26	0.42	0.03	0.00	0.00	0.20	0.02
27	0.40	0.03	0.00	0.00	0.21	0.01
28	0.35	0.02	0.00	0.00	0.19	0.01
29	0.28	0.02	0.00	0.00	0.17	0.01
30	0.21	0.01	0.00	0.00	0.13	0.01
31	0.15	0.01	0.00	0.00	0.10	0.01
32	0.10	0.01	0.00	0.00	0.07	0.00
33	0.07	0.00	0.00	0.00	0.05	0.00
34	0.05	0.00	0.00	0.00	0.03	0.00
35	0.03	0.00	0.00	0.00	0.02	0.00
36	0.03	0.00	0.00	0.00	0.01	0.00
37	0.02	0.00	0.00	0.00	0.00	0.00
38	0.01	0.00	0.00	0.00	0.00	0.00
39	0.01	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 80

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+155

REACTOR LOADING, MLS :	450.0	T, C :	261.0	FEED RATIO,	
CATALYST LOADING, WT%:	21.1	P, PSIG :	305	CO/H2:	0.49
TIME ON STREAM, HRS :	3868-0	SV, L/G/HR:	1.00		

USAGE RATIO, CO/H2 :	0.41	BULK ACTIVITY,	
%OVERALL CONV-, CO+H2:	40.48	MOL SYNGAS/KG CAT/HR:	18.092
%CO CONV-	35.96	SPECIFIC ACTIVITY,	
%H2 CONV-	42.71	MOL CO/MOL METAL/MIN:	0.099

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	15.23	H2O:	20.42
OXYGENATES :	0.43	CO :	52.64
CO2 :	4.44	H2 :	6.83

HYDROCARBON SELECTIVITY, WT%:

C1 :	42.11	C4+ENE :	3.37
C2+ANE :	7.64	C5+C11 :	22.85
C2+ENE :	0.00	C12+C18:	3.94
C3+ANE :	7.21	C19+C23:	0.84
C3+ENE :	3.30	C24+34 :	2.48
C4 ISO+ANE:	6.19	C35+ :	0.08

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	22.85
DIESEL (C9+C25) :	11.60

% ELEMENTAL RECOVERY:	CARBON :	102.58
	HYDROGEN:	102.49
	OXYGEN :	109.96

TABLE 81

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO- 8862+1+31

SAMPLE NO. 155

CARBON NO-	N [†] TALKANES		I [†] TALKENE		BRANCHED WT %	ISOMERS MOLE %
	WT %	MOLE %	WT %	MOLE %		
1	42.11	73.67	0.00	0.00	0.00	0.00
2	7.64	7.13	0.00	0.00	0.00	0.00
3	7.21	4.59	3.30	2.20	0.00	0.00
4	5.95	2.87	3.37	1.68	0.24	0.12
5	4.79	1.86	2.15	0.86	0.68	0.26
6	4.34	1.41	0.15	0.05	0.00	0.00
7	2.04	0.57	0.20	0.06	0.28	0.08
8	1.49	0.36	0.17	0.04	0.41	0.10
9	1.83	0.40	0.15	0.03	0.63	0.14
10	1.38	0.27	0.14	0.03	0.62	0.12
11	0.90	0.16	0.08	0.02	0.41	0.07
12	0.70	0.12	0.05	0.01	0.32	0.05
13	0.59	0.09	0.00	0.00	0.25	0.04
14	0.46	0.06	0.08	0.01	0.10	0.01
15	0.35	0.05	0.00	0.00	0.14	0.02
16	0.27	0.03	0.00	0.00	0.11	0.01
17	0.20	0.02	0.00	0.00	0.08	0.01
18	0.15	0.02	0.00	0.00	0.07	0.01
19	0.13	0.01	0.00	0.00	0.04	0.00
20	0.11	0.01	0.00	0.00	0.03	0.00
21	0.11	0.01	0.00	0.00	0.03	0.00
22	0.14	0.01	0.00	0.00	0.03	0.00

