

**APPENDIX C**

**SLURRY BUBBLE COLUMN REACTOR DATA**

Table I

## SUMMARY OF M3 SBCR RUN RESULTS

a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using H<sub>2</sub> as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C<sub>1</sub>+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	H <sub>2</sub> : CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf		Olefins C6-18, %	Comments	
												%CH <sub>4</sub>	%C <sub>2</sub>	%C <sub>3</sub> +	%CO <sub>2</sub>							
2	CO.001	16.5	1	162	177	225	450	2.0	20	15.9	0.70	2.3	0.8	96.4	0.53	0.98	0.88	5.00	2.27	25.2		
2	CO.001	16.5	2	202	228	200	450	2.0	20	3.9	0.17	0.0	0.0	99.9	0.00	0.81	0.91	0.00	0.00	21.7		
2	CO.001	16.5	3	254	280	240	450	2.0	20	30.9	1.36	11.7	1.8	85.5	1.04	0.87	0.77	2.63	1.64	22.4		
2	CO.001	16.5	4	302	323	225	450	1.2	20	9.9	0.59	0.7	0.3	98.4	0.67	0.76	0.90	0.00	7.14	29.4		
2	CO.001	16.5	5	350	372	225	450	2.0	20	15.3	0.68	6.0	1.0	92.5	0.49	0.84	0.88	4.00	2.70	23.1		
2	CO.001	16.5	6	398	420	225	300	2.0	20	12.5	0.55	6.1	1.1	92.2	0.63	0.79	0.86	4.35	2.86	21.7		
2	CO.001	16.5	7	446	468	240	300	2.0	20	22.9	1.02	16.5	0.8	81.5	1.16	0.71	0.79	3.03	1.79	22.4		
2	CO.001	16.5	8	494	516	240	600	2.0	20	29.9	1.33	12.6	1.6	85.0	0.84	0.76	0.82	2.63	1.69	22.4		
2	CO.001	16.5	9	517	540	240	600	2.0	0	29.5	1.31	12.0	1.7	85.3	0.96	0.76	--	2.50	1.56	22.4		
2	CO.001	16.5	9	541	564	240	600	2.0	0	28.4	1.26	10.4	1.7	87.1	0.89	0.77	--	3.03	1.72	--		
2	CO.001	16.5	9	565	588	240	600	2.0	0	27.9	1.27	11.1	1.7	86.2	0.93	0.76	--	3.03	1.72	--		
2	CO.001	16.5	9	589	612	240	600	2.0	0	27.0	1.20	10.7	1.7	86.7	0.89	0.76	0.82	2.78	2.00	--		
2	CO.001	16.5	10	637	660	240	600	2.0	20	26.4	1.17	11.0	1.7	86.4	0.85	0.77	0.83	2.86	1.96	22.4	G.C. Calib	
2	CO.001	16.5	11	684	706	225	450	2.0	20	11.6	0.51	5.4	1.0	93.0	0.61	0.81	0.87	5.26	3.45	23.8		
3	CO.005	19.5	1	12	36	240	450	2.0	20	33.2	1.23	5.6	1.6	91.8	1.06	0.80	0.81	2.04	1.27	23.1	G.C. Calib	
3	CO.005	19.5	2	60	84	220	450	2.0	20	15.0	0.56	2.9	0.6	96.2	0.24	0.86	0.87	4.55	3.23	21.7		
3	CO.005	19.5	3	108	132	240	450	1.2	20	18.5	0.94	6.9	1.0	91.3	0.85	0.81	--	5.88	3.85	26.6		
3	CO.005	19.5	4	156	179	240	450	2.0	20	29.6	1.11	11.5	1.8	85.8	0.91	0.76	0.78	2.22	1.39	21.7		
4	CO.002	20.1	1	37	59	240	450	2.0	20	36.1	1.32	22.9	3.2	72.4	1.51	0.66	0.77	0.65	0.31	16.8		
4	CO.002	20.1	2	85	106	220	450	2.0	20	16.6	0.60	3.8	1.1	94.7	0.35	0.84	0.88	2.44	0.89	--		
4	CO.002	20.1	3	133	149	210	600	1.0	20	5.2	0.28	0.0	0.0	99.1	0.87	0.89	0.94	0.00	0.00	--	Power Fail	
5	CO.003	15.1	1	15	35	240	450	2.0	20	31.7	1.53	16.7	2.4	79.8	1.16	0.71	--	1.30	0.60	18.2	G.C. Calib	
5	CO.003	15.1	2	61	83	220	450	2.0	20	13.2	0.63	5.1	1.0	93.4	0.51	0.82	0.90	4.55	1.89	--		
5	CO.003	15.1	3	88	107	240	450	2.0	20	28.4	1.37	15.1	2.4	81.4	1.11	0.75	--	1.45	0.97	--		
5	CO.003	15.1	4	133	155	240	450	1.0	20	13.1	0.95	4.2	1.2	93.3	1.24	0.83	0.88	6.67	3.70	--		
5	CO.003	15.1	5	181	203	240	600	1.0	20	13.4	0.97	3.9	1.1	93.7	1.30	0.81	--	5.26	3.45	30.1		
5	CO.003	15.1	6	217	227	240	450	2.0	20	25.4	1.23	14.9	2.4	81.7	1.03	0.73	--	1.89	1.19	--		
6	CO.011	15.3	1	13	35	240	450	2.0	20	14.3	0.67	7.6	1.6	89.4	1.42	0.78	0.83	4.17	2.57	21.7		
6	CO.011	15.3	2	61	83	220	450	2.0	20	5.1	0.23	0.0	0.0	97.2	2.78	0.87	0.82	--	--	--		
6	CO.011	15.3	3	88	107	240	450	2.0	20	13.5	0.63	5.4	1.7	91.1	1.86	0.79	--	4.00	2.83	--		
6	CO.011	15.3	4	133	155	240	450	1.0	20	6.3	0.44	0.4	1.0	95.5	3.05	0.82	0.88	--	--	--		
6	CO.011	15.3	5	181	203	240	600	1.0	20	6.7	0.46	0.2	0.9	96.0	2.91	0.84	0.89	12.00	3.67	27.3	G.C. Calib	
6	CO.011	15.3	6	217	226	240	450	2.0	20	12.0	0.57	5.9	1.8	90.4	1.91	0.78	--	4.40	2.43	--		

Table I  
(Continued)

SUMMARY OF M3 SBCR RUN RESULTS

a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	N2: CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities %C1+	%C2	%C3+	%CO2	Alpha GC	Alpha Liq	Olefin/Paraf C3	C4	Olefins C6-18, %	Comments
7	CO.012	15.8	1	14	36	240	450	2.0	20	13.9	0.63	6.1	1.5	90.6	1.74	0.80	0.89	4.00	2.57	17.5	
7	CO.012	15.8	2	62	84	220	450	2.0	20	5.1	0.23	0.0	0.2	97.8	2.02	0.89	0.90	--	2.50	--	
7	CO.012	15.8	3	88	92	240	450	2.0	20	13.1	0.59	6.1	1.7	90.4	1.75	0.80	--	5.00	2.25	--	Power Fail
7	CO.012	15.8	4	134	156	240	450	1.0	20	3.9	0.26	4.8	2.3	86.3	6.64	0.70	0.85	16.00	3.50	--	
7	CO.012	15.8	5	182	204	240	600	1.0	20	4.3	0.28	0.1	2.1	91.6	9.29	0.75	0.82	8.50	3.50	30.8	
7	CO.012	15.8	6	218	227	240	450	2.0	20	7.2	0.32	7.3	3.2	85.1	4.45	0.70	--	5.00	3.17	--	
8	CO.015	15.0	1	14	35	240	450	2.0	20	28.3	1.37	12.7	2.0	84.1	1.24	0.76	0.80	1.61	1.07	19.6	G.C. Calib
8	CO.015	15.0	2	61	83	220	450	2.0	20	11.5	0.56	4.4	1.0	93.9	0.80	0.81	0.89	3.60	2.14	--	
8	CO.015	15.0	3	97	106	240	450	2.0	20	26.4	1.28	13.2	2.1	83.5	1.12	0.75	--	1.69	1.20	--	
8	CO.015	15.0	4	133	155	240	450	1.0	20	11.5	0.83	4.8	1.2	92.5	1.53	0.80	0.85	5.60	3.29	--	
8	CO.015	15.0	5	181	191	240	600	1.0	20	12.4	0.90	4.9	0.8	93.6	0.73	0.84	0.85	5.20	3.14	30.8	Power Fail
9	CO.011	15.0	1	13	35	240	450	2.0	20	18.5	0.89	8.8	1.7	88.8	0.77	0.78	0.83	3.18	1.85	20.3	G.C. Calib
9	CO.011	15.0	2	61	82	220	450	2.0	20	6.3	0.31	0.0	1.0	98.6	0.41	0.88	0.93	12.00	1.80	--	
9	CO.011	15.0	3	97	107	240	450	2.0	20	16.6	0.80	8.4	2.1	88.7	0.81	0.77	--	3.30	2.00	--	
9	CO.011	15.0	4	133	155	240	450	1.0	20	8.0	0.58	1.3	1.3	96.3	1.16	0.82	0.87	7.00	2.83	--	
9	CO.011	15.0	5	181	203	240	600	1.0	20	8.7	0.63	1.4	1.1	96.4	1.05	0.83	0.87	5.00	2.67	30.5	
9	CO.011	15.0	6	228	229	240	450	2.0	20	14.7	0.71	7.9	2.2	89.1	0.85	0.78	--	3.78	1.67	--	Power Fail
11	CO.017	15.0	1	9	31	240	450	2.0	20	27.2	1.32	11.2	1.8	85.9	1.14	0.77	0.80	2.09	1.20	30.8	
11	CO.017	15.0	2	55	79	220	450	2.0	20	11.4	0.55	5.0	0.0	94.8	0.22	0.88	0.90	5.00	3.20	--	
11	CO.017	15.0	3	81	103	240	450	2.0	20	25.9	1.26	11.7	1.6	85.6	1.14	0.77	--	1.95	1.26	--	
11	CO.017	15.0	4	129	151	240	450	1.0	20	11.6	0.84	5.0	0.0	93.9	1.19	0.82	0.86	25.0	2.88	--	
11	CO.017	15.0	5	177	199	240	600	1.0	20	11.6	0.84	4.2	0.0	96.7	1.17	0.86	0.86	24.0	1.63	21.0	G.C. Calib
11	CO.017	15.0	6	213	221	240	450	2.0	20	24.3	1.20	12.1	1.4	86.4	0.08	0.78	--	2.47	1.64	--	
12	CO.018	15.6	1	13	35	240	450	2.0	20	33.8	1.56	9.7	2.0	86.6	1.68	0.75	0.85	1.81	1.13	21.0	G.C. Calib
12	CO.018	15.6	2	61	80	220	450	2.0	20	12.6	0.59	2.8	0.0	97.1	0.08	0.90	0.88	--	--	--	
12	CO.018	15.6	3	97	107	240	450	2.0	20	27.9	1.30	9.4	1.9	87.7	1.03	0.75	--	2.65	2.17	--	
12	CO.018	15.6	4	133	155	240	450	1.0	20	12.4	0.86	3.3	0.0	95.0	1.67	0.80	0.86	--	--	--	
12	CO.018	15.6	5	181	203	240	600	1.0	20	13.0	0.90	3.2	0.0	94.9	1.86	0.80	0.85	--	--	38.5	
12	CO.018	15.6	6	217	226	240	450	2.0	20	26.4	1.22	10.1	1.4	86.8	1.74	0.73	--	2.89	2.05	--	

Table I  
(Continued)

SUMMARY OF M3 SBGR RUN RESULTS

)Unless otherwise noted, total flow is ca.15 L/min. STP, or 3 cm/sec linear gas flow.

)Conversion is total CO conversion over the period (%).

)Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

)Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat.,hr).

)Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	N2: CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities	Alpha GC	Alpha Liq	Olefin/Paraf C3	C4	Olefins C6-18, %	Comments
13	CO.016	14.7	1	16	35	240	450	2.0	20	26.4	1.31	8.3 1.7 89.3 0.68	0.78	0.81	2.00	1.41	21.7	G.C.Calib
13	CO.016	14.7	2	65	83	220	450	2.0	20	9.7	0.48	0.0 0.99.9 0.00	0.91	0.88	--	--	--	TCO weak.
13	CO.016	14.7	3	89	105	240	450	2.0	20	25.2	1.25	9.2 1.7 88.6 0.51	0.78	--	2.10	1.41	--	CN4 peaks
13	CO.016	14.7	4	134	155	240	450	1.0	20	10.9	0.81	1.2 0.7 97.7 0.32	0.84	0.86	--	--	--	are lower
13	CO.016	14.7	5	181	203	240	600	1.0	20	11.4	0.85	0.0 0.4 99.3 0.25	0.92	0.86	--	--	32.2	than
13	CO.016	14.7	6	210	226	240	450	2.0	20	22.7	1.12	3.8 1.9 93.7 0.46	0.79	--	2.37	1.41	--	expected.
14	CO.019	15.2	1	14	35	240	450	2.0	20	13.9	0.66	0.4 1.7 97.2 0.70	0.80	0.86	5.33	2.67	26.6	G.C.Calib
14	CO.019	15.2	2	66	83	220	450	2.0	20	3.8	0.18	0.0 1.7 96.7 1.56	0.88	--	--	--	--	New TCO
14	CO.019	15.2	3	88	105	240	450	2.0	20	12.2	0.57	0.0 2.0 96.3 1.67	0.80	--	5.60	3.80	--	
14	CO.019	15.2	4	133	155	240	450	1.0	20	--	--	-- -- -- 0.85	--	--	--	--	--	Repair G.C
14	CO.019	15.2	5	169	178	240	600	1.0	20	5.9	0.41	0.0 1.5 96.1 2.42	0.80	--	8.50	13.00	--	Valve Leak
14	CO.019	15.2	6	193	203	240	450	2.0	20	10.2	0.68	0.8 2.2 95.0 1.96	0.79	--	4.80	3.40	--	CN4 peaks
14	CO.019	15.2	7	217	226	240	450	1.0	20	5.1	0.36	0.0 1.6 95.4 3.09	0.80	--	--	--	--	undetected
15	CO.005	14.7	1	25	35	240	450	2.0	20	27.1	1.34	7.9 1.6 89.7 0.82	0.79	0.82	2.30	1.38	23.1	G.C.Calib
15	CO.005	14.7	2	62	83	220	450	2.0	20	10.7	0.53	0.0 0.9 98.4 0.70	0.83	0.88	4.25	3.25	--	
15	CO.005	14.7	3	86	105	240	450	2.0	20	25.3	1.25	7.6 1.8 89.6 1.01	0.78	--	2.42	1.50	--	
15	CO.005	14.7	4	134	155	240	450	1.0	20	11.6	0.85	0.0 1.1 97.5 1.37	0.82	0.85	7.00	4.60	--	
15	CO.005	14.7	5	182	203	240	600	1.0	20	12.3	0.90	0.0 1.0 97.7 1.33	0.83	0.85	7.00	4.40	--	
15	CO.005	14.7	6	210	226	240	450	2.0	20	23.0	1.13	5.9 1.8 91.4 0.99	0.78	--	3.20	2.00	--	
16	CO.002	15.4	1	14	35	240	450	2.0	20	30.1	1.42	12.5 2.5 83.9 1.09	0.75	0.80	1.00	0.66	17.5	
16	CO.002	15.4	2	67	83	220	450	2.0	20	12.8	0.60	4.2 1.3 93.9 0.65	0.80	0.86	2.57	1.63	--	G.C.Calib
16	CO.002	15.4	3	91	107	240	450	2.0	20	28.2	1.34	17.3 2.9 78.8 0.99	0.71	--	0.93	0.65	--	
16	CO.002	15.4	4	136	155	240	450	1.0	20	12.6	0.89	4.4 1.6 92.8 1.21	0.79	0.84	4.43	2.88	--	
16	CO.002	15.4	5	182	198	240	600	1.0	20	13.1	0.92	3.6 1.4 93.9 1.12	0.81	0.84	4.29	2.75	25.2	
16	CO.002	15.4	6	209	227	240	450	2.0	20	25.6	1.22	17.4 3.1 78.7 0.83	0.71	--	1.00	0.66	--	
17	CO.025	15.6	1	21	35	240	450	2.0	20	26.6	1.24	10.7 2.1 86.4 0.82	0.76	0.82	2.25	1.47	21.7	G.C.Calib
17	CO.025	15.6	2	62	83	220	450	2.0	20	8.4	0.39	0.0 1.1 96.9 1.94	0.82	0.92	6.50	3.00	--	
17	CO.025	15.6	3	90	107	240	450	2.0	20	21.5	1.00	9.0 2.0 88.0 1.03	0.77	--	2.64	1.64	--	
17	CO.025	15.6	4	134	155	240	450	1.0	20	10.3	0.71	0.8 1.2 96.7 1.30	0.82	0.93	7.67	4.25	--	
17	CO.025	15.6	5	181	203	240	600	1.0	20	11.7	0.81	1.3 1.1 96.5 1.12	0.83	0.88	8.00	4.25	32.9	
17	CO.025	15.6	6	217	226	240	450	2.0	20	19.9	0.93	9.3 2.2 87.7 0.91	0.76	--	2.92	1.85	--	
18	CO.004	15.0	1	20	39	240	450	2.0	20	33.9	1.64	15.3 2.4 80.9 1.37	0.74	0.79	1.17	0.78	20.3	Repair G.C
18	CO.004	15.0	2	66	87	220	450	2.0	20	15.1	0.73	4.1 1.6 94.0 0.29	0.81	0.85	3.83	2.25	--	
18	CO.004	15.0	3	92	111	240	450	2.0	20	32.7	1.59	15.7 2.6 80.2 1.49	0.73	--	1.20	0.80	--	
18	CO.004	15.0	4	138	159	240	450	1.0	20	14.7	1.06	4.1 1.2 93.2 1.44	0.80	0.83	6.17	3.75	--	
18	CO.004	15.0	5	186	207	240	600	1.0	20	15.0	1.09	3.6 1.1 94.1 1.18	0.82	0.83	5.67	4.00	33.6	
18	CO.004	15.0	6	214	230	240	450	2.0	20	28.4	1.38	14.9 2.5 86.5 1.13	0.73	--	1.58	1.03	--	

Table I  
(Continued)

SUMMARY OF M3 SBGR RUN RESULTS

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c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d) Prod. rates: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	N2: CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf C3	Paraf C4	Olefins C5-18, %	Comments
19	CO.021	15.6	1	16	35	240	450	2.0	20	23.2	1.08	9.4	2.0	88.0	0.73	0.77	0.82	2.56	1.54	20.3	
19	CO.021	15.6	2	62	83	220	450	2.0	20	8.3	0.38	0.0	1.3	98.2	0.51	0.82	0.88	4.33	3.33	--	
19	CO.021	15.6	3	90	107	240	450	2.0	20	21.8	1.02	10.2	2.2	86.7	0.95	0.76	--	2.50	1.53	--	
19	CO.021	15.6	4	134	155	240	450	1.0	20	9.9	0.49	1.7	1.6	95.5	1.41	0.81	0.83	6.00	3.80	--	
19	CO.021	15.6	5	182	203	240	600	1.0	20	11.5	0.80	1.8	1.2	95.8	1.16	0.83	0.85	6.50	3.80	30.8	
19	CO.021	15.6	6	210	226	240	450	2.0	20	19.9	0.93	9.6	2.3	87.2	0.95	0.76	--	2.31	1.38	--	
20	CO.041	15.8	1	17	37	240	450	2.0	20	25.3	1.16	11.0	2.1	86.0	0.88	0.76	0.84	2.94	1.61	20.3	
20	CO.041	15.8	2	66	75	220	450	2.0	20	9.1	0.41	0.0	1.5	97.8	0.65	0.82	0.91	8.00	2.75	--	
20	CO.041	15.8	3	90	109	240	450	2.0	20	24.3	1.21	9.5	1.9	87.8	0.82	0.78	--	2.81	1.71	--	
20	CO.041	15.8	4	136	148	240	450	1.0	20	12.7	0.88	1.9	1.2	95.9	0.95	0.83	0.86	9.00	4.20	--	
20	CO.041	15.8	5	169	178	240	600	1.0	20	13.2	0.91	2.0	1.0	96.1	0.93	0.84	--	7.00	3.50	--	
20	CO.041	15.8	6	193	203	240	450	2.0	20	24.6	1.13	9.4	1.8	87.9	0.92	0.78	--	2.93	1.75	--	
21	CO.014	15.1	1	24	38	240	450	2.0	20	8.5	0.40	8.3	3.5	85.8	2.43	0.74	0.83	2.75	1.67	17.5	G.C. Calib
21	CO.014	15.1	2	68	86	220	450	2.0	20	3.2	0.15	0.0	2.3	93.4	4.31	0.76	0.86	3.50	3.00	--	
21	CO.014	15.1	3	93	110	240	450	2.0	20	7.1	0.36	8.7	3.0	85.9	2.46	0.71	--	3.00	2.00	--	
21	CO.014	15.1	4	138	157	240	450	1.0	20	2.2	0.15	0.0	2.8	89.3	7.92	0.67	0.84	9.00	4.00	--	
21	CO.014	15.1	5	186	206	240	600	1.0	20	2.1	0.15	0.0	2.6	94.8	2.68	0.71	0.81	4.50	3.50	--	
22	CO.040	14.5	1	19	32	240	450	2.0	20	1.8	0.09	0.0	4.0	94.1	1.89	0.71	0.82	2.50	2.00	--	G.C. Calib
22	CO.040	14.5	2	43	63	220	450	2.0	20	0.7	0.03	0.0	0.7	97.1	2.17	0.91	--	1.00	2.00	--	Shut down
23	CO.047	15.8	1	21	39	240	450	2.0	20	28.2	1.29	7.7	1.5	89.3	1.47	0.79	0.84	3.14	1.69	24.5	
23	CO.047	15.8	2		220	450	2.0	20	--	--	--	--	--	--	--	--	--	--	--	--	Repair G.C
23	CO.047	15.8	3	94	111	240	450	2.0	20	25.6	1.17	8.9	1.5	88.2	1.38	0.78	--	3.15	2.00	--	
23	CO.047	15.8	4	141	159	240	450	1.0	20	11.9	0.81	2.9	0.9	94.1	2.13	0.82	0.88	7.33	4.75	--	
23	CO.047	15.8	5	187	207	240	600	1.0	20	11.8	0.81	2.6	0.8	94.6	2.01	0.82	0.87	7.00	3.40	--	
23	CO.047	15.8	6	215	226	240	450	2.0	20	24.0	1.10	10.7	1.9	85.7	1.71	0.75	--	3.54	2.13	--	
24	CO.049	15.6	1	19	39	240	450	2.0	20	30.6	1.41	10.9	1.8	85.7	1.66	0.76	0.82	2.09	1.30	14.0	
24	CO.049	15.6	2	71	87	220	450	2.0	20	12.0	1.07	2.7	0.9	95.3	1.09	0.81	0.95	4.25	3.25	--	
24	CO.049	15.6	3	95	111	240	450	2.0	20	29.5	1.37	9.5	1.6	87.6	1.30	0.78	--	2.32	1.40	--	
24	CO.049	15.6	4	139	159	240	450	1.0	20	12.6	0.87	3.1	1.0	94.1	1.80	0.81	0.86	8.33	4.20	--	
24	CO.049	15.6	5	187	207	240	600	1.0	20	13.4	0.93	2.6	0.9	94.8	1.68	0.82	0.88	8.33	4.20	37.8	
24	CO.049	15.6	6	211	231	240	450	2.0	20	24.9	1.16	10.4	1.7	86.5	1.36	0.76	--	2.75	1.75	--	
25	CO.047	15.6	1	19	33	240	450	2.0	20	28.1	1.30	8.8	1.6	88.1	1.50	0.78	0.85	2.93	1.88	25.9	Repeat R23
25	CO.047	15.6	2	55	69	220	450	2.0	20	7.4	0.34	1.5	1.2	96.3	1.02	0.76	0.89	3.00	4.67	--	
25	CO.047	15.6	3	93	119	240	450	2.0	20	25.6	1.19	8.9	1.6	87.9	1.48	0.77	--	3.14	2.00	--	
25	CO.047	15.6	4	143	159	240	450	1.0	20	10.8	0.75	3.0	1.0	94.2	1.84	0.81	0.94	8.00	4.75	--	
25	CO.047	15.6	5	189	207	240	600	1.0	20	12.4	0.86	2.2	0.8	95.6	1.39	0.83	0.86	7.33	4.50	36.4	
25	CO.047	15.6	6	215	231	240	450	2.0	20	23.2	1.08	9.6	1.7	87.4	1.28	0.77	--	3.50	2.07	--	
26	CO.031	15.9	1	19	39	240	450	2.0	20	30.9	1.41	12.1	1.9	84.9	1.12	0.75	0.83	1.83	1.14	22.4	
26	CO.031	15.9	2	67	87	220	450	2.0	20	13.6	0.62	3.9	0.9	94.6	0.49	0.80	0.85	4.20	2.67	--	
26	CO.031	15.9	3	93	111	240	450	2.0	20	29.5	1.35	12.2	2.1	84.6	1.15	0.75	--	1.97	1.25	--	
26	CO.031	15.9	4	141	159	240	450	1.0	20	12.9	0.88	3.6	1.1	94.3	1.11	0.80	0.88	7.75	4.00	--	
26	CO.031	15.9	5	189	207	240	600	1.0	20	13.9	0.95	3.5	1.0	94.4	1.12	0.81	0.85	6.80	3.71	30.1	
26	CO.031	15.9	6	221	230	240	450	2.0	20	26.6	1.22	12.0	2.2	84.9	0.96	0.74	--	2.30	1.43	--	

Table I  
(Continued)

SUMMARY OF M3 SCCR RUN RESULTS

a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d) Prod. rates: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	N2: CO	Synfl CO	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf C3	Olefins C4	Comments
												CO	CO2	CO3+	CO2					
27	CO.029	15.9	1	23	39	240	450	2.0	20	28.3	1.27	8.3	1.6	87.9	2.21	0.77	0.84	3.40	2.20	27.3
27	CO.029	15.9	2	71	87	220	450	2.0	20	9.5	0.43	1.7	1.1	96.0	1.23	0.80	0.89	5.67	3.00	--
27	CO.029	15.9	3	99	111	240	450	2.0	20	25.7	1.16	7.7	1.6	88.3	1.86	0.78	--	4.00	2.36	--
27	CO.029	15.9	4	150	159	240	450	1.0	20	12.0	0.82	1.9	0.9	95.4	1.88	0.83	0.90	8.33	4.75	--
27	CO.029	15.9	5	191	207	240	600	1.0	20	12.1	0.82	1.7	0.9	95.6	1.75	0.83	0.89	7.67	4.75	39.9
27	CO.029	15.9	6	222	230	240	450	2.0	20	23.7	1.08	8.2	1.7	88.5	1.60	0.78	--	3.92	2.67	--
28	CO.01	15.0	1	19	36	240	450	2.0	20	1.1	0.05	0.0	12.	83.9	4.23	0.58	--	3.33	2.50	-- Shut down
29	CO.053	25.2	1	21	39	240	450	2.0	20	42.0	1.19	15.8	2.3	79.5	2.42	0.73	--	1.00	0.67	17.5
29	CO.053	25.2	2	71	87	220	450	2.0	20	20.5	0.59	5.7	4.8	89.0	0.50	0.79	0.84	3.38	2.10	--
29	CO.053	25.2	3	95	111	240	450	2.0	20	39.2	1.13	15.8	2.9	79.2	2.09	0.72	--	1.11	0.74	--
29	CO.053	25.2	4	143	159	240	450	1.0	20	18.4	0.79	5.3	2.6	90.6	1.52	0.80	0.84	5.86	3.56	--
29	CO.053	25.2	5	191	207	240	600	1.0	20	19.7	0.85	4.6	1.2	92.9	1.34	0.82	--	5.71	3.44	35.6
29	CO.053	25.2	6	239	255	240	600	2.0	20	40.8	1.17	14.8	2.1	81.4	1.68	0.75	0.80	1.10	0.74	--
29	CO.053	25.2	7	303	304	240	450	2.0	20	31.5	0.45	21.0	3.9	72.2	2.93	0.63	--	1.34	0.97	-- G.C.Repair
29	CO.053	25.2	8	332	351	260	450	2.0	20	31.0	0.44	36.4	5.3	52.6	5.74	0.52	--	2.60	1.75	--
29	CO.053	25.2	9	375	376	240	450	2.0	20	18.0	0.55	23.0	3.5	72.1	1.46	0.66	--	3.21	2.05	--
29	CO.053	25.2	10	415	423	240	450	2.0	20	21.5	0.98	14.4	2.5	82.4	0.82	0.72	--	2.87	1.79	G.C.Repair
30	CO.053	29.6	1	26	39	240	450	2.0	20	41.8	1.02	22.6	2.9	71.5	3.05	0.66	--	0.99	0.65	19.6
30	CO.053	29.6	2	55	63	250	450	2.0	20	46.9	1.11	40.6	5.5	46.0	7.98	0.45	--	0.83	0.64	--
30	CO.053	29.6	3	79	87	280	450	2.0	20	41.4	0.96	41.9	6.5	42.0	9.63	0.40	--	2.06	1.35	--
30	CO.053	29.6	4	103	111	240	450	2.0	20	19.9	0.49	19.2	3.6	75.8	1.45	0.64	--	4.29	2.50	--
30	CO.053	29.6	5	131	135	265	450	2.0	20	36.4	0.89	36.4	5.2	54.4	4.04	0.53	--	2.45	1.60	--
30	CO.053	29.6	6	154	159	280	450	2.0	20	39.6	0.96	48.3	5.9	39.0	6.84	0.40	--	2.44	1.62	--
30	CO.053	29.6	7	174	183	300	450	2.0	20	40.7	0.94	42.4	6.8	40.7	10.2	0.47	--	3.11	2.03	--
30	CO.053	29.6	8	198	207	309	450	2.0	20	38.3	0.85	22.8	7.3	58.3	11.6	0.62	--	3.76	2.68	-- G.C.Calib
30	CO.053	29.6	9	220	231	310	450	2.0	20	37.5	0.87	55.5	7.2	25.5	11.8	0.13	--	3.93	2.67	--
30	CO.053	29.6	10	242	254	320	450	2.0	20	40.8	0.90	61.7	7.4	14.5	16.4	0.00	--	3.62	2.63	--
30	CO.053	29.6	11	270	279	320	450	1.0	20	30.8	0.92	42.9	6.0	26.9	24.2	0.30	--	5.68	4.28	--

Table I  
(Continued)