TABLE 81
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8852+1+31

SAMPLE NO. 155

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.18	0.02	0.00	0.00	0.05	0.00
24	0.22	0.02	0.00	0.00	0.08	0.01
25	0.27	0.02	0.00	0.00	0.10	0.01
26	0.24	0.02	0.00	0.00	0.12	0.01
27	0.23	0.02	0.00	0.00	0.12	0.01
28	0.20	0.01	0.00	0.00	0.11	0.01
29	0.16	0.01	0.00	0.00	0.09	0.01
30	0.12	0.01	0.00	0.00	0.07	0.00
31	0.09	0.01	0.00	0.00	0.05	0.00
32	0.06	0.00	0.00	0.00	0.04	0.00
33	0.04	0.00	0.00	0.00	0.02	0.00
34	0.03	0.00	0.00	0.00	0.02	0.00
35	0.02	0.00	0.00	0.00	0.01	0.00
36	0.02	0.00	0.00	0.00	0.01	0.00
37	0.01	0.00	0.00	0.00	0.00	0.00
38	0.01	0.00	0.00	0.00	0.00	0.00
39	0.01	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 82

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE No: 8862+1+3I+158

REACTOR LOADING, MLS :	450-0	T, C :	281-0	FEED RATIO,	
CATALYST LOADING, WT%:	21-1	P, PSIG :	305	CO/H2:	1.00
TIME ON STREAM, HRS :	3964-0	SV, L/G/HR:	2.00		

USAGE RATIO, CO/H2 :	0.62	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	40-78	MOL SYNGAS/KG CAT/HR:	36-425
%CO CONV. :	31-15	SPECIFIC ACTIVITY,	
%H2 CONV. :	50-41	MOL CO/MOL METAL/MIN:	0.260

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	9.79	H2O:	11.84
OXYGENATES :	0.16	CO :	65.99
CO2 :	8.83	H2 :	3.39

HYDROCARBON SELECTIVITY, WT%:

C1 :	37.15	C4+ENE :	5.03
C2+ANE :	6.97	C5+C11 :	27.50
C2+ENE :	0.00	C12+C18:	7.06
C3+ANE :	3.85	C19+C23:	1.75
C3+ENE :	5.07	C24+34 :	2.51
C4 ISO+ANE:	3.10	C35+ :	0.03

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	27.50
DIESEL (C9+C25) :	17.85

% ELEMENTAL RECOVERY:	CARBON :	94.11
	HYDROGEN:	96.80
	OXYGEN :	99.91

TABLE 83
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 158

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	37.15	71.78	0.00	0.00	0.00	0.00
2	6.97	7.18	0.00	0.00	0.00	0.00
3	3.85	2.70	5.07	3.73	0.00	0.00
4	2.91	1.55	5.03	2.77	0.19	0.10
5	2.50	1.08	2.84	1.25	0.51	0.22
6	5.73	2.06	0.20	0.08	0.00	0.00
7	2.73	0.84	0.65	0.20	0.59	0.18
8	1.94	0.53	0.59	0.16	0.79	0.21
9	1.63	0.39	0.54	0.13	1.15	0.28
10	1.08	0.23	0.58	0.13	1.36	0.30
11	0.79	0.16	0.35	0.07	0.95	0.19
12	0.68	0.12	0.28	0.05	0.72	0.13
13	0.61	0.10	0.21	0.04	0.58	0.10
14	0.50	0.08	0.15	0.02	0.46	0.07
15	0.53	0.08	0.00	0.00	0.39	0.06
16	0.42	0.06	0.00	0.00	0.34	0.05
17	0.34	0.04	0.00	0.00	0.30	0.04
18	0.30	0.04	0.00	0.00	0.25	0.03
19	0.25	0.03	0.00	0.00	0.20	0.02
20	0.20	0.02	0.00	0.00	0.18	0.02
21	0.17	0.02	0.00	0.00	0.16	0.02
22	0.15	0.02	0.00	0.00	0.15	0.01