SUMMARY OF M3 SBCR RUN RESULTS

a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Per wt, g	Time No	Time Start	Time Stop	Temp C	Pres psi	N2: CO	Synfld cc/hr	Conv. %	Prod. Rate	Selectivity XCH4	XC2H6	XC3+	Alpha GC	Alpha Liq	Olefin/Paraf C3	C4	Olefins C6-C18, %	Comments
31	Co.055	15.0	1	23	39	240	450	2.0	20	30.0	1.46	23.7	3.73	70.2	0.61	0.81	0.90	0.60	20.3	
31	Co.055	15.0	2	71	87	220	450	2.0	20	9.1	0.44	10.6	2.53	85.7	0.61	0.85	2.89	1.80	--	
31	Co.055	15.0	3	98	110	240	450	2.0	20	25.8	1.26	23.9	3.94	70.1	0.58	--	1.06	0.70	--	
31	Co.055	15.0	4	143	159	240	450	1.0	20	16.7	1.06	5.5	1.44	91.7	0.78	0.83	5.71	3.22	--	
31	Co.055	15.0	5	196	207	240	600	1.0	20	16.1	1.16	4.7	1.21	92.8	0.80	0.83	6.17	3.11	33.6	
31	Co.055	15.0	6	222	234	240	450	2.0	20	29.1	1.42	18.0	2.84	77.8	0.69	--	1.40	0.91	--	
32	Co.044	16.4	1	23	39	240	450	2.0	20	20.9	0.93	6.7	1.91	90.8	0.77	0.83	3.42	2.17	23.1	
32	Co.044	16.4	2	71	87	220	450	2.0	20	10.3	0.46	0.0	0.92	98.8	0.85	--	4.33	4.50	--	
32	Co.044	16.4	3	102	110	240	450	2.0	20	21.8	0.97	6.4	1.72	91.3	0.79	--	3.00	1.77	--	
32	Co.044	16.4	4	143	159	240	450	1.0	20	9.87	0.25	2.1	3.19	92.5	0.61	0.87	7.33	4.00	--	
32	Co.044	16.4	5	174	182	240	450	2.0	20	20.2	0.89	6.8	1.85	90.8	0.79	--	2.92	1.75	--	
33	Co.053	31.4	1	24	39	240	450	2.0	20	41.4	0.94	23.2	3.14	69.6	0.65	0.76	0.82	0.58	21.7	G.C. Calib
33	Co.053	31.4	2	54	63	240	300	2.0	20	35.2	0.47	29.9	3.93	59.6	0.55	--	0.89	0.70	--	
33	Co.053	31.4	3	78	87	240	300	2.0	20	38.7	0.38	31.1	3.90	57.5	0.54	--	0.97	0.71	--	
33	Co.053	31.4	4	102	111	250	300	2.0	20	39.6	0.38	43.1	4.60	41.1	0.38	--	0.99	0.77	--	
33	Co.053	31.4	5	126	135	260	300	2.0	20	37.7	0.37	42.1	4.59	42.4	0.42	--	1.76	1.21	--	
33	Co.053	31.4	6	150	159	260	450	2.0	20	45.0	0.44	43.2	4.80	40.9	0.44	--	1.35	0.95	--	
33	Co.053	31.4	7	174	183	260	450	2.0	20	45.7	0.73	46.4	4.63	40.2	0.43	--	1.06	0.77	--	
33	Co.053	31.4	8	198	207	260	450	2.0	20	49.2	0.98	44.4	4.26	43.5	0.51	--	0.87	0.65	--	
33	Co.053	31.4	9	222	230	240	450	2.0	20	16.1	0.38	33.7	4.79	59.2	0.35	--	3.14	1.91	--	
34	Co.060	15.6	1	23	32	240	450	2.0	20	31.4	1.46	14.0	2.34	82.2	0.75	0.79	1.61	1.00	23.1	G.C. Calib
34	Co.060	15.6	2	71	87	220	450	2.0	20	13.0	0.60	0.1	1.77	97.8	0.81	0.88	4.00	2.83	--	G.C. Calib
34	Co.060	15.6	3	102	111	240	450	2.0	20	28.8	1.34	14.1	2.40	82.2	0.73	--	1.87	1.17	--	
34	Co.060	15.6	4	150	157	240	450	1.0	20	13.5	0.94	4.3	1.75	92.5	0.77	0.85	7.00	4.67	--	
34	Co.060	15.6	5	191	207	240	600	1.0	20	12.8	0.89	2.2	1.64	94.9	0.82	0.86	6.60	4.33	38.5	G.C. Calib
34	Co.060	15.6	6	222	230	240	450	2.0	20	26.9	1.16	13.8	2.78	82.2	0.74	--	2.73	1.73	--	
35	Co.041	26.0	1	23	39	240	450	2.0	20	35.7	1.00	13.6	2.13	82.9	0.79	0.82	1.09	0.74	18.2	
35	Co.041	26.0	2	54	63	250	450	2.0	20	42.1	1.17	27.3	4.61	64.4	0.65	--	0.49	0.41	--	G.C. Calib
35	Co.041	26.0	3	78	87	260	450	2.0	20	45.1	1.24	41.7	6.83	46.9	0.51	--	0.35	0.37	--	
35	Co.041	26.0	4	102	111	260	450	2.0	20	46.7	0.77	39.1	4.55	49.9	0.56	--	0.66	0.52	--	
35	Co.041	26.0	5	126	135	260	450	2.0	20	49.6	0.61	39.4	4.02	49.6	0.57	--	0.70	0.52	--	
35	Co.041	26.0	6	150	159	260	450	2.0	20	47.9	0.95	33.1	3.93	58.7	0.64	--	0.75	0.52	--	
35	Co.041	26.0	7	174	183	260	450	2.0	20	49.7	1.24	30.9	4.38	61.3	0.66	--	0.71	0.49	--	
35	Co.041	26.0	8	198	206	240	450	2.0	20	19.6	0.55	17.3	2.64	79.1	0.71	--	2.08	1.63	--	

Table I  
(continued)

SUMMARY OF M3 SBGR RUN RESULTS

a)Unless otherwise noted, total flow is ca.15 L/min. STP, or 3 cm/sec linear gas flow.

b)Conversion is total CO conversion over the period (I).

c)Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d)Prod. rate: Rate for production of total hydrocarbons,C1+ (kg/kg cat.,hr).

e)Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	H2: CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin C3	Paraf C4	Olefins C6-18, x	Comments
36	Co.032	15.9	1	23	39	240	450	2.0	20	24.0	1.10	9.1	1.8	88.2	0.83	0.77	0.83	3.23	2.00	25.2	
36	Co.032	15.9	2	71	87	220	450	2.0	20	7.7	0.35	0.0	1.5	97.8	0.77	0.81	0.91	4.00	3.33	--	
36	Co.032	15.9	3	102	111	240	450	2.0	20	21.1	0.97	8.7	2.4	88.2	0.68	0.78	--	3.08	1.86	--	G.C.Calib
36	Co.032	15.9	4	126	135	240	450	1.0	20	9.5	0.65	1.4	1.2	96.5	0.87	0.83	--	7.67	4.50	--	
36	Co.032	15.9	5	150	159	240	450	2.0	20	18.2	0.83	8.9	1.6	88.9	0.64	0.78	--	3.36	2.36	--	
36	Co.032	15.9	6	174	183	250	450	2.0	20	23.3	1.07	14.5	3.0	81.6	1.01	0.73	--	2.29	1.46	--	
36	Co.032	15.9	7	199	207	260	450	2.0	20	25.3	1.17	23.5	3.8	71.2	1.51	0.61	--	1.76	1.15	--	G.C.Calib
36	Co.032	15.9	8	222	230	240	450	2.0	20	11.0	0.51	10.4	2.9	85.9	0.88	0.67	--	3.33	2.33	--	
37	Co.045	15.9	1	23	39	240	450	2.0	20	14.8	0.87	8.0	1.7	89.4	0.91	0.76	0.84	2.78	1.90	20.3	
37	Co.045	15.9	2	54	63	220	450	2.0	20	5.1	0.23	0.0	1.5	97.7	0.77	0.80	0.88	4.00	3.00	--	
37	Co.045	15.9	3	78	87	240	450	2.0	20	13.8	0.63	8.2	1.9	89.0	0.89	0.76	--	3.00	1.80	--	
37	Co.045	15.9	4	102	111	240	450	1.0	20	6.5	0.44	0.1	1.4	97.3	1.16	0.82	--	5.00	2.00	--	
37	Co.045	15.9	5	126	135	240	450	2.0	20	13.4	0.61	0.6	1.8	88.9	0.80	0.79	--	2.00	0.00	--	
37	Co.045	15.9	6	150	159	250	450	2.0	20	19.6	0.91	17.5	2.5	80.0	--	0.77	--	--	0.00	--	G.C.Calib
37	Co.045	15.9	7	174	183	260	450	2.0	20	27.4	1.26	30.1	5.2	62.2	2.49	0.61	--	0.83	0.60	--	
37	Co.045	15.9	8	198	207	240	450	2.0	20	13.7	0.63	9.3	1.7	87.4	0.78	0.75	--	2.67	1.67	--	
38	Co.058	15.9	1	23	39	240	450	2.0	20	28.0	1.28	11.9	2.1	85.1	0.91	0.75	0.85	1.88	1.17	22.4	
38	Co.058	15.9	2	47	63	220	450	2.0	20	11.7	0.54	1.4	1.4	96.9	0.38	0.81	--	4.00	3.00	--	
38	Co.058	15.9	3	74	88	240	450	2.0	20	12.7	0.87	3.2	1.3	94.5	1.01	0.81	--	7.25	4.40	--	
38	Co.058	15.9	4	96	111	240	450	2.0	20	26.4	1.21	11.9	2.2	85.0	0.87	0.74	--	2.09	1.26	--	
39	Co.064	15.9	1	23	39	240	450	2.0	20	34.2	1.56	13.6	2.3	82.6	1.55	0.73	0.85	1.40	0.92	21.0	G.C.CALIB
39	Co.064	15.9	2	47	62	220	450	2.0	20	15.0	0.68	4.6	1.2	93.8	0.44	0.78	--	4.17	2.38	--	
39	Co.064	15.9	3	71	87	240	450	2.0	20	15.8	1.09	4.7	1.2	92.9	1.28	0.80	--	7.86	3.88	--	
39	Co.064	15.9	4	95	111	240	450	2.0	20	33.1	1.52	15.7	2.6	80.3	1.52	0.72	--	1.37	0.90	--	
40	Co.063	15.0	1	23	40	240	450	2.0	20	8.7	0.43	6.5	0.9	92.6	0.09	0.74	--	7.67	3.40	25.9	
40	Co.063	15.0	2	47	63	220	450	2.0	20	2.0	0.95	0.1	0.0	99.9	0.00	0.67	--	7.00	7.00	--	
40	Co.063	15.0	3	71	87	240	450	1.0	20	3.6	0.27	2.3	1.3	95.9	0.54	0.76	--	13.00	5.50	--	
40	Co.063	15.0	4	95	111	240	450	2.0	20	9.5	0.46	8.1	1.9	89.6	0.40	0.74	--	4.80	3.17	--	
41	Co.062	15.0	1	23	38	240	450	2.0	20	6.6	0.32	3.5	0.3	95.3	1.00	0.76	0.89	9.50	3.50	25.9	
41	Co.062	15.0	2	47	62	220	450	2.0	20	1.8	0.09	0.0	0.0	99.9	0.00	0.88	--	4.00	5.00	--	
41	Co.062	15.0	3	71	86	240	450	1.0	20	2.7	0.19	0.1	1.0	96.9	1.99	0.77	--	10.00	4.00	--	
41	Co.062	15.0	4	95	109	240	450	2.0	20	5.6	0.27	4.3	2.1	92.0	1.60	0.74	--	5.70	4.00	--	



Table I  
(Continued)

SUMMARY OF M3 SBCR RUN RESULTS

)Unless otherwise noted, total flow is ca.15 L/min. STP, or 3 cm/sec linear gas flow.

)Conversion is total CO conversion over the period (T).

)Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

)Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat.,hr).

)Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres H2: psi	Synfl CO	Conv. cc/hr	Prod. %	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf		Olefins	Comments	
											XC4	XC2	XC3+	XCO2			C3	C4	C6-18,X		
42	Co.065	15.9	1	23	38	240	450	2.0	20	27.6	1.25	7.9	2.0	88.6	1.61	0.79	0.84	2.94	1.88	28.0	G.C.Calib
42	Co.065	15.9	2	47	62	220	450	2.0	20	10.0	0.46	0.0	2.0	97.3	0.67	0.82	--	5.33	3.25	--	
42	Co.065	15.9	3	71	86	240	450	1.0	20	13.1	0.89	1.2	1.5	95.7	1.67	0.84	--	7.00	5.50	--	
42	Co.065	15.9	4	95	110	240	450	2.0	20	26.2	1.19	9.0	2.1	87.3	1.57	0.78	--	3.06	2.13	--	
43	CoW.12	9.1	1	23	38	240	450	2.0	20	6.1	0.47	20.3	6.1	66.3	7.29	0.61	0.83	3.63	2.33	11.9	
43	CoW.12	9.1	2	54	62	279	450	2.0	20	25.1	1.86	32.4	5.4	51.3	11.0	0.52	--	1.62	1.12	--	
44	CoW.11	15.6	1	23	38	240	450	2.0	20	4.7	0.20	8.4	6.3	74.4	10.9	0.60	--	5.40	3.50	--	
44	CoW.11	15.6	2	47	62	260	450	2.0	20	12.7	0.51	18.6	6.1	59.8	15.4	0.56	--	4.57	3.00	--	
44	CoW.11	15.6	3	71	80	280	450	2.0	20	24.5	0.94	25.6	6.3	47.3	20.8	0.49	--	3.38	2.29	--	
45	Fe.01	15.9	1	23	38	240	450	2.0	20	3.4	0.14	0.0	7.5	84.8	7.7	0.72	0.77	2.80	1.50	--	
45	Fe.01	15.9	2	71	62	280	450	2.0	20	14.5	0.55	17.2	8.8	54.0	19.9	0.54	--	1.51	1.00	--	
45	Fe.01	15.9	3	95	109	300	450	2.0	20	19.0	0.66	23.3	10.0	39.8	26.7	0.44	0.76	1.36	1.05	14.0	
46	CoW.05	15.7	1	23	38	240	450	2.0	20	4.9	0.23	10.9	6.5	81.9	0.74	0.60	0.78	3.11	2.14	13.3	
46	CoW.05	15.7	2	71	86	280	450	2.0	20	14.0	0.66	44.2	10.0	42.5	2.84	0.41	0.82	0.82	0.68	14.0	
46	CoW.05	15.7	3	95	110	300	450	2.0	20	19.4	0.89	54.4	11.0	28.2	6.39	0.16	0.78	0.69	0.62	9.8	
47	Co.070	15.6	1	23	38	240	450	2.0	20	22.8	1.07	10.9	2.7	85.7	0.70	0.75	0.85	2.60	1.56	24.5	
47	Co.070	15.6	2	47	63	220	450	2.0	20	8.6	0.40	0.0	4.3	95.7	0.02	0.82	--	--	--	--	
47	Co.070	15.6	3	71	87	220	450	1.0	20	1.2	0.08	0.0	--	94.5	--	0.62	--	--	--	--	
47	Co.070	15.6	4	95	111	240	450	1.0	20	5.3	0.37	3.7	4.2	90.3	1.76	0.71	--	--	--	--	
47	Co.070	15.6	5	119	135	240	450	2.0	20	19.8	0.93	10.4	2.1	86.8	0.68	0.76	--	2.85	1.71	--	
47	Co.070	15.6	6	143	158	240	600	2.0	20	20.5	0.96	9.6	2.2	87.6	0.61	0.77	--	2.36	1.40	--	
48	CoW.13	15.5	1	23	38	240	450	2.0	20	8.5	0.39	10.9	8.1	76.9	4.30	0.74	0.89	4.00	3.00	21.0	G.C.Calib
48	CoW.13	15.5	2	47	62	260	450	2.0	20	20.0	0.90	19.9	5.0	68.5	6.61	0.64	--	2.56	1.74	--	
48	CoW.13	15.5	3	71	86	279	450	2.0	20	25.7	1.11	34.5	6.0	48.1	11.4	0.48	--	2.17	1.52	--	
48	CoW.13	15.5	4	95	110	300	450	2.0	20	28.0	1.12	41.2	7.4	32.0	19.4	0.35	--	2.22	1.61	--	
48	CoW.13	15.5	5	117	133	240	450	2.0	20	2.62	0.12	12.3	18.6	62.9	6.2	0.66	--	5.00	3.50	--	
49	Co.068	15.5	1	23	39	242	450	2.0	20	26.7	1.26	18.9	4.6	75.3	1.19	0.68	0.77	0.52	0.34	20.3	
49	Co.068	15.5	2	47	62	259	450	2.0	20	34.5	1.62	35.3	6.4	55.0	3.38	0.54	--	0.35	0.27	--	
49	Co.068	15.5	3	71	86	278	450	2.0	20	34.6	1.61	53.2	7.5	33.0	6.30	0.34	--	0.59	0.46	--	
49	Co.068	15.5	4	102	110	299	450	2.0	20	28.4	1.31	63.2	8.4	20.3	8.11	--	--	1.07	0.81	--	
49	Co.068	15.5	5	114	116	241	450	2.0	20	3.8	0.18	34.8	16.7	45.8	2.65	0.55	--	2.57	1.60	--	
50	Co.066	15.5	1	23	38	240	450	2.0	20	21.1	0.99	11.3	3.5	83.6	1.58	0.72	0.81	3.19	1.94	--	
50	Co.066	15.5	2	47	62	260	450	2.0	20	36.1	1.66	21.6	4.2	70.1	4.09	0.64	--	1.72	1.13	--	
50	Co.066	15.5	3	71	86	279	450	2.0	20	36.9	1.66	37.6	6.2	48.1	8.10	0.47	--	2.01	1.37	--	
50	Co.066	15.5	4	95	110	289	450	2.0	20	31.1	1.35	40.7	7.9	39.7	11.7	0.37	--	3.35	2.27	--	
50	Co.066	15.5	5	119	133	239	450	2.0	20	3.7	0.17	15.1	17.0	64.6	3.31	0.67	--	7.00	12.00	--	