TABLE 83

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 158

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.15	0.01	0.00	0.00	0.13	0.01
24	0.16	0.01	0.00	0.00	0.13	0.01
25	0.21	0.02	0.00	0.00	0.12	0.01
26	0.21	0.02	0.00	0.00	0.13	0.01
27	0.22	0.02	0.00	0.00	0.14	0.01
28	0.20	0.02	0.00	0.00	0.13	0.01
29	0.17	0.01	0.00	0.00	0.11	0.01
30	0.13	0.01	0.00	0.00	0.09	0.01
31	0.09	0.01	0.00	0.00	0.07	0.00
32	0.06	0.00	0.00	0.00	0.04	0.00
33	0.04	0.00	0.00	0.00	0.03	0.00
34	0.02	0.00	0.00	0.00	0.02	0.00
35	0.01	0.00	0.00	0.00	0.01	0.00
36	0.01	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	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 84

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE NO: 8852+1+31+162

REACTOR LOADING, MLS :	450.0	T, C :	281.0	FEED RATIO,	
CATALYST LOADING, WT% :	21.1	P, PSIG :	310	CO/H ₂ :	0.49
TIME ON STREAM, HRS :	4036.0	SV, L/G/HR:	1.80		

USAGE RATIO, CO/H ₂ :	0.46	BULK ACTIVITY,	
%OVERALL CONV., CO+H ₂ :	44.56	MOL SYNGAS/KG CAT/HR:	35.817
%CO CONV. :	42.54	SPECIFIC ACTIVITY,	
%H ₂ CONV. :	45.55	MOL CO/MOL METAL/MIN:	0.211

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	17.87	H ₂ O:	17.69
OXYGENATES :	0.23	CO :	49.81
CO ₂ :	7.57	H ₂ :	6.84

HYDROCARBON SELECTIVITY, WT%:

C1 :	56.45	C4+ENE :	3.27
C2+ANE :	7.72	C5+C11 :	17.85
C2+ENE :	0.00	C12+C18:	0.49
C3+ANE :	5.43	C19+C23:	0.13
C3+ENE :	3.34	C24+34 :	0.88
C4 ISO+ANE:	4.34	C35+ :	0.11

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	17.85
DIESEL (C9+C25) :	2.98

% ELEMENTAL RECOVERY:	CARBON :	101.10
	HYDROGEN:	100.74
	OXYGEN :	100.53

TABLE 85

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 162

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	56.45	81.45	0.00	0.00	0.00	0.00
2	7.72	5.94	0.00	0.00	0.00	0.00
3	5.43	2.85	3.34	1.83	0.00	0.00
4	4.16	1.65	3.27	1.35	0.18	0.07
5	3.56	1.14	2.59	0.85	0.62	0.20
6	2.79	0.75	0.61	0.17	0.86	0.23
7	2.19	0.51	0.24	0.06	0.32	0.07
8	1.15	0.23	0.16	0.03	0.49	0.10
9	0.87	0.16	0.11	0.02	0.25	0.05
10	0.53	0.09	0.10	0.02	0.24	0.04
11	0.11	0.02	0.02	0.00	0.06	0.01
12	0.08	0.01	0.01	0.00	0.04	0.01
13	0.07	0.01	0.01	0.00	0.04	0.00
14	0.05	0.01	0.00	0.00	0.02	0.00
15	0.04	0.00	0.01	0.00	0.01	0.00
16	0.03	0.00	0.01	0.00	0.01	0.00
17	0.03	0.00	0.01	0.00	0.01	0.00
18	0.02	0.00	0.00	0.00	0.01	0.00
19	0.02	0.00	0.00	0.00	0.02	0.00
20	0.02	0.00	0.00	0.00	0.01	0.00
21	0.01	0.00	0.00	0.00	0.01	0.00
22	0.01	0.00	0.00	0.00	0.01	0.00

TABLE 85
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 162

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

TABLE 86

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : CO/ZR/SILICA+EXTENDED TES
SAMPLE NO: 8862+1+31+164

REACTOR LOADING, MLS : 450.0 T, C : 280.0 FEED RATIO,
CATALYST LOADING, WT%: 21.1 P, PSIG : 300 CO/H2: 0.49
TIME ON STREAM, HRS : 4108.0 SV, L/G/HR: 1.00

USAGE RATIO, CO/H2 : 0.44 BULK ACTIVITY,
%OVERALL CONV., CO+H2: 58.66 MOL SYNGAS/KG CAT/HR: 26.216
%CO CONV. : 53.94 SPECIFIC ACTIVITY,
%H2 CONV. : 60.98 MOL CO/MOL METAL/MIN: 0.149