Table I  
(Continued)

SUMMARY OF M3 SBCR RUN RESULTS

a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	N2: CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf C3	C4	Olefins C6-C18, %	Comments
29	Co.053	25.2	1	21	39	240	450	2.0	20	42.0	1.19	15.8	2.3	79.5	2.42	0.73	--	1.00	0.67	17.5	
29	Co.053	25.2	2	71	87	220	450	2.0	20	20.5	0.59	5.7	4.8	89.0	0.50	0.79	0.84	3.38	2.10	--	
29	Co.053	25.2	3	95	111	240	450	2.0	20	39.2	1.13	15.8	2.9	79.2	2.09	0.72	--	1.11	0.74	--	
29	Co.053	25.2	4	143	159	240	450	1.0	20	18.4	0.79	5.3	2.6	90.6	1.52	0.80	0.84	5.86	3.56	33.6	
29	Co.053	25.2	5	191	207	240	600	1.0	20	19.7	0.85	4.6	1.2	92.9	1.34	0.82	0.85	5.71	3.44	--	
29	Co.053	25.2	6	239	255	240	600	2.0	20	40.8	1.17	14.8	2.1	81.4	1.68	0.75	0.80	1.10	0.74	--	
29	Co.053	25.2	7	303	304	240	450	2.0	20	31.5	0.45	21.0	3.9	72.2	2.93	0.63	--	1.34	0.97	--	G.C.Repair
29	Co.053	25.2	8	332	351	260	450	2.0	20	31.0	0.44	36.4	5.3	52.6	5.74	0.52	--	2.60	1.75	--	
29	Co.053	25.2	9	375	376	240	450	2.0	20	18.0	0.55	23.0	3.5	72.1	1.46	0.66	--	3.21	2.05	--	
29	Co.053	25.2	10	415	423	240	450	2.0	20	21.6	0.98	14.4	2.5	82.4	0.82	0.72	0.79	2.87	1.79	25.9	G.C.Repair

Feed Gas Rates

Per No	N2 SLH	N2 SLH	CO SLH	Total SLH
1	565	225	112	902
2	565	225	112	902
3	565	225	112	902
4	565	169	169	903
5	565	169	169	903
6	565	225	112	902
7	733	112	56	901
8	733	112	56	901
9	551	234	117	912
10	367	348	175	890

Table I  
(Continued)

SUMMARY OF M3 SBCR RUN RESULTS

a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

b) Conversion is total CO conversion over the period (2).

c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	H2: Synfl CO	Conv. %	Prod. Rate cc/hr	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf Olefins		Comments		
											IC3+	IC2	IC1	IC02	C3 C4 C5-C13,2						
33	Co.053	31.4	1	24	39	240	450	2.0	20	41.4	0.94	23.2	3.1	69.6	4.06	0.65	0.76	0.82	0.58	21.7	G.C. Calib
33	Co.053	31.4	2	54	63	240	300	2.0	20	35.2	0.47	29.9	3.9	59.6	6.57	0.55	--	0.89	0.70	--	
33	Co.053	31.4	3	78	87	240	300	2.0	20	38.7	0.38	31.1	3.9	57.5	7.48	0.54	--	0.97	0.71	--	
33	Co.053	31.4	4	102	111	250	300	2.0	20	39.6	0.38	43.1	4.6	41.1	11.3	0.38	--	0.99	0.77	--	
33	Co.053	31.4	5	125	135	260	300	2.0	20	37.7	0.37	42.1	4.6	42.4	10.9	0.42	--	1.75	1.21	--	
33	Co.053	31.4	6	150	159	260	450	2.0	20	45.0	0.44	43.2	4.8	40.9	11.1	0.44	--	1.35	0.95	--	
33	Co.053	31.4	7	174	183	250	450	2.0	20	45.7	0.73	46.4	4.6	40.2	8.77	0.43	--	1.06	0.77	--	
33	Co.053	31.4	8	198	207	250	450	2.0	20	49.2	0.98	44.4	4.3	43.5	7.84	0.51	--	0.87	0.85	--	
33	Co.053	31.4	9	222	230	240	450	2.0	20	15.1	0.38	33.7	4.8	59.2	2.24	0.35	--	3.14	1.91	--	

Feed Gas Rates

Per No	N2 SLR	H2 SLR	CO SLR	Total SLR
1	563	225	112	900
2	338	135	67	540
3	250	100	50	400
4	250	100	50	400
5	250	100	50	400
6	250	100	50	400
7	160	160	80	400
8	100	200	100	400
9	563	225	112	900

Table I  
(Continued)

SUMMARY OF M3 SBCR RUN RESULTS

a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

b) Conversion is total CO conversion over the period (2).

c) Conversion and selectivities are calculated using H<sub>2</sub> as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C<sub>1</sub>+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	H <sub>2</sub> : CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf		Olefins	Comments
												IC <sub>3</sub> +	IC <sub>2</sub>	IC <sub>3</sub> +	IC <sub>2</sub>	GC		C <sub>3</sub>	C <sub>4</sub>	CS-18,1	
35	CO.041	26.0	1	23	39	240	450	2.0	20	35.7	1.00	13.6	2.1	82.9	1.41	0.79	0.82	1.09	0.74	18.2	G.C. Calib
35	CO.041	26.0	2	54	63	250	450	2.0	20	42.1	1.17	27.3	4.6	64.4	3.78	0.65	--	0.49	0.41	--	
35	CO.041	26.0	3	78	87	260	450	2.0	20	45.1	1.24	41.7	6.8	44.9	6.58	0.51	--	0.35	0.37	--	
35	CO.041	26.0	4	102	111	260	450	2.0	20	46.7	0.77	39.1	4.6	49.9	6.40	0.56	--	0.66	0.52	--	
35	CO.041	26.0	5	126	135	260	450	2.0	20	49.6	0.61	39.4	4.0	49.6	7.00	0.57	--	0.70	0.52	--	
35	CO.041	26.0	6	150	159	260	450	2.0	20	47.9	0.95	33.1	3.9	58.7	4.32	0.64	--	0.75	0.52	--	
35	CO.041	26.0	7	174	183	260	450	2.0	20	49.7	1.24	30.9	4.4	61.3	3.50	0.66	--	0.71	0.49	--	
35	CO.041	26.0	8	198	206	240	450	2.0	20	19.6	0.55	17.3	2.6	79.1	0.93	0.71	--	2.08	1.63	--	

Feed Gas Rates

Per No	H <sub>2</sub> SLH	H <sub>2</sub> SLH	CO SLH	Total SLH
1	563	225	112	905
2	563	225	112	905
3	563	225	112	905
4	341	135	68	544
5	253	100	50	403
6	183	150	80	403
7	103	200	100	403
8	571	225	112	908

Table II

DATE: 12/30/94

## M3 SBCR RUN RESULTS

## COMPARISON OF CATALYST ACTIVITY AT SIMILAR RUN CONDITIONS

Period No.	Temp.	Pres.	H <sub>2</sub> /CO Ratio
1	240 C	450psi	2.0

a) Total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.  
Flows: N<sub>2</sub>-563 SLH, H<sub>2</sub>-225 SLH, CO-112.5 SLH

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N<sub>2</sub> as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C<sub>1</sub>+ (kg/kg cat., hr)

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf C3	Olefin/Paraf C4	Olefins C6-18, %
5	CO.003	15.1	31.7	1.53	16.7	2.4	79.8	1.2	0.71	--	1.30	0.60	18.2
6	CO.011	15.3	14.3	0.67	7.6	1.6	89.4	1.4	0.78	0.83	4.17	2.57	21.7
7	CO.012	15.8	13.9	0.63	6.1	1.5	90.6	1.7	0.80	0.89	4.00	2.57	17.5
8	CO.015	15.0	28.3	1.37	12.7	2.0	84.1	1.2	0.76	0.80	1.61	1.07	19.6
9	CO.011	15.0	27.2	1.32	11.2	1.8	85.9	1.1	0.77	0.80	3.18	1.85	20.3
11	CO.017	15.0	27.2	1.32	11.2	1.8	85.9	1.1	0.77	0.80	2.09	1.20	30.8
12	CO.018	15.6	33.8	1.56	9.7	2.0	86.6	1.7	0.75	0.85	1.81	1.13	21.0
13	CO.016	14.7	26.4	1.31	(1)	1.7	89.3	0.7	0.78	0.81	2.00	1.41	21.7
14	CO.019	15.2	13.9	0.66	(2)	1.7	97.2	0.7	0.80	0.86	5.33	2.67	26.6
15	CO.005	14.7	27.1	1.34	7.9	1.6	89.7	0.8	0.79	0.82	2.30	1.38	23.1
16	CO.002	15.4	30.1	1.42	12.5	2.5	83.9	1.1	0.75	0.80	1.00	0.66	17.5
17	CO.025	15.6	26.6	1.24	10.7	2.1	86.4	0.8	0.76	0.82	2.25	1.47	21.7
18	CO.004	15.0	33.9	1.64	15.3	2.4	80.9	1.4	0.74	0.79	1.17	0.78	20.3
19	CO.021	15.6	23.2	1.08	9.4	2.0	88.0	0.7	0.77	0.82	2.56	1.54	20.3
20	CO.041	15.8	25.3	1.16	11.0	2.1	86.0	0.9	0.76	0.84	2.94	1.61	20.3
21	CO.014	15.1	8.5	0.40	8.3	3.5	85.8	2.4	0.74	0.83	2.75	1.67	17.5
22	CO.040	14.5	1.8	0.09	0.0	4.0	94.1	1.9	0.71	0.82	2.50	2.00	--
23	CO.047	15.8	28.2	1.29	7.7	1.5	89.3	1.5	0.79	0.84	3.14	1.69	24.5
24	CO.049	15.6	30.6	1.41	10.9	1.8	85.7	1.7	0.76	0.82	2.09	1.30	14.0
25	CO.047	15.6	28.1	1.30	8.8	1.6	88.1	1.5	0.78	0.85	2.93	1.88	25.9
26	CO.031	15.9	30.9	1.41	12.1	1.9	84.9	1.1	0.75	0.83	1.83	1.14	22.4
27	CO.029	15.9	28.3	1.27	8.3	1.6	87.9	2.2	0.77	0.84	3.40	2.20	27.3
28	COW.01	15.0	1.1	0.05	0.0	12.	83.9	4.2	0.58	--	3.33	2.50	--
29	CO.053	25.2	42.0	1.19	15.8	2.3	79.5	2.4	0.73	--	1.00	0.67	17.5
30	CO.053	29.6	41.8	1.02	22.6	2.9	71.5	3.1	0.66	0.77	0.99	0.65	19.6
31	CO.055	15.0	30.0	1.46	23.7	3.7	70.2	2.3	0.61	0.81	0.90	0.60	20.3
32	CO.044	16.4	20.9	0.93	6.7	1.9	90.8	0.6	0.77	0.83	3.42	2.17	23.1
33	CO.053	31.4	41.4	0.94	23.2	3.1	69.6	4.1	0.65	0.76	0.82	0.58	21.7
34	CO.060	15.6	31.4	1.46	14.0	2.3	82.2	1.5	0.75	0.79	1.61	1.00	23.1

Note: Catalyst Run 9 screened thru 170 x 400 mesh.

Catalysts For Runs 11 thru 20, and 23 thru 28 screened thru 150 x 400 mesh.

Catalysts for Runs 21 and 22 screened thru 100 x 400 mesh.

- (1) Weak TCD filaments in G.C. CH<sub>4</sub> peaks smaller than expected.  
(2) Internal valve in G.C. leaked. CH<sub>4</sub> peak undetected.

Table II  
(Continued)

DATE: 09/30/95

M3 SBCR RUN RESULTS

COMPARISON OF CATALYST ACTIVITY AT SIMILAR RUN CONDITIONS

Period No.	Temp.	Pres.	H2/CO Ratio
1	240 C	450psi	2.0

- a) Total flow is ca.15 L/min. STP, or 3 cm/sec linear gas flow.  
 Flows: N2-563 SLH, H2-225 SLH, CO-112.5 SLH  
 b) Conversion is total CO conversion over the period (%).  
 c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.  
 d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat.,hr)  
 e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf		Olefins
					%C1	%C2	%C3+	%CO2			C3	C4	C6-18, %
35	Co.041	26.0	35.7	1.00	13.6	2.1	82.9	1.4	0.79	0.76	1.09	0.74	18.2
36	CO.032	15.9	24.0	1.10	9.1	1.8	88.2	0.8	0.77	0.83	3.23	2.00	25.2
37	Co.045	15.9	14.8	0.67	8.0	1.7	89.4	0.9	0.76	0.84	2.78	1.90	20.3
38	Co.058	15.9	28.0	1.28	11.9	2.1	85.1	0.9	0.75	0.85	1.88	1.17	22.4
39	Co.064	15.9	34.2	1.56	13.6	2.3	82.6	1.6	0.73	0.85	1.40	0.92	21.0
40	Co.063	15.0	8.7	0.43	6.5	0.9	92.6	0.1	0.74	--	7.67	3.40	25.9
41	Co.062	15.0	6.6	0.32	3.5	0.3	95.3	1.0	0.76	0.89	9.50	3.50	25.9
42	Co.065	15.9	27.6	1.25	7.9	2.0	88.6	1.6	0.79	0.84	2.94	1.88	28.0
43	COW.12	9.1	6.1	0.47	20.3	6.1	66.3	7.3	0.61	0.83	3.63	2.33	11.9
44	COW.11	15.6	4.7	0.20	8.4	6.3	74.4	10.9	0.60	--	5.40	3.50	--
45	Fe.01	15.9	3.4	0.14	0.0	7.5	84.8	7.7	0.71	0.77	2.80	1.50	--
46	COW.05	15.7	4.9	0.23	10.9	6.5	81.9	0.7	0.60	0.78	3.11	2.14	13.3
47	Co.070	15.6	22.8	1.07	10.9	2.7	85.7	0.7	0.75	0.85	2.60	1.56	24.5
48	COW.13	15.5	8.5	0.39	10.9	8.1	76.9	4.3	0.74	0.89	4.00	3.00	21.0
49	Co.068	15.5	26.7	1.26	18.9	4.6	75.3	1.2	0.68	0.77	0.52	0.34	20.3
50	Co.066	15.5	21.1	0.99	11.3	3.5	83.6	1.5	0.72	0.81	3.19	1.94	--

Note: All catalysts were screened thru 150 x 400 mesh.  
 Catalyst No. COW.12 contains 10% Co plus 10% Fe. It is also full size.  
 Catalyst No. Fe.01 contains 30% Fe and no cobalt.  
 Catalyst No. Co.070 contains 13% Co with no promoter.  
 Catalysts Nos. COW.11 and COW.13 contained 10% Co plus 10% Fe.  
 Catalyst No. Co.066 contains 15% Co plus 5% Fe and 0.5% Ru.

Table III

## M3 SBCR RUN RESULTS

## COMPARISON OF CATALYST ACTIVITY AT SIMILAR RUN CONDITIONS

Period No.	Temp.	Pres.	H <sub>2</sub> /CO Ratio
2	220 C	450psi	2.0

a) Total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.  
Flows: N<sub>2</sub>-563 SLH, H<sub>2</sub>-225 SLH, CO-112.5 SLH

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N<sub>2</sub> as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C<sub>1</sub>+ (kg/kg cat., hr)

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Lig	Olefin/Paraf C <sub>3</sub>	Olefin C <sub>4</sub>	Olefin C <sub>6-18</sub>
5	CO.003	15.1	13.2	0.63	5.1	1.0	93.4	0.5	0.82	0.90	4.55	1.89	--
6	CO.011	15.3	5.1	0.23	0.0	0.0	97.2	2.8	0.87	0.82	--	--	--
7	CO.012	15.8	5.1	0.23	0.0	0.2	97.8	2.0	0.89	0.90	--	2.50	--
8	CO.015	15.0	11.5	0.56	4.4	1.0	93.9	0.8	0.81	0.89	3.60	2.14	--
9	CO.011	15.0	6.3	0.31	0.0	1.0	98.6	0.4	0.88	0.93	12.00	1.80	--
11	CO.017	15.0	11.4	0.55	5.0	0.0	94.8	0.2	0.88	0.90	5.00	3.20	--
12	CO.018	15.6	12.6	0.59	2.8	0.0	97.1	0.1	0.90	0.88	--	--	--
13	CO.016	14.7	9.7	0.48	(1)	0.1	99.9	0.0	0.91	0.88	--	--	--
14	CO.019	15.2	3.8	0.18	(2)	1.7	96.7	1.6	0.88	--	--	--	--
15	CO.005	14.7	10.7	0.53	0.0	0.9	98.4	0.7	0.83	0.88	4.25	3.25	--
16	CO.002	15.4	12.8	0.60	4.2	1.3	93.9	0.7	0.80	0.86	2.57	1.63	--
17	CO.025	15.6	8.4	0.39	0.0	1.1	96.9	1.9	0.82	0.92	6.50	3.00	--
18	CO.004	15.0	15.1	0.73	4.1	1.6	94.0	0.3	0.81	0.85	3.83	2.25	--
19	CO.021	15.6	8.3	0.38	0.0	1.3	98.2	0.5	0.82	0.88	4.33	3.33	--
20	CO.041	15.8	9.1	0.41	0.0	1.5	97.8	0.7	0.82	0.91	8.00	2.75	--
21	CO.014	15.1	3.2	0.15	0.0	2.3	85.8	4.3	0.76	0.86	3.50	3.00	--
22	CO.040	14.5	0.7	0.35	0.0	0.7	97.1	2.2	0.91	--	1.00	2.00	--
23	CO.047	15.8	---	---	(3)	---	---	---	---	---	---	---	--
24	CO.049	15.6	12.0	1.07	2.7	0.9	95.3	1.1	0.81	0.95	4.25	3.25	--
25	CO.047	15.6	7.4	0.34	1.5	1.2	96.3	1.0	0.76	0.89	3.00	4.67	--
26	CO.031	15.9	13.6	0.62	3.9	0.9	94.6	0.5	0.80	0.85	4.20	2.67	--
27	CO.029	15.9	9.5	0.43	1.7	1.1	96.0	1.2	0.80	0.89	5.67	3.00	--
29	CO.053	25.2	20.5	0.59	5.7	4.8	89.0	0.5	0.79	0.84	3.38	2.10	--
31	CO.055	15.0	9.1	0.44	10.6	2.5	85.7	1.1	0.61	0.85	2.89	1.80	--
32	CO.044	16.4	10.3	0.46	0.0	0.9	98.8	0.3	0.85	--	4.33	4.50	--
34	CO.060	15.6	13.0	0.60	0.1	1.8	97.8	0.4	0.81	0.88	4.00	2.83	--

Note: Catalyst Run 9 screened thru 170 x 400 mesh.

Catalysts for Runs 11 thru 27 (except Runs 21 and 22) screened through 150 x 400 mesh.

Catalysts for Runs 21 and 22 screened thru 100 x 400.

(1) Weak TCD filaments in G.C. CH<sub>4</sub> peaks smaller than expected.

(2) Internal valve in G.C. leaked. CH<sub>4</sub> peak undetected.

(3) Replaced dual column restrictor valve.

Table III  
(Continued)

DATE: 06/30/95

M3 SBCR RUN RESULTS

COMPARISON OF CATALYST ACTIVITY AT SIMILAR RUN CONDITIONS

Period No.	Temp.	Pres.	H2/CO Ratio
2	220 C	450psi	2.0

- a) Total flow is ca.15 L/min. STP, or 3 cm/sec linear gas flow.  
Flows: N2-563 SLH, H2-225 SLH, CO-112.5 SLH
- b) Conversion is total CO conversion over the period (%).
- c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.
- d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat.,hr)
- e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt,g	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf		Olefin
					%CH4	%C2	%C3+	%CO2			C3	C4	C6-18,
36	Co.032	15.9	7.7	0.35	0.0	1.5	97.8	0.77	0.81	0.91	4.00	3.33	--
37	Co.045	15.9	5.1	0.23	0.0	1.5	97.7	0.77	0.80	0.88	4.00	3.00	--
38	Co.058	15.9	11.7	0.54	1.4	1.4	96.9	0.38	0.81	--	4.00	3.00	--
39	Co.064	15.9	15.0	0.68	4.6	1.2	93.8	0.44	0.78	--	4.17	2.38	--
40	Co.063	15.0	2.0	0.09	0.1	0.0	99.9	0.00	0.67	--	7.00	7.00	--
41	Co.062	15.0	1.9	0.09	0.0	0.1	99.9	0.00	0.88	--	4.00	5.00	--
42	Co.065	15.9	10.0	0.46	0.0	2.0	97.3	0.67	0.82	--	5.33	3.25	--
47	Co.070	15.6	8.6	0.40	0.0	4.3	95.7	0.02	0.82	--	--	--	--

Note: All catalysts were screened thru 150 x 400 mesh.



Table IV

DATE: 12/30/94

## M3 SBCR RUN RESULTS

## COMPARISON OF CATALYST ACTIVITY AT SIMILAR RUN CONDITIONS

Period No.	Temp.	Pres.	H <sub>2</sub> /CO Ratio
4	240 C	450psi	1.0

a) Total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.  
Flows: N<sub>2</sub>-562 SLH, H<sub>2</sub>-119 SLH, CO-119 SLH

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N<sub>2</sub> as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C<sub>1</sub>+ (kg/kg cat., hr)

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin C <sub>3</sub>	Paraf C <sub>4</sub>	Olefin C <sub>6-18</sub>
					%CH <sub>4</sub>	%C <sub>2</sub>	%C <sub>3</sub> +	%CO <sub>2</sub>					
5	CO.003	15.1	13.1	0.95	4.2	1.2	93.3	1.2	0.83	0.88	6.67	3.70	--
6	CO.011	15.3	6.3	0.44	0.4	1.0	95.5	3.1	0.82	0.88	--	--	--
7	CO.012	15.8	3.9	0.26	4.8	2.3	86.3	6.6	0.70	0.85	16.00	3.50	--
8	CO.015	15.0	11.5	0.83	4.8	1.2	92.5	1.5	0.80	0.85	5.60	3.29	--
9	CO.011	15.0	8.0	0.58	1.3	1.3	96.3	1.2	0.82	0.87	7.00	2.83	--
11	CO.017	15.0	11.6	0.84	5.0	0.0	93.9	1.2	0.82	0.86	25.00	2.88	--
12	CO.018	15.6	12.4	0.86	3.3	0.0	95.0	1.7	0.80	0.86	--	--	--
13	CO.016	14.7	10.9	0.81	(1)	0.8	97.7	0.3	0.84	0.86	--	--	--
14	CO.019	15.2	--	--	(2)	--	--	--	0.80	--	--	--	--
15	CO.005	14.7	11.6	0.85	0.0	1.1	97.5	1.4	0.82	0.85	7.00	4.60	--
16	CO.002	15.4	12.6	0.89	4.4	1.6	92.8	1.2	0.79	0.84	4.43	2.88	--
17	CO.025	15.6	10.3	0.71	0.8	1.2	96.7	1.3	0.82	0.93	7.67	4.25	--
18	CO.004	15.0	14.7	1.06	4.1	1.2	93.2	1.4	0.80	0.83	6.17	3.75	--
19	CO.021	15.6	9.9	0.69	1.7	1.4	95.5	1.4	0.81	0.83	6.00	3.80	--
20	CO.041	15.8	12.7	0.88	1.9	1.2	95.9	1.0	0.83	0.86	9.00	4.20	--
21	CO.014	15.1	2.2	0.15	0.0	2.8	89.3	7.9	0.67	0.84	9.00	4.00	--
23	CO.047	15.8	11.9	0.81	2.9	0.9	94.1	2.1	0.82	0.88	7.33	4.75	--
24	CO.049	15.6	12.6	0.87	3.1	1.0	94.1	1.8	0.81	0.86	8.33	4.20	--
25	CO.047	15.6	10.8	0.75	3.0	1.0	94.2	1.8	0.81	0.90	8.00	4.75	--
26	CO.031	15.9	12.9	0.88	3.6	1.1	94.3	1.1	0.80	0.88	7.75	4.00	--
27	CO.029	15.9	12.0	0.82	1.9	0.9	95.4	1.9	0.83	0.90	8.33	4.75	--
29	CO.053	25.2	18.4	0.79	5.3	2.6	90.6	1.5	0.80	0.84	5.86	3.56	--
31	CO.055	15.0	14.7	1.06	5.5	1.4	91.7	1.4	0.78	0.83	5.71	3.22	--
32	CO.044	16.4	9.9	0.25	2.1	3.2	92.5	2.2	0.61	0.87	7.33	4.00	--
34	CO.060	15.6	13.5	0.94	4.3	1.8	92.5	1.5	0.77	0.85	7.00	4.67	--

Note: Catalyst Run 9 screened thru 170 x 400 mesh.

Catalysts for Runs 11 thru 20 and Run 27 (except Runs 21 and 22) screened thru 150 x 400 mesh.

Catalysts for Runs 21 and 22 screened thru 100 x 400 mesh.

(1) Weak TCD filaments in G.C. CH<sub>4</sub> peaks smaller than expected.

(2) Internal valve in G.C. leaked. CH<sub>4</sub> peak undetected.

Table IV  
(Continued)

DATE: 06/30/95

M3 SBCR RUN RESULTS

COMPARISON OF CATALYST ACTIVITY AT SIMILAR RUN CONDITIONS

Period No.	Temp.	Pres.	H2/CO Ratio
4	240 C	450psi	1.0

- a) Total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.  
 Flows: N2-562 SLH, H2-119 SLH, CO-119 SLH  
 b) Conversion is total CO conversion over the period (%).  
 c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.  
 d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr)  
 e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf		Olefin
					%CH4	%C2	%C3+	%CO2			C3	C4	C6-18,
36	Co.032	15.9	9.5	0.65	1.4	1.2	96.5	0.87	0.83	--	7.67	4.50	--
37	Co.045	15.9	6.5	0.44	0.1	1.4	97.3	1.16	0.82	--	5.00	2.00	--
38	Co.058	15.9	12.7	0.87	3.2	1.3	94.5	1.01	0.81	--	7.25	4.40	--
39	Co.064	15.9	15.9	1.09	4.7	1.2	92.9	1.28	0.80	--	7.86	3.88	--
40	Co.063	15.0	3.6	0.26	2.3	1.3	95.9	0.54	0.76	--	13.00	5.50	--
41	Co.062	15.0	2.7	0.19	0.1	1.0	96.9	1.99	0.77	--	10.00	4.00	--
42	Co.065	15.9	13.1	0.89	1.2	1.5	95.7	1.67	0.84	--	7.00	5.50	--
47	Co.070	15.6	5.3	0.37	3.7	4.2	90.3	1.76	0.71	--	2.85	1.71	--

Note: All catalysts were screened thru 150 x 400 mesh.

Table V

DATE: 12/30/94

## M3 SBCR RUN RESULTS

## COMPARISON OF CATALYST ACTIVITY AT SIMILAR RUN CONDITIONS

Period No.	Temp.	Pres.	H <sub>2</sub> /CO Ratio
5	240 C	600psi	1.0

a) Total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.  
Flows: N<sub>2</sub>-562 SLH, H<sub>2</sub>-119 SLH, CO-119 SLH

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N<sub>2</sub> as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C<sub>1</sub>+ (kg/kg cat., hr)

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf Olefin		
					%CH <sub>4</sub>	%C <sub>2</sub>	%C <sub>3</sub> +	%CO <sub>2</sub>			C <sub>3</sub>	C <sub>4</sub>	C <sub>6-18</sub> , %
5	CO.003	15.1	13.4	0.97	3.9	1.1	93.7	1.3	0.81	--	5.26	3.45	30.1
6	CO.011	15.3	6.7	0.46	0.2	0.9	96.0	2.9	0.84	0.89	12.00	3.67	27.3
7	CO.012	15.8	4.3	0.28	0.1	2.1	91.6	6.3	0.75	0.82	8.50	3.50	--
8	CO.015	15.0	12.4	0.90	4.9	0.8	93.6	0.7	0.84	0.85	5.20	3.14	30.8
9	CO.011	15.0	8.7	0.63	1.4	1.1	96.4	1.1	0.83	0.87	5.00	2.67	30.5
11	CO.017	15.0	11.6	0.84	4.2	0.0	94.7	1.2	0.86	0.86	24.00	1.63	21.0
12	CO.018	15.6	13.0	0.90	3.2	0.0	94.9	1.9	0.80	0.85	--	--	38.5
13	CO.016	14.7	11.4	0.85	(1)	0.5	99.2	0.3	0.92	0.86	--	--	32.2
14	CO.019	15.2	5.9	0.41	(2)	1.5	96.1	2.4	0.80	--	--	--	--
15	CO.005	14.7	23.0	0.90	0.0	1.0	97.7	1.3	0.83	0.85	7.00	4.40	36.4
16	CO.002	15.4	13.1	0.92	3.6	1.4	93.9	1.1	0.81	0.84	4.29	2.75	25.2
17	CO.025	15.6	19.9	0.81	9.3	1.1	96.5	1.1	0.83	0.88	8.00	4.25	32.9
18	CO.004	15.0	15.0	1.09	3.6	1.1	94.1	1.2	0.82	0.83	5.67	4.00	33.6
19	CO.021	15.6	11.5	0.80	1.8	1.2	95.8	1.2	0.83	0.85	6.50	3.80	30.8
20	CO.041	15.8	13.2	0.91	2.0	1.0	96.1	0.9	0.84	0.87	7.00	3.50	31.5
21	Co.014	15.1	2.1	0.15	0.0	2.6	94.8	2.7	0.71	0.81	4.50	3.50	23.1
23	CO.047	15.8	11.8	0.80	2.6	0.8	94.6	2.0	0.82	0.87	7.00	3.60	38.5
24	CO.049	15.6	13.4	0.92	2.6	0.9	94.8	1.7	0.82	0.88	8.33	4.20	37.8
25	CO.047	15.6	12.4	0.86	2.2	0.8	95.6	1.3	0.83	0.86	7.33	4.50	36.4
26	CO.031	15.9	13.9	0.95	3.5	1.0	94.4	1.1	0.81	0.85	6.80	3.71	30.1
27	CO.029	15.9	12.1	0.82	1.7	0.9	95.6	1.8	0.83	0.89	7.67	4.75	39.9
29	CO.053	25.2	19.7	0.85	4.6	1.2	92.9	1.3	0.82	0.85	5.71	3.44	33.6
31	CO.055	15.0	16.1	1.16	4.7	1.2	92.8	1.3	0.80	0.83	6.17	3.11	33.6
34	CO.060	15.6	12.8	0.89	2.2	1.6	94.9	1.2	0.82	0.86	6.60	4.33	38.5

Note: Catalyst Run 9 screened thru 170 x 400 mesh.  
Catalysts for Runs 11 thru 27 (except Runs 21 and 22) screened thru 150 x 400 mesh.  
Catalyst for Run 21 screened thru 100 x 400 mesh.