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS: 21.74 H2O: 23.73
OXYGENATES : 0.42 CO : 37.36
CO2 : 12.16 H2 : 4.59

HYDROCARBON SELECTIVITY, WT%:

C1 : 55.25 C4+ENE : 2.69
C2+ANE : 7.19 C5+C11 : 17.35
C2+ENE : 0.00 C12+C18: 3.32
C3+ANE : 5.90 C19+C23: 0.32
C3+ENE : 2.48 C24+34 : 0.96
C4 ISO+ANE: 4.50 C35+ : 0.06

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 17.35
DIESEL (C9+C25) : 9.49

% ELEMENTAL RECOVERY: CARBON : 105.41
HYDROGEN: 101.24
OXYGEN : 111.03

TABLE 87

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+131

SAMPLE NO. 164

CARBON NO.	N ⁺ ALKANES		I ⁺ ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	55.25	81.96	0.00	0.00	0.00	0.00
2	7.19	5.69	0.00	0.00	0.00	0.00
3	5.90	3.18	2.48	1.40	0.00	0.00
4	4.28	1.75	2.69	1.14	0.21	0.09
5	3.02	1.00	1.86	0.63	0.50	0.17
6	2.43	0.67	0.16	0.04	0.00	0.00
7	1.32	0.31	0.16	0.04	0.34	0.08
8	1.23	0.26	0.16	0.03	0.46	0.10
9	1.67	0.31	0.00	0.00	0.66	0.12
10	1.31	0.22	0.00	0.00	0.69	0.12
11	0.75	0.11	0.11	0.02	0.53	0.08
12	0.55	0.08	0.08	0.01	0.34	0.05
13	0.43	0.06	0.05	0.01	0.25	0.03
14	0.36	0.04	0.00	0.00	0.18	0.02
15	0.27	0.03	0.00	0.00	0.14	0.02
16	0.20	0.02	0.00	0.00	0.11	0.01
17	0.14	0.01	0.00	0.00	0.08	0.01
18	0.10	0.01	0.00	0.00	0.04	0.00
19	0.08	0.01	0.00	0.00	0.03	0.00
20	0.06	0.00	0.00	0.00	0.02	0.00
21	0.04	0.00	0.00	0.00	0.02	0.00
22	0.03	0.00	0.00	0.00	0.01	0.00

TABLE 87

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8852+1+31

SAMPLE NO. 164

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.03	0.00	0.00	0.00	0.01	0.00
24	0.03	0.00	0.00	0.00	0.01	0.00
25	0.07	0.00	0.00	0.00	0.02	0.00
26	0.06	0.00	0.00	0.00	0.03	0.00
27	0.08	0.00	0.00	0.00	0.04	0.00
28	0.09	0.01	0.00	0.00	0.04	0.00
29	0.08	0.00	0.00	0.00	0.04	0.00
30	0.07	0.00	0.00	0.00	0.04	0.00
31	0.06	0.00	0.00	0.00	0.04	0.00
32	0.04	0.00	0.00	0.00	0.03	0.00
33	0.03	0.00	0.00	0.00	0.02	0.00
34	0.02	0.00	0.00	0.00	0.01	0.00
35	0.01	0.00	0.00	0.00	0.01	0.00
36	0.01	0.00	0.00	0.00	0.00	0.00
37	0.01	0.00	0.00	0.00	0.00	0.00
38	0.01	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 83

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+167

REACTOR LOADING, MLS :	450.0	T, C :	283.0	FEED RATIO,	
CATALYST LOADING, WT%:	21.1	P, PSIG :	305	CO/H2:	0.93
TIME ON STREAM, HRS :	4204.0	SV, L/G/HR:	1.00		

USAGE RATIO, CO/H2 :	0.53	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	49.34	MOL SYNGAS/KG CAT/HR:	22.036
%CO CONV.	35.47	SPECIFIC ACTIVITY,	
%H2 CONV.	62.20	MOL CO/MOL METAL/MIN:	0.142

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	14.50	H2O:	14.15
OXYGENATES :	0.18	CO :	53.63
CO2 :	15.12	H2 :	2.42