- (1) Weak TCD filaments in G.C. CH<sub>4</sub> peaks smaller than expected.
- (2) Internal valve in G.C. leaked. CH<sub>4</sub> peak undetected.

Table VI

## SUMMARY OF M4 SBCR RUN RESULTS

a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec (linear gas flow).

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	N2: CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities %C <sub>1</sub>	%C <sub>2</sub>	%C <sub>3</sub>	%C <sub>4</sub>	Alpha GC	Alpha Liq	Olefin/Paraf C <sub>3</sub>	C <sub>4</sub>	Olefins C <sub>6-18, %</sub>	Comments
3	CO.002	15.2	1	25	35	240	450	2.0	20	29.4	1.42	17.3	2.2	79.4	1.01	0.73	0.82	0.91	0.60	17.5	
3	CO.002	15.2	2	73	83	220	450	2.0	20	11.8	0.56	4.7	1.0	93.7	0.59	0.81	0.90	2.71	1.63	--	G.C. Calib
3	CO.002	15.2	3	97	107	240	450	2.0	20	26.4	1.28	16.0	3.1	80.1	0.88	0.73	--	0.98	0.66	--	
3	CO.002	15.2	4	145	155	240	450	1.0	20	11.6	0.83	3.9	2.4	92.8	0.84	0.81	0.87	4.29	3.14	--	G.C. Calib
3	CO.002	15.2	5	182	203	240	600	1.0	20	12.9	0.92	4.0	1.5	93.5	0.91	0.81	0.82	4.29	2.75	26.5	
3	CO.002	15.2	6	217	226	240	450	2.0	20	24.2	1.17	17.1	3.1	79.0	0.83	0.71	--	1.03	0.70	--	
4	CO.024	15.4	1	20	37	240	450	2.0	20	25.5	1.21	8.6	2.0	89.0	0.43	0.79	0.84	2.93	1.93	21.7	
4	CO.024	15.4	2	68	85	220	450	2.0	0	9.5	0.45	0.0	2.1	97.6	0.27	0.83	0.91	5.33	4.00	--	No Synfl
4	CO.024	15.4	3	92	109	240	450	2.0	0	23.7	1.13	9.5	2.1	88.0	0.45	0.77	--	2.81	1.88	--	
4	CO.024	15.4	4	140	157	240	450	1.0	0	10.3	0.73	0.5	1.6	97.2	0.71	0.83	0.87	8.33	4.75	--	
4	CO.024	15.4	5	188	205	240	600	1.0	0	11.3	0.80	0.9	1.5	97.0	0.65	0.83	0.87	6.50	3.80	36.4	
4	CO.024	15.4	6	212	229	240	450	2.0	0	21.5	1.02	9.3	2.3	87.9	0.50	0.76	--	2.93	2.07	--	
5	CO.035	15.4	1	16	37	240	450	2.0	20	24.8	1.18	8.5	2.1	89.0	0.47	0.78	0.84	3.13	1.94	23.1	
5	CO.035	15.4	2	68	85	220	450	2.0	20	8.8	0.42	0.0	2.3	97.4	0.31	0.82	--	5.33	4.00	--	
5	CO.035	15.4	3	99	109	240	450	2.0	20	23.5	1.11	8.7	2.1	88.6	0.61	0.77	--	3.07	1.94	--	
5	CO.035	15.4	4	136	157	240	450	1.0	20	10.4	0.73	0.9	0.0	98.4	0.65	--	0.83	--	--	--	G.C. Calib
5	CO.035	15.4	5	184	205	240	600	1.0	20	10.7	0.76	0.7	1.4	97.1	0.75	0.84	0.88	6.25	4.50	27.3	
5	CO.035	15.4	6	212	228	240	450	2.0	20	19.4	0.92	7.8	2.3	89.4	0.56	0.79	--	3.08	1.77	--	
6	CO.028	15.4	1	23	40	240	450	2.0	20	21.2	1.00	6.1	1.6	91.3	1.01	0.81	0.83	4.86	3.00	28.7	
6	CO.028	15.4	2	67	88	220	450	2.0	20	6.6	0.31	0.0	1.9	97.4	0.72	0.83	0.90	5.50	4.00	--	
6	CO.028	15.4	3	95	112	240	450	2.0	20	20.1	0.94	5.8	1.6	91.6	1.02	0.81	--	4.25	2.67	--	
6	CO.028	15.4	4	139	160	240	450	1.0	20	9.2	0.65	0.0	1.3	97.3	1.46	0.85	0.88	9.50	3.75	--	
6	CO.028	15.4	5	189	208	240	600	1.0	20	9.5	0.67	0.0	1.1	97.5	1.36	0.85	0.88	6.00	3.50	40.6	
6	CO.028	15.4	6	213	232	240	450	2.0	20	18.0	0.84	5.7	1.6	91.5	1.12	0.80	--	4.57	2.88	--	
7	CO.043	15.4	1	18	39	240	450	2.0	20	13.0	0.61	3.7	1.8	93.4	1.06	0.79	0.85	5.60	3.17	27.3	
7	CO.043	15.4	2	53	63	220	450	2.0	20	4.3	0.20	0.0	1.4	96.3	2.25	0.81	0.91	4.00	3.00	--	
7	CO.043	15.4	3	94	111	240	450	2.0	20	12.3	0.58	3.0	1.5	93.9	1.58	0.80	--	5.00	2.83	--	
7	CO.043	15.4	4	138	159	240	450	1.0	20	5.2	0.37	0.0	0.0	99.4	0.64	0.83	0.89	7.00	5.00	--	
7	CO.043	15.4	5	191	207	240	600	1.0	20	5.9	0.41	0.0	2.2	94.8	2.99	0.82	0.89	6.00	3.75	30.1	G.C. Calib
7	CO.043	15.4	6	215	231	240	450	2.0	20	10.2	0.47	4.7	2.1	91.4	1.79	0.78	--	5.50	3.20	--	Repair G.C
8	CO.006	15.0	1	19	40	240	450	2.0	20	2.7	0.13	0.1	0.2	98.8	1.75	0.67	0.85	3.33	2.33	16.1	Shut down

Table VI  
(Continued)

SUMMARY OF M4 SBCR RUN RESULTS

a)Unless otherwise noted, total flow is ca.15 L/min. STP, or 3 cm/sec linear gas flow.

b)Conversion is total CO conversion over the period (%).

c)Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d)Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat.,hr).

e)Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	N2: CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf C3	Olefins C4	Olefins C6-18, %	Comments
9	CO.048	15.4	1	19	40	240	450	2.0	12	19.1	0.90	9.9	1.6	87.4	1.05	0.77	0.88	3.60	2.09	20.3	
9	CO.048	15.4	2	70	84	220	450	2.0	12	6.1	0.28	1.8	1.0	95.2	1.93	0.80	0.91	3.67	3.00	--	
9	CO.048	15.4	3	93	111	240	450	2.0	20	17.8	0.84	10.1	1.7	86.9	1.33	0.77	--	3.30	2.10	--	
9	CO.048	15.4	4	139	159	240	450	1.0	20	8.2	0.57	2.3	1.0	93.8	2.98	0.82	0.90	8.50	4.33	--	
9	CO.048	15.4	5	189	207	240	600	1.0	20	11.9	0.83	2.7	0.9	94.4	1.93	0.84	0.89	5.75	3.20	14.0	
9	CO.048	15.4	6	217	226	240	450	2.0	20	24.2	1.17	17.1	3.1	79.0	0.83	0.71	--	1.03	0.70	--	
10	CAL.02	15.9	1	19	40	240	450	2.0	20	34.5	1.58	12.9	2.0	83.9	1.23	0.75	0.84	1.66	1.06	21.0	
10	CAL.02	15.9	2	69	88	220	450	2.0	20	14.9	0.68	4.6	0.9	94.0	0.47	0.81	0.88	4.40	2.29	--	
10	CAL.02	15.9	3	91	112	240	450	2.0	20	34.2	1.57	12.6	2.0	84.4	1.00	0.75	--	1.71	1.06	--	
10	CAL.02	15.9	4	139	160	240	450	1.0	20	14.6	1.00	4.6	1.1	93.3	0.97	0.80	0.88	7.20	4.00	--	
10	CAL.02	15.9	5	187	201	240	600	1.0	20	16.4	1.12	4.2	1.0	94.0	0.89	0.82	0.86	5.83	3.86	35.7	
10	CAL.02	15.9	6	215	230	240	450	2.0	20	30.9	1.42	13.3	2.1	83.7	0.90	0.74	--	1.90	1.21	--	
11	CAL.03	15.6	1	19	40	240	450	2.0	20	29.7	1.39	13.5	2.1	83.4	1.08	0.74	0.86	1.65	1.03	18.2	ShutDown
12	CO.053	15.9	1	22	40	240	450	2.0	20	34.2	1.56	12.6	2.0	84.2	1.23	0.75	0.83	1.60	1.00	24.5	
12	CO.053	15.9	2	69	88	220	450	2.0	20	14.4	0.66	4.3	1.0	94.3	0.48	0.81	0.89	4.20	2.67	--	
12	CO.053	15.9	3	93	112	240	450	2.0	20	34.0	1.56	13.4	2.2	83.2	1.21	0.74	--	1.50	0.94	--	
12	CO.053	15.9	4	150	152	240	450	1.0	20	13.3	0.91	4.3	1.2	93.3	1.18	0.80	0.89	6.60	3.71	--	
12	CO.053	15.9	5	189	208	240	600	1.0	20	15.6	1.06	4.0	0.9	94.0	1.01	0.82	0.87	5.50	3.57	32.2	
12	CO.053	15.9	6	223	231	240	450	2.0	20	29.8	1.37	12.8	2.0	84.3	0.94	0.75	--	1.89	1.10	--	
13	CO.054	15.7	1	23	40	240	450	2.0	20	10.4	0.48	4.7	1.8	92.3	1.17	0.78	0.86	5.75	4.00	25.9	
13	CO.054	15.7	2	71	88	220	450	2.0	20	0.2	0.01	0.0	19.	60.8	19.5	0.33	0.94	8.00	5.00	--	
13	CO.054	15.7	3	102	112	240	450	2.0	20	10.6	0.49	4.5	1.5	92.8	1.23	0.79	--	5.50	3.75	--	
13	CO.054	15.7	4	143	160	240	450	1.0	20	5.2	0.36	0.0	1.2	97.0	1.85	0.83	0.95	6.00	4.50	--	
13	CO.054	15.7	5	191	208	240	600	1.0	20	5.0	0.34	0.0	1.3	96.9	1.78	0.82	0.93	6.50	3.33	30.8	
13	CO.054	15.7	6	223	230	240	450	2.0	20	8.8	0.40	4.7	2.0	91.7	1.54	0.78	--	5.00	3.50	--	
14	BlendA	20.0	1	25	39	240	450	2.0	20	29.3	1.41	10.1	1.6	86.3	2.02	0.77	0.86	2.23	1.35	23.1	
14	BlendA	20.0	2	69	87	220	450	2.0	20	12.4	0.60	4.3	0.9	93.9	0.95	0.81	0.91	3.80	2.33	--	
14	BlendA	20.0	3	93	111	240	450	2.0	20	27.5	1.33	10.5	1.7	86.4	1.44	0.76	--	2.09	1.32	--	
14	BlendA	20.0	4	143	158	240	450	1.0	20	12.7	0.91	3.4	1.0	94.0	1.61	0.81	0.86	7.50	3.83	--	
14	BlendA	20.0	5	191	207	240	600	1.0	20	14.1	1.02	3.7	1.0	93.8	1.45	0.82	0.89	6.40	3.43	32.9	
14	BlendA	20.0	6	215	231	240	450	2.0	20	27.0	1.29	11.5	1.9	85.5	1.12	0.76	--	2.04	1.30	--	

(Continued)

SUMMARY OF M4 SBCR RUN RESULTS

a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Per wt. g	Time No	Time Start	Temp Stop	Pres C	H2: psi	Synfl CO	Conv. cc/hr	Prod. I	Rate	Selectivities	Alpha GC	Alpha Liq	Olefin/Paraf C3	Olefins C4	Comments C5-18,2
15	CO.034	13.0	1	21	39	240	450	2.0	20	27.5	1.54	10.4 1.6 87.2 0.80	0.78	0.84	2.21	1.40	21.0 G.C.Calib
15	CO.034	13.0	2	45	87	220	450	2.0	20	11.0	0.61	4.0 0.9 94.5 0.59	0.82	0.90	4.00	3.00	--
15	CO.034	13.0	3	95	111	240	450	2.0	20	26.6	1.49	11.5 1.9 85.9 0.82	0.76	--	2.10	1.33	--
15	CO.034	13.0	4	141	159	240	450	1.0	20	11.2	0.94	3.9 1.0 94.0 1.02	0.82	0.87	8.33	4.00	--
15	CO.034	13.0	5	189	207	240	600	1.0	20	11.8	0.99	3.9 1.1 94.0 1.03	0.83	--	5.75	3.80	37.8
15	CO.034	13.0	6	215	231	240	450	2.0	20	21.6	1.19	10.9 1.9 86.3 0.87	0.76	--	3.33	2.15	--
16	CAL.04	16.1	1	21	39	240	450	1.8	20	26.3	1.34	7.1 1.3 90.3 1.38	0.80	0.85	4.80	3.18	32.9 H2/CO:
16	CAL.04	16.1	2	54	153	220	450	1.8	20	8.4	0.42	2.6 1.0 94.1 2.31	0.80	0.88	5.00	4.00	-- 1.76/1.0
17	CAL.08	15.0	1	21	39	240	450	1.8	20	16.9	0.93	5.9 1.0 91.7 1.36	0.82	0.88	5.20	3.33	28.7 H2/CO:
17	CAL.08	15.0	2	47	62	220	450	1.8	20	5.4	0.28	0.1 0.8 96.9 2.23	0.83	--	4.00	3.00	-- 1.76/1.0
18	CAL.07	15.0	1	21	39	240	450	2.0	20	20.6	1.03	7.7 1.2 90.0 1.09	0.81	0.88	5.00	3.00	32.2
18	CAL.07	15.0	2	47	62	220	450	2.0	20	6.7	0.33	1.8 1.4 95.0 1.81	0.84	--	4.00	3.00	--
19	CAL.05	15.7	1	23	39	240	450	2.0	20	26.6	1.22	7.3 1.3 90.2 1.19	0.82	0.86	4.11	2.70	18.2 G.C.Calib
19	CAL.05	15.7	2	47	62	220	450	2.0	20	9.0	0.41	2.3 1.4 94.8 1.56	0.84	--	5.50	3.00	--
20	CAL.06	15.0	1	15	30	240	450	2.0	20	5.6	0.26	3.1 2.1 92.0 2.86	0.80	0.90	4.50	3.50	30.8 G.C.Calib
20	CAL.06	15.0	2	55	63	240	450	2.0	20	3.5	0.16	0.0 3.3 92.8 3.87	0.80	0.85	3.00	2.50	--
20	CAL.06	15.0	3	103	110	240	450	2.0	20	1.7	0.08	0.0 3.3 89.5 7.22	0.80	--	1.50	3.00	-- Cat.Loss
21	CO.004	15.9	1	23	40	240	450	2.0	20	39.3	1.80	15.2 2.3 81.2 1.38	0.74	0.89	1.16	0.73	23.1
21	CO.004	15.9	2	71	88	220	450	2.0	20	16.1	0.74	8.1 1.2 90.2 0.48	0.78	0.87	3.38	2.22	--
21	CO.004	15.9	3	105	110	240	450	2.0	20	37.6	1.47	16.4 2.3 80.2 1.20	0.73	--	1.10	0.70	--
21	CO.004	15.9	4	136	138	240	450	1.0	20	14.9	1.02	7.4 1.4 89.9 1.29	0.77	0.84	4.67	2.82	--
21	CO.004	15.9	5	166	184	240	600	1.0	20	18.4	1.26	6.1 1.1 91.9 0.94	0.81	0.84	5.25	2.91	-- G.C.Repair
21	CO.004	15.9	6	199	207	240	600	2.0	20	39.0	1.80	14.2 1.9 83.0 0.91	0.78	0.82	0.85	0.77	--
21	CO.004	15.9	7	212	214	240	450	2.0	20	34.6	1.59	15.8 2.3 81.0 1.00	0.76	--	0.86	0.81	-- G.C.Repair
22	BlendB	30.5	1	23	39	240	450	2.0	20	35.6	1.64	12.7 1.6 79.4 6.29	0.75	0.81	1.40	0.81	27.3
22	BlendB	30.5	2	78	87	240	450	1.0	20	15.8	1.07	1.5 0.9 90.5 7.06	0.80	0.83	5.00	2.22	38.5 G.C.Calib
22	BlendB	30.5	3	125	135	240	450	0.7	20	10.6	0.86	0.8 0.8 92.6 5.83	0.82	0.87	7.33	3.20	33.6 G.C.Calib
22	BlendB	30.5	4	150	158	240	450	1.0	20	14.1	0.99	3.9 1.0 91.0 4.07	0.80	--	5.40	2.25	--
22	BlendB	30.5	5	174	183	240	450	2.0	20	30.1	1.44	13.2 1.8 82.4 2.56	0.75	--	1.33	0.69	--
22	BlendB	30.5	6	191	207	260	450	1.0	20	23.5	1.63	10.0 1.9 82.1 6.02	0.74	--	2.92	1.15	--
22	BlendB	30.5	7	223	232	280	450	1.0	20	26.9	1.79	17.8 3.1 68.4 10.7	0.64	--	3.00	1.88	--
22	BlendB	30.5	8	247	255	280	450	0.7	20	17.1	1.34	8.8 2.6 78.8 9.8	0.70	--	6.00	3.53	--
23	CAL.09	15.0	1	23	40	240	450	2.0	20	17.4	0.84	0.02 1.2 97.9 0.95	0.84	0.88	5.40	3.33	29.4 G.C.Calib
23	CAL.09	15.0	2	57	63	220	450	2.0	20	6.8	0.32	0.2 0.9 98.0 0.92	0.90	--	4.00	3.00	--