HYDROCARBON SELECTIVITY, WT%:

C1 :	42.27	C4+ENE :	3.46
C2+ANE :	6.47	C5+C11 :	25.55
C2+ENE :	0.00	C12+C18:	9.49
C3+ANE :	3.75	C19+C23:	1.71
C3+ENE :	3.64	C24+34 :	0.88
C4 ISO+ANE:	2.76	C35+ :	0.02

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	25.55
DIESEL (C9+C25) :	22.24

% ELEMENTAL RECOVERY:	CARBON :	108.99
	HYDROGEN:	107.61
	OXYGEN :	114.34

TABLE 89
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 167

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	42.27	76.68	0.00	0.00	0.00	0.00
2	6.47	6.26	0.00	0.00	0.00	0.00
3	3.75	2.47	3.64	2.51	0.00	0.00
4	2.55	1.27	3.46	1.79	0.21	0.11
5	1.93	0.78	3.05	1.27	0.38	0.15
6	3.65	1.23	0.26	0.09	0.00	0.00
7	1.77	0.51	0.35	0.10	0.52	0.15
8	1.64	0.42	0.38	0.10	0.83	0.21
9	2.38	0.54	0.00	0.00	1.39	0.32
10	1.53	0.31	0.70	0.14	1.75	0.36
11	1.18	0.22	0.47	0.09	1.38	0.26
12	1.00	0.17	0.39	0.07	1.07	0.18
13	0.86	0.14	0.28	0.04	0.82	0.13
14	0.68	0.10	0.19	0.03	0.60	0.09
15	0.57	0.08	0.11	0.02	0.49	0.07
16	0.55	0.07	0.00	0.00	0.42	0.05
17	0.43	0.05	0.00	0.00	0.37	0.04
18	0.38	0.04	0.00	0.00	0.30	0.03
19	0.30	0.03	0.00	0.00	0.23	0.02
20	0.23	0.02	0.00	0.00	0.19	0.02
21	0.18	0.02	0.00	0.00	0.15	0.01
22	0.13	0.01	0.00	0.00	0.12	0.01

TABLE 89

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 167

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.10	0.01	0.00	0.00	0.09	0.01
24	0.07	0.01	0.00	0.00	0.07	0.01
25	0.06	0.01	0.00	0.00	0.05	0.00
26	0.06	0.00	0.00	0.00	0.05	0.00
27	0.06	0.00	0.00	0.00	0.04	0.00
28	0.06	0.00	0.00	0.00	0.05	0.00
29	0.05	0.00	0.00	0.00	0.04	0.00
30	0.04	0.00	0.00	0.00	0.04	0.00
31	0.03	0.00	0.00	0.00	0.03	0.00
32	0.02	0.00	0.00	0.00	0.03	0.00
33	0.01	0.00	0.00	0.00	0.01	0.00
34	0.01	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	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 90

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : CO/ZR/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+171

REACTOR LOADING, MLS :	450.0	T, C :	280.0	FEED RATIO,	
CATALYST LOADING, WT% :	21.1	P, PSIG :	300	CO/H2:	1.00
TIME ON STREAM, HRS :	4276.0	SV, L/G/HR:	2.00		

USAGE RATIO, CO/H2 :	0.59	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	33.50	MOL SYNGAS/KG CAT/HR:	29.927
%CO CONV.	24.78	SPECIFIC ACTIVITY,	
%H2 CONV.	42.23	MOL CO/MOL METAL/MIN:	0.207

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	8.32	H2O:	8.35
OXYGENATES :	0.07	CO :	72.62
CO2 :	6.65	H2 :	3.98

HYDROCARBON SELECTIVITY, WT%:

C1 :	44.31	C4+ENE :	4.93
C2+ANE :	7.15	C5+C11 :	25.53
C2+ENE :	0.00	C12+C18:	4.04
C3+ANE :	4.11	C19+C23:	0.79
C3+ENE :	5.29	C24+34 :	0.54
C4 ISO+ANE:	3.28	C35+ :	0.02

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	25.53
DIESEL (C9+C25) :	9.23