Table VI  
(Continued)

SUMMARY OF M4 SBCR RUN RESULTS

a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

b) Conversion is total C<sub>3</sub> conversion over the period (Z).

c) Conversion and selectivities are calculated using N<sub>2</sub> as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C<sub>1+</sub> (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt. g	Per No	Time Start	Time Stop	Temp C	Pres psi	H <sub>2</sub> CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities IC <sub>3</sub> + IC <sub>2</sub> IC <sub>3</sub> + IC <sub>2</sub> IC <sub>3</sub> + IC <sub>2</sub>	Alpha GC	Alpha Liq	Olefin/Paraf C <sub>3</sub> C <sub>4</sub>	Olefins CS-18,2	Comments				
24	CO.053	28.5	1	23	39	240	450	2.0	20	50.4	1.28	14.1	2.1	81.8	2.03	0.75	0.79	1.14	0.68	--	G.C. Calib
24	CO.053	28.5	2	54	63	250	450	2.0	20	53.5	1.34	24.2	3.6	67.9	4.24	0.66	--	0.65	0.48	--	
24	CO.053	28.5	3	78	87	250	450	2.0	30	55.3	1.36	38.2	5.2	49.0	7.64	0.53	--	0.53	0.47	--	
24	CO.053	28.5	4	102	110	250	450	2.0	30	52.8	2.13	29.1	4.0	62.1	4.79	0.64	--	0.68	0.49	--	
24	CO.053	28.5	5	125	135	250	450	2.0	30	58.9	1.90	28.5	3.9	62.8	4.90	0.65	--	0.70	0.48	--	
24	CO.053	28.5	6	148	158	250	450	2.0	30	42.6	1.74	25.9	3.8	66.3	2.96	0.85	--	0.99	0.67	--	
24	CO.053	28.5	7	175	182	250	450	2.0	30	51.5	1.31	31.6	4.5	60.0	3.90	0.60	--	0.94	0.65	--	
24	CO.053	28.5	8	199	208	250	450	2.0	30	58.1	1.89	27.6	3.7	65.1	3.67	0.66	--	0.88	0.56	--	
24	CO.053	28.5	9	218	231	250	450	2.0	30	62.9	2.05	23.2	3.0	70.6	3.20	0.71	--	0.93	0.58	--	
24	CO.053	28.5	10	259	263	275	450	2.0	30	72.1	2.24	39.1	5.0	46.4	9.53	0.57	--	0.41	0.34	--	
24	CO.053	28.5	11	290	304	250	450	2.0	30	48.8	1.62	29.0	3.8	65.4	1.83	0.65	--	1.78	1.09	--	

Feed Gas Rates

Per No	N <sub>2</sub> SLH	H <sub>2</sub> SLH	CO SLH	Total SLH
1	583	225	112	900
2	563	225	112	900
3	563	225	112	900
4	360	360	180	900
5	298	288	144	720
6	540	360	180	1080
7	563	225	112	900
8	200	288	144	632
9	108	288	144	540
10	108	288	144	540
11	108	288	144	540

Table VI  
(Continued)

SUMMARY OF M4 SBCR RUN RESULTS

- a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.
- b) Conversion is total C3 conversion over the period (%).
- c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.
- d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).
- e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Per wt. %	Time No	Time Start	Time Stop	Temp C	Pres psi	H2: Synfl C3	Conv. cc/hr	Prod. %	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf Olefins			Comments	
											C3H6	C3H8	C3+	C3C2			C3	C4	C5-18,2		
26	CAL.10	15.6	1	23	39	240	450	2.0	20	21.9	1.01	5.4	1.5	91.9	1.25	0.79	0.85	3.60	2.27	25.9	
26	CAL.10	15.6	2	54	63	240	450	2.0	20	21.7	1.30	8.3	1.1	89.9	1.10	0.80	--	3.78	2.45	--	
25	CAL.10	15.6	3	78	87	240	450	2.0	20	17.2	1.04	11.7	1.4	86.1	1.39	0.76	--	3.57	2.30	--	
25	CAL.10	15.6	4	102	111	240	450	2.0	20	17.7	1.01	11.9	1.4	86.0	1.40	0.77	--	3.52	2.28	--	
26	CAL.10	15.6	5	118	125	240	450	2.0	20	16.2	0.75	4.9	1.7	92.3	1.10	0.77	--	4.29	2.75	--	

Feed Gas Rates

Per No	N2 SLH	H2 SLH	CO SLH	Total SLH
1	563	225	112	900
2	108	288	144	540
3	54	288	144	486
4	25	274	137	436
5	563	225	112	900



Table VI  
(Continued)

SUMMARY OF M4 SECR RUN RESULTS

a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

b) Conversion is total CO conversion over the period (I).

c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	H2: CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities	IC1+	IC2	IC3+	IC4	IC5	IC6-18,2	Alpha GC	Alpha Liq	Olefin/Paraf C3	Olefins C4	Comments	
25	CO.056	15.0	1	23	39	240	450	2.0	20	11.4	0.55	7.8	3.6	87.2	1.43	0.67	0.87	3.60	2.30	20.3				
25	CO.056	15.0	2	47	63	220	450	2.0	20	4.5	0.22	0.3	2.7	95.7	1.27	0.73	--	4.67	3.00	--				
26	CAL.10	15.6	1	23	39	240	450	2.0	20	21.9	1.01	5.4	1.3	91.9	1.25	0.79	0.85	3.60	2.27	25.9				
26	CAL.10	15.6	2	54	63	240	450	2.0	20	21.7	1.30	8.3	1.1	89.9	0.68	0.80	--	3.78	2.45	--				
26	CAL.10	15.6	3	78	87	240	450	2.0	20	17.2	1.04	11.7	1.4	86.1	0.78	0.76	--	3.57	2.30	--				
26	CAL.10	15.6	4	102	111	240	450	2.0	20	17.7	1.01	11.9	1.4	86.0	0.73	0.77	--	3.52	2.28	--				
26	CAL.10	15.6	5	118	126	240	450	2.0	20	16.2	0.75	4.9	1.7	92.3	1.10	0.77	--	4.29	2.75	--				
27	Co.050	14.6	1	23	39	240	450	2.0	20	20.4	1.01	6.8	1.9	90.2	1.04	0.78	0.87	2.50	1.69	18.9				
27	Co.050	14.6	2	78	87	220	450	2.0	20	8.1	0.39	0.0	4.8	92.6	2.56	0.79	0.87	8.50	3.00	--				
27	Co.050	14.6	3	102	111	240	450	2.0	20	19.8	0.98	9.1	2.6	87.0	1.30	0.76	--	2.50	1.69	--				
27	Co.050	14.6	4	142	157	240	450	1.0	20	8.4	0.61	1.1	2.9	93.3	2.78	0.79	0.90	6.25	5.00	--				
27	Co.050	14.6	5	173	182	240	450	2.0	20	17.3	0.87	9.9	3.0	85.4	1.74	0.75	--	2.50	1.75	--				
28	Co.057	15.8	1	23	40	240	450	2.0	20	18.7	0.86	5.3	1.5	92.3	0.98	0.81	0.85	3.27	2.36	23.1				
28	Co.057	15.8	2	71	88	220	450	2.0	20	6.0	0.27	0.0	1.9	97.2	0.93	0.79	--	5.50	4.00	--				G.C.Repair
28	Co.057	15.8	3	102	112	240	450	2.0	20	19.4	0.90	7.7	2.1	89.3	0.97	0.77	--	3.70	2.27	--				
28	Co.057	15.8	4	126	135	240	450	1.0	20	8.1	0.56	1.3	4.6	92.7	1.44	0.79	--	7.33	5.67	--				
28	Co.057	15.8	5	150	159	240	450	2.0	20	18.0	0.83	7.6	3.3	88.0	1.00	0.76	--	3.89	2.30	--				
28	Co.057	15.8	6	175	184	250	450	2.0	20	25.3	1.18	13.2	2.8	82.5	1.60	0.73	--	2.30	1.45	--				
28	Co.057	15.8	7	198	208	260	450	2.0	20	29.7	1.36	22.7	3.9	70.7	2.75	0.65	--	1.39	0.92	--				
28	Co.057	15.8	8	222	231	240	450	2.0	20	13.8	0.63	8.7	2.6	87.4	1.34	0.75	--	3.11	2.11	--				
29	Co.061	45.4	1	39	41	240	450	2.0	20	29.0	0.46	14.4	2.8	81.6	1.53	0.72	0.80	1.49	0.94	18.9				G.C.Calib
29	Co.061	45.4	2	54	64	220	450	2.0	20	11.8	0.19	3.9	1.9	93.5	0.73	0.77	--	3.67	2.29	--				Cat.Loss
29	Co.061	45.4	3	78	86	240	450	2.0	20	24.4	0.39	13.3	2.5	83.2	1.08	0.72	--	1.67	1.08	--				Cat.Loss
30	Co.011	15.9	1	23	40	240	450	2.0	20	8.0	0.36	5.8	3.9	87.8	2.49	0.71	0.89	5.75	3.00	22.4				G.C.Repair
30	Co.011	15.9	2	54	64	250	450	2.0	20	15.8	0.72	10.0	3.0	84.8	2.28	0.74	--	4.22	2.40	--				
30	Co.011	15.9	3	78	87	250	450	2.0	20	23.6	1.06	18.1	3.7	74.5	3.72	0.67	--	2.21	1.54	--				G.C.Repair
30	Co.011	15.9	4	102	111	270	450	2.0	20	28.3	1.28	26.5	3.4	64.9	5.23	0.60	--	1.67	1.14	--				
30	Co.011	15.9	5	126	135	278	450	2.0	20	28.5	1.27	34.5	4.0	55.1	6.43	0.53	--	1.84	1.26	--				
30	Co.011	15.9	6	150	159	280	450	2.0	20	36.0	0.95	40.3	4.5	47.9	7.32	0.48	--	1.77	1.20	--				
30	Co.011	15.9	7	174	183	280	450	2.0	20	36.5	0.77	43.7	4.7	43.7	7.90	0.45	--	1.93	1.29	--				
30	Co.011	15.9	8	198	207	280	450	2.0	20	36.0	1.15	38.5	4.5	50.9	6.07	0.52	--	2.18	1.43	--				
30	Co.011	15.9	9	222	230	240	450	2.0	20	4.4	0.20	6.9	4.0	85.5	3.63	0.66	--	6.00	3.67	--				

Table VI  
(Continued)

SUMMARY OF M4 SBCR RUN RESULTS

- a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.  
 b) Conversion is total CO conversion over the period (2).  
 c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.  
 d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).  
 e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	H2: Synfl CO	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf Olefins		Comments		
											IC1+	IC2	IC3+	IC02			C3	C4	C6-18, I		
30	Co.011	15.9	1	23	40	240	450	2.0	20	8.0	0.36	5.8	3.9	87.8	2.49	0.71	0.89	5.75	3.00	22.4	G.C. Calib
30	Co.011	15.9	2	54	64	250	450	2.0	20	15.8	0.72	10.0	3.0	84.8	2.28	0.74	--	4.22	2.40	--	
30	Co.011	15.9	3	78	87	260	450	2.0	20	23.6	1.06	18.1	3.7	74.5	3.72	0.67	--	2.21	1.54	--	
30	Co.011	15.9	4	102	111	270	450	2.0	20	28.3	1.26	26.3	3.4	64.9	5.23	0.60	--	1.67	1.14	--	G.C. Calib
30	Co.011	15.9	5	126	135	278	450	2.0	20	28.5	1.27	34.5	4.0	55.1	6.43	0.53	--	1.84	1.26	--	
30	Co.011	15.9	6	150	159	280	450	2.0	20	36.0	0.95	40.3	4.5	47.9	7.32	0.48	--	1.77	1.20	--	
30	Co.011	15.9	7	174	183	280	450	2.0	20	38.5	0.77	43.7	4.7	43.7	7.90	0.45	--	1.93	1.29	--	
30	Co.011	15.9	8	198	207	280	450	2.0	20	36.0	1.15	38.5	4.5	50.9	6.07	0.52	--	2.18	1.43	--	
30	Co.011	15.9	9	222	230	240	450	2.0	20	4.4	0.20	1.9	4.0	85.5	3.63	0.66	--	6.00	3.67	--	

Feed Gas Rates

Per No	N2 SLH	H2 SLH	CO SLH	Total SLH
1	558	225	112	895
2	558	225	112	895
3	558	225	112	895
4	558	225	112	895
5	558	225	112	895
6	338	135	67	540
7	250	100	50	400
8	160	160	80	400
9	558	225	112	895

Table VI  
(Continued)