% ELEMENTAL RECOVERY: CARBON : 95.76
HYDROGEN: 95.61
OXYGEN : 97.50

TABLE 91
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 171

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	44.31	75.21	0.00	0.00	0.00	0.00
2	7.15	6.47	0.00	0.00	0.00	0.00
3	4.11	2.54	5.29	3.42	0.00	0.00
4	3.05	1.43	4.93	2.39	0.23	0.11
5	2.67	1.01	4.64	1.80	0.53	0.20
6	7.44	2.35	0.26	0.08	0.00	0.00
7	2.63	0.71	0.51	0.14	0.56	0.15
8	1.28	0.31	0.30	0.07	0.46	0.11
9	1.09	0.23	0.00	0.00	0.49	0.10
10	0.52	0.10	0.33	0.06	0.63	0.12
11	0.42	0.07	0.20	0.04	0.56	0.10
12	0.36	0.06	0.17	0.03	0.41	0.06
13	0.33	0.05	0.13	0.02	0.32	0.05
14	0.29	0.04	0.10	0.01	0.26	0.04
15	0.24	0.03	0.06	0.01	0.23	0.03
16	0.25	0.03	0.00	0.00	0.20	0.02
17	0.20	0.02	0.00	0.00	0.17	0.02
18	0.17	0.02	0.00	0.00	0.15	0.02
19	0.13	0.01	0.00	0.00	0.11	0.01
20	0.10	0.01	0.00	0.00	0.09	0.01
21	0.08	0.01	0.00	0.00	0.07	0.01
22	0.06	0.01	0.00	0.00	0.06	0.01

TABLE 91

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 171

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.05	0.00	0.00	0.00	0.05	0.00
24	0.04	0.00	0.00	0.00	0.04	0.00
25	0.04	0.00	0.00	0.00	0.03	0.00
26	0.03	0.00	0.00	0.00	0.03	0.00
27	0.03	0.00	0.00	0.00	0.02	0.00
28	0.03	0.00	0.00	0.00	0.02	0.00
29	0.03	0.00	0.00	0.00	0.02	0.00
30	0.03	0.00	0.00	0.00	0.02	0.00
31	0.02	0.00	0.00	0.00	0.01	0.00
32	0.02	0.00	0.00	0.00	0.01	0.00
33	0.02	0.00	0.00	0.00	0.01	0.00
34	0.01	0.00	0.00	0.00	0.01	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	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 92

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+173

REACTOR LOADING, MLS :	450.0	T, C :	261.0	FEED RATIO,	
CATALYST LOADING, WT%:	21.1	P, PSIG :	305	CO/H2:	1.00
TIME ON STREAM, HRS :	4348.0	SV, L/G/HR:	2.00		

USAGE RATIO, CO/H2 :	0.56	BULK ACTIVITY,	
%OVERALL CONV., CO+H2:	23.70	MOL SYNGAS/KG CAT/HR:	21.171
%CO CONV-	17.04	SPECIFIC ACTIVITY,	
%H2 CONV-	30.36	MOL CO/MOL METAL/MIN:	0.142

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	5.67	H2O:	6.40
OXYGENATES :	0.07	CO :	78.96
CO2 :	4.16	H2 :	4.73

HYDROCARBON SELECTIVITY, WT%:

C1 :	44.09	C4+ENE :	4.90
C2+ANE :	7.36	C5+C11 :	23.16
C2+ENE :	0.00	C12+C18:	3.81
C3+ANE :	5.32	C19+C23:	0.76
C3+ENE :	4.47	C24+34 :	0.18
C4 ISO+ANE:	5.93	C35+ :	0.00

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11): 23.16
DIESEL (C9+C25) : 8.73

% ELEMENTAL RECOVERY: CARBON : 96.92
HYDROGEN: 97.10
OXYGEN : 99.05

TABLE 93

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO- 8862+1+31

SAMPLE NO- 173

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	44.09	74.39	0.00	0.00	0.00	0.00
2	7.36	6.63	0.00	0.00	0.00	0.00
3	5.32	3.26	4.47	2.87	0.00	0.00
4	5.67	2.64	4.90	2.36	0.27	0.12
5	4.58	1.72	3.32	1.25	1.00	0.37
6	5.55	1.74	0.20	0.07	0.00	0.00
7	2.01	0.54	0.40	0.11	0.40	0.11
8	1.05	0.25	0.25	0.06	0.34	0.08
9	0.90	0.19	0.16	0.03	0.36	0.07
10	0.70	0.13	0.28	0.05	0.47	0.09
11	0.51	0.09	0.20	0.03	0.48	0.08
12	0.41	0.06	0.15	0.02	0.36	0.06
13	0.35	0.05	0.11	0.02	0.27	0.04
14	0.30	0.04	0.08	0.01	0.22	0.03
15	0.26	0.03	0.05	0.01	0.19	0.02
16	0.26	0.03	0.00	0.00	0.17	0.02
17	0.21	0.02	0.00	0.00	0.15	0.02
18	0.18	0.02	0.00	0.00	0.13	0.01
19	0.15	0.01	0.00	0.00	0.10	0.01
20	0.11	0.01	0.00	0.00	0.08	0.01
21	0.08	0.01	0.00	0.00	0.06	0.01
22	0.06	0.00	0.00	0.00	0.05	0.00

TABLE 93

HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 173

CARBON NO.	N+ALKANES		1+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.04	0.00	0.00	0.00	0.04	0.00
24	0.03	0.00	0.00	0.00	0.03	0.00
25	0.02	0.00	0.00	0.00	0.02	0.00
26	0.01	0.00	0.00	0.00	0.01	0.00
27	0.01	0.00	0.00	0.00	0.01	0.00
28	0.01	0.00	0.00	0.00	0.01	0.00
29	0.01	0.00	0.00	0.00	0.00	0.00
30	0.01	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	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 94

MASS BALANCE
PROCESS CONDITIONS AND PRODUCT SUMMARY

CATALYST : Co/Zr/SILICA+EXTENDED TES
SAMPLE No: 8862+1+31+176

REACTOR LOADING, MLS :	450.0	T, C :	260.0	FEED RATIO,	
CATALYST LOADING, WT%:	21.1	P, PSIG :	300	CO/H2:	1.00
TIME ON STREAM, HRS :	4417.0	SV, L/G/HR:	2.00		

USAGE RATIO, CO/H2 :	0.55	BULK ACTIVITY,	
%OVERALL CONV-, CO+H2:	23.60	MOL SYNGAS/KG CAT/HR:	21.077
%CO CONV-	16.76	SPECIFIC ACTIVITY,	
%H2 CONV-	30.43	MOL CO/MOL METAL/MIN:	0.140

WEIGHT % PRODUCT DISTRIBUTION:

HYDROCARBONS:	5.15	H2O:	7.04
OXYGENATES :	0.09	CO :	79.60
CO2 :	3.37	H2 :	4.75

HYDROCARBON SELECTIVITY, WT%:

C1 :	45.26	C4+ENE :	4.93
C2+ANE :	6.44	C5+C11 :	23.27
C2+ENE :	0.00	C12+C18:	3.26
C3+ANE :	5.72	C19+C23:	0.50
C3+ENE :	4.62	C24+34 :	0.33
C4 ISO+ANE:	5.68	C35+ :	0.01

FUEL FRACTIONS, WT%:

GASOLINE (C5+C11):	23.27
DIESEL (C9+C25) :	7.84

% ELEMENTAL RECOVERY: CARBON : 95.60
HYDROGEN: 96.48
OXYGEN : 99.24

TABLE 95
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 176

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
1	45.26	75.39	0.00	0.00	0.00	0.00
2	6.44	5.72	0.00	0.00	0.00	0.00
3	5.72	3.46	4.62	2.93	0.00	0.00
4	5.31	2.44	4.93	2.34	0.37	0.17
5	4.59	1.70	3.54	1.35	0.87	0.32
6	5.06	1.57	0.13	0.04	0.00	0.00
7	2.35	0.63	0.34	0.09	0.39	0.11
8	1.36	0.32	0.25	0.06	0.39	0.09
9	1.08	0.22	0.16	0.03	0.38	0.08
10	0.79	0.15	0.20	0.04	0.46	0.09
11	0.45	0.08	0.11	0.02	0.36	0.06
12	0.40	0.06	0.09	0.01	0.29	0.04
13	0.34	0.05	0.06	0.01	0.21	0.03
14	0.29	0.04	0.04	0.01	0.19	0.03
15	0.27	0.03	0.00	0.00	0.16	0.02
16	0.22	0.03	0.00	0.00	0.14	0.02
17	0.19	0.02	0.00	0.00	0.12	0.01
18	0.15	0.02	0.00	0.00	0.09	0.01
19	0.11	0.01	0.00	0.00	0.07	0.01
20	0.07	0.01	0.00	0.00	0.05	0.00
21	0.05	0.00	0.00	0.00	0.04	0.00
22	0.04	0.00	0.00	0.00	0.03	0.00

TABLE 95
HYDROCARBON PRODUCT DISTRIBUTION

RUN NO. 8862+1+31

SAMPLE NO. 176

CARBON NO.	N+ALKANES		I+ALKENE		BRANCHED ISOMERS	
	WT %	MOLE %	WT %	MOLE %	WT %	MOLE %
23	0.03	0.00	0.00	0.00	0.02	0.00
24	0.03	0.00	0.00	0.00	0.02	0.00
25	0.02	0.00	0.00	0.00	0.02	0.00
26	0.02	0.00	0.00	0.00	0.02	0.00
27	0.02	0.00	0.00	0.00	0.02	0.00
28	0.02	0.00	0.00	0.00	0.01	0.00
29	0.02	0.00	0.00	0.00	0.01	0.00
30	0.02	0.00	0.00	0.00	0.01	0.00
31	0.02	0.00	0.00	0.00	0.01	0.00
32	0.01	0.00	0.00	0.00	0.01	0.00
33	0.01	0.00	0.00	0.00	0.01	0.00
34	0.01	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	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 96
SUPPORT PROPERTIES

SUPPORT (1)	XRD Phases	B.E.T. Surface Area	PORE VOLUME		AVE. PORE Diameter	MEAN PARTICLE Diameter
			Macro.	Micro.		
Catapal [®] SB Alumina	γ -Al ₂ O ₃ mostly amorphous	217 m ² /g	0.167 cc/g	0.879 cc/g	154 Å (Hg)	55.4 μm
Davison 952 silica gel	amorphous	339	1.25	1.22	153 (N ₂) 261 (Hg)	57.3
167 Davison 952 Silica gel Calcined @ 900°C	N.D.	196	0.907	0.399	115 (Hg)	N.D.

(1) Supports were calcined at 500°C for 3 hours in static air.

TABLE 97

Selected Kinetic Functionalities*

$$-r_{\text{CO}+\text{H}_2} = \frac{kC_{\text{H}_2}}{1 + KC_{\text{CO}_2}/C_{\text{CO}}} \quad (1)$$

$$-r_{\text{CO} + \text{H}_2} = \frac{kC_{\text{H}_2}}{1 + KC_{\text{H}_2\text{O}}/C_{\text{CO}}} \quad (2)$$

$$-r_{\text{CO} + \text{H}_2} = \frac{kC_{\text{H}_2}}{1 + K_1C_{\text{CO}_2}/C_{\text{CO}} + K_2C_{\text{H}_2\text{O}}/C_{\text{CO}}} \quad (3)$$

$$-r_{\text{CO} + \text{H}_2} = \frac{kC_{\text{H}_2}}{1 + KC_{\text{H}_2\text{O}}/(C_{\text{CO}}C_{\text{H}_2})} \quad (4)$$

$$-r_{\text{CO} + \text{H}_2} = kC_{\text{H}_2}^a C_{\text{CO}}^b \quad (5)$$

*To correlate the equations with reference 3: A = 2; B = 1; C = 3; D = 4

TABLE 98

Summary of Fitted Kinetic Parameters

Kinetic Functionality ¹	k ²	K ²	a	b	Average Error (%)
1	0.546	1.13	--	--	8.5
2	0.587	0.0939	--	--	9.3
4	0.664	4.24x10 ⁻⁶	--	--	6.2
5	7.65x10 ⁵	---	1.84	0.54	7.4

¹ Refer to Table 97

² Units are consistent with: rate = mol/g. cat./sec.
 concentration = mol/cc (slurry)