SUMMARY OF M4 SBOR CALSICAT CATALYST AGING RUN

a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	H2: CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities ICH <sub>4</sub>	IC <sub>2</sub>	IC <sub>3</sub> +	IC <sub>2</sub> O	Alpha GC	Alpha Liq	Olefin C <sub>3</sub>	Paraf C <sub>4</sub>	Olefins C <sub>5</sub> -18, %	Comments
33	CAL.13	15.9	1	23	39	241	450	2.0	20	28.1	1.28	6.4	1.4	90.9	1.29	0.81	0.85	3.64	2.15	23.8	
33	CAL.13	15.9	2	47	63	240	450	2.0	20	25.4	1.21	6.7	1.3	90.8	1.17	0.81	--	3.80	2.45	--	
33	CAL.13	15.9	3	71	87	240	450	2.0	20	25.7	1.18	6.8	1.3	90.8	1.14	0.80	--	3.80	2.25	--	
33	CAL.13	15.9	4	95	111	240	450	2.0	20	25.1	1.15	6.7	1.4	90.6	1.24	0.80	--	4.33	2.55	--	
33	CAL.13	15.9	5	119	135	238	450	2.0	20	22.4	1.02	5.7	1.4	91.8	1.14	0.80	--	4.25	2.50	--	
33	CAL.13	15.9	6	143	159	243	450	2.0	20	27.4	1.25	7.9	1.7	89.0	1.40	0.79	--	3.54	2.13	--	
33	CAL.13	15.9	7	162	178	240	450	2.0	20	23.8	1.09	6.4	1.5	91.0	1.13	0.80	--	4.88	2.55	--	
33	CAL.13	15.9	8	186	203	240	450	2.0	20	22.5	1.03	6.3	1.6	91.1	1.07	0.79	--	4.50	2.60	--	
33	CAL.13	15.9	9	210	231	241	450	2.0	20	23.2	1.06	6.7	1.6	90.5	1.12	0.81	0.85	4.22	2.45	25.2	G.C. Calib
33	CAL.13	15.9	10	234	255	240	450	2.0	20	21.9	1.00	6.4	1.6	90.9	1.05	0.79	--	4.50	2.78	--	
33	CAL.13	15.9	11	262	279	240	450	2.0	20	22.0	1.00	6.3	1.6	91.1	1.02	0.80	--	4.37	2.50	--	
33	CAL.13	15.9	12	282	303	240	450	2.0	20	21.4	0.98	6.1	1.5	91.4	1.01	0.80	--	4.25	2.78	--	
33	CAL.13	15.9	13	306	327	240	450	2.0	20	20.1	0.92	5.9	1.6	91.5	1.05	0.80	--	4.71	2.56	--	
33	CAL.13	15.9	14	331	351	240	450	2.0	20	20.3	0.93	6.0	1.7	91.1	1.12	0.79	--	4.13	2.67	--	
33	CAL.13	15.9	15	360	373	240	450	2.0	20	18.5	0.85	7.2	1.5	90.3	0.98	0.80	--	4.20	3.00	--	
33	CAL.13	15.9	16	385	398	240	450	2.0	20	19.8	0.91	6.8	1.4	90.8	1.02	0.79	0.85	4.71	2.40	24.5	G.C. Calib
33	CAL.13	15.9	17	402	423	240	450	2.0	20	18.4	0.84	7.5	1.6	89.9	1.09	0.78	--	4.00	2.50	--	
33	CAL.13	15.9	18	428	447	239	450	2.0	20	17.2	0.78	7.1	1.6	90.3	1.06	0.78	--	4.43	2.88	--	
33	CAL.13	15.9	19	510	519	241	450	2.0	20	15.6	0.71	6.9	1.5	90.6	1.11	0.78	--	4.67	2.63	--	Down 48hr
33	CAL.13	15.9	20	522	543	241	450	2.0	20	14.5	0.66	6.8	1.2	91.1	0.88	0.77	--	4.50	3.00	--	
33	CAL.13	15.9	21	546	567	240	450	2.0	20	14.0	0.64	6.9	1.2	91.1	0.76	0.77	0.88	5.40	3.00	26.6	
33	CAL.13	15.9	22	570	591	240	450	2.0	20	13.6	0.62	6.9	1.5	90.7	0.98	0.77	--	5.40	3.00	--	
33	CAL.13	15.9	23	596	614	240	450	2.0	20	14.1	0.64	7.0	1.5	90.6	0.95	0.77	--	4.50	3.00	--	
33	CAL.13	15.9	24	617	638	240	450	2.0	20	13.5	0.62	7.0	1.5	90.6	0.87	0.77	--	5.40	2.86	--	
33	CAL.13	15.9	25	641	662	240	450	2.0	20	13.1	0.60	7.1	1.5	90.5	0.88	0.76	--	6.50	2.86	--	
33	CAL.13	15.9	26	665	686	240	450	2.0	20	12.8	0.59	7.3	1.4	90.6	0.73	0.76	--	5.20	2.86	--	
33	CAL.13	15.9	27	689	710	240	450	2.0	20	12.6	0.58	7.2	1.4	90.5	0.86	0.76	--	5.20	2.86	--	
33	CAL.13	15.9	28	713	734	240	450	2.0	20	12.4	0.57	7.5	1.6	90.0	1.01	0.76	0.84	5.20	2.85	25.9	
33	CAL.13	15.9	29	737	758	240	450	2.0	20	12.4	0.57	7.6	1.5	90.2	0.74	0.76	--	5.20	2.86	--	
33	CAL.13	15.9	30	761	782	241	450	2.0	20	12.3	0.56	7.9	1.6	89.6	0.82	0.76	--	5.20	3.00	--	
33	CAL.13	15.9	31	785	808	241	450	2.0	20	12.3	0.56	7.8	0.7	90.9	0.52	0.76	--	6.50	2.86	--	
33	CAL.13	15.9	32	811	830	241	450	2.0	20	12.0	0.55	7.7	1.1	90.6	0.61	0.75	--	6.50	2.86	--	
33	CAL.13	15.9	33	833	854	240	450	2.0	20	11.7	0.54	7.7	1.5	90.1	0.74	0.75	--	5.20	2.86	--	
33	CAL.13	15.9	34	857	878	241	450	2.0	20	11.8	0.54	8.0	0.6	91.0	0.50	0.76	--	6.50	2.86	--	
33	CAL.13	15.9	35	881	902	240	450	2.0	20	11.5	0.53	8.0	0.3	91.2	0.47	0.76	--	6.50	2.86	25.9	
33	CAL.13	15.9	36	905	926	240	450	2.0	20	11.3	0.52	8.6	1.1	89.9	0.44	0.75	--	6.50	3.17	--	
33	CAL.13	15.9	37	929	950	240	450	2.0	20	11.3	0.52	8.8	1.3	89.5	0.46	0.75	--	6.50	3.17	--	
33	CAL.13	15.9	38	953	974	240	450	2.0	20	11.3	0.52	9.2	1.6	88.4	0.81	0.74	--	5.00	2.71	--	
33	CAL.13	15.9	39	977	998	240	450	2.0	20	11.3	0.52	9.3	1.6	88.4	0.75	0.75	--	5.00	3.33	--	
33	CAL.13	15.9	40	1001	1022	241	450	2.0	20	10.8	0.49	10.2	0.8	88.4	0.52	0.74	--	5.00	2.86	--	
33	CAL.13	15.9	41	1031	1046	241	450	2.0	20	12.9	0.60	9.3	0.0	90.7	0.00	0.77	--	5.40	3.00	--	
33	CAL.13	15.9	42	1049	1069	240	450	2.0	20	11.2	0.52	9.4	0.6	89.6	0.37	0.75	--	5.50	2.86	22.4	

SUMMARY OF M4 SECR COBALT ONLY CATALYST AGING RUN

a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

b) Conversion is total CO conversion over the period (X).

c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Per No	Time Start	Time Stop	Temp C	Pres psi	H2: CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities	Alpha GC	Alpha Liq	Olefin/Paraf C3	Paraf C4	Olefins C6-18, X	Comments
37	CO.005	25.0	1	1	18	216	450	2.0	20	8.1	0.23	0 -- -- --	--	--	--	--	--	
37	CO.005	25.0	2	20	38	221	450	2.0	20	12.5	0.36	1.5 3.9 93.9 0.71	0.90	0.89	--	--	26.5	
37	CO.005	25.0	3	41	62	221	450	2.0	20	14.4	0.42	2.9 -- 96.5 0.60	0.91	--	--	--	--	Repair G.C
37	CO.005	25.0	4	65	86	221	450	2.0	20	14.9	0.43	3.4 5.0 91.1 0.49	0.88	--	6.33	--	--	
37	CO.005	25.0	5	89	110	221	450	2.0	20	14.4	0.42	3.6 9.0 86.8 0.60	0.85	--	6.67	7.50	--	
37	CO.005	25.0	6	113	134	221	450	2.0	20	14.1	0.41	3.8 8.0 87.7 0.58	0.85	--	5.00	15.00	--	
37	CO.005	25.0	7	137	158	222	450	2.0	20	14.8	0.43	4.4 6.6 88.5 0.55	0.82	0.90	5.50	3.20	23.1	
37	CO.005	25.0	8	165	182	221	450	2.0	20	14.1	0.41	4.3 5.3 89.9 0.50	0.80	--	5.50	4.25	--	
37	CO.005	25.0	9	185	206	220	450	2.0	20	13.3	0.39	3.9 3.6 92.0 0.53	0.79	--	5.25	3.20	--	
37	CO.005	25.0	10	209	230	221	450	2.0	20	13.6	0.39	5.1 3.2 91.3 0.51	0.78	--	5.50	2.67	--	
37	CO.005	25.0	11	233	254	221	450	2.0	20	13.5	0.39	4.7 3.6 91.2 0.48	0.78	0.89	4.60	3.20	22.4	
37	CO.005	25.0	12	257	278	221	450	2.0	20	13.3	0.39	4.5 3.1 91.9 0.49	0.78	--	4.40	2.67	--	
37	CO.005	25.0	13	281	302	221	450	2.0	20	13.1	0.38	4.7 3.3 91.5 0.49	0.78	--	4.40	2.67	--	
37	CO.005	25.0	14	305	326	221	450	2.0	20	12.7	0.37	4.9 4.1 90.5 0.52	0.78	--	4.40	2.67	--	
37	CO.005	25.0	15	329	350	221	450	2.0	20	12.4	0.36	4.9 3.9 90.6 0.54	0.77	--	4.60	2.67	--	
37	CO.005	25.0	16	353	374	221	450	2.0	0	12.5	0.36	5.2 3.8 90.5 0.54	0.77	0.83	4.60	2.67	--	Stop Syn F
37	CO.005	25.0	17	377	397	221	450	2.0	0	12.5	0.36	5.1 3.3 90.9 0.56	0.77	--	4.60	2.67	--	
37	CO.005	25.0	18	401	422	221	450	2.0	0	12.9	0.37	5.3 3.9 90.4 0.42	0.77	0.87	4.80	2.83	--	
37	CO.005	25.0	19	425	446	221	450	2.0	0	12.3	0.36	5.1 3.1 91.6 0.44	0.77	--	4.60	2.83	--	
37	CO.005	25.0	20	449	470	221	450	2.0	0	8.6	0.41	10.4 2.5 86.7 0.37	0.72	--	4.14	2.63	--	
37	CO.005	25.0	21	473	494	221	450	2.0	0	9.1	0.43	10.5 2.6 86.5 0.37	0.74	--	4.43	2.63	25.2	
37	CO.005	25.0	22	497	518	221	450	2.0	0	8.9	0.42	10.8 2.8 85.9 0.45	0.73	0.86	4.43	2.63	--	
37	CO.005	25.0	23	521	542	221	450	2.0	0	8.7	0.41	10.9 2.7 85.9 0.50	0.73	--	4.43	2.63	--	
37	CO.005	25.0	24	545	554	221	450	2.0	0	8.5	0.41	10.9 3.2 85.3 0.50	0.72	--	4.43	3.00	--	
37	CO.005	25.0	25	574	590	221	450	2.0	0	8.1	0.38	10.9 3.5 84.9 0.55	0.72	--	4.29	2.86	--	
37	CO.005	25.0	26	593	614	221	450	2.0	0	7.9	0.37	10.8 3.5 85.1 0.54	0.72	--	4.14	2.86	--	
37	CO.005	25.0	27	617	638	220	450	2.0	0	7.6	0.36	10.8 3.1 85.6 0.57	0.72	0.86	4.00	2.71	--	
37	CO.005	25.0	28	641	662	220	450	2.0	0	7.6	0.36	10.8 2.6 85.9 0.54	0.72	--	4.00	2.71	--	
37	CO.005	25.0	29	674	686	221	450	1.5	0	5.6	0.32	8.4 2.6 88.2 0.78	0.73	--	5.00	2.83	--	
37	CO.005	25.0	30	698	710	221	450	1.5	0	4.8	0.29	10.3 3.0 85.9 0.81	0.71	0.85	5.00	3.40	--	
37	CO.005	25.0	31	731	734	215	450	1.5	0	3.2	0.19	8.3 4.5 85.1 2.03	0.70	--	4.50	12.00	--	
37	CO.005	25.0	32	742	758	221	450	1.5	20	5.6	0.35	8.6 3.1 87.6 0.71	0.75	--	4.80	3.20	--	Add Syn F1
37	CO.005	25.0	33	774	782	220	450	2.0	20	10.4	0.31	4.7 3.0 91.6 0.70	0.75	--	4.40	2.50	--	
37	CO.005	25.0	34	785	806	220	450	2.0	20	10.3	0.29	4.7 2.9 91.6 0.70	0.75	--	3.67	2.50	--	
37	CO.005	25.0	35	813	830	220	450	1.5	20	4.5	0.28	9.7 3.3 86.2 0.82	0.72	--	4.60	3.20	--	

Feed Gas Rates

Per No	N2 SLH	H2 SLH	CO SLH	Total SLH
1	563	225	112	900
20	360	360	180	900
29	360	324	216	900
30	300	360	240	900
33	563	225	112	900
35	300	360	240	900

Table VI  
(Continued)

SUMMARY OF M4 SECR CALSICAT CATALYST TEST RUN

- a) Unless otherwise noted, total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.  
 b) Conversion is total CO conversion over the period (%).  
 c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.  
 d) Prod. rate: Rate for production of total hydrocarbons, C1+ (kg/kg cat., hr).  
 e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt. g	Per No	Time Start	Time Stop	Temp C	Pres psi	H2: CO	Synfl cc/hr	Conv. %	Prod. Rate	Selectivities	Alpha GC	Alpha Liq	Olefin/Paraf C3	Olefins C4	Olefins C6-18, %	Comments
38	CAL.14	15.0	1	17	25	240	450	2.0	20	25.5	1.23	6.2 1.8 91.0 1.04	0.79	4.75	2.80	--		Shut Down

## M4 SBCR RUN RESULTS

## COMPARISON OF CATALYST ACTIVITY AT SIMILAR RUN CONDITIONS

Period No.	Temp.	Pres.	H <sub>2</sub> /CO Ratio
1	240 C	450psi	2.0

a) Total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

Flows: N<sub>2</sub>-563 SLH, H<sub>2</sub>-225 SLH, CO-112.5 SLH

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N<sub>2</sub> as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons C<sub>1</sub>+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf C <sub>3</sub>	Olefin C <sub>4</sub>	Olefin C <sub>5-18, %</sub>
					%CH <sub>4</sub>	%C <sub>2</sub>	%C <sub>3</sub> +	%CO <sub>2</sub>					
3	CO.002	15.2	29.4	1.42	17.3	2.3	79.4	1.01	0.73	0.82	0.91	0.60	17.5
4	CO.024	15.4	25.5	1.21	8.6	2.0	89.0	0.43	0.79	0.84	2.93	1.93	21.7
5	CO.035	15.4	24.8	1.18	8.5	2.1	89.0	0.47	0.78	0.84	3.13	1.94	23.1
6	CO.028	15.4	21.2	1.00	6.1	1.6	91.3	1.01	0.81	0.83	4.86	3.00	28.7
7	CO.043	15.4	13.0	0.61	3.7	1.8	93.4	1.06	0.79	0.85	5.60	3.17	27.3
8	CO.006	15.0	2.7	0.25	0.1	0.2	98.8	1.75	0.67	0.85	3.33	2.33	16.1
9	CO.048	15.4	19.1	0.90	9.9	1.6	87.4	1.05	0.77	0.88	3.60	2.09	20.3
10	CAL.02	15.9	34.5	1.58	12.9	2.0	83.9	1.23	0.75	0.81	1.66	1.06	21.0
11	CAL.03	15.6	29.7	1.39	13.5	2.1	83.4	1.08	0.74	0.86	1.65	1.03	18.2
12	CO.053	15.9	34.2	1.56	12.6	2.0	84.2	1.23	0.75	0.83	1.60	1.00	24.5
13	CO.054	15.7	10.4	0.48	4.7	1.8	92.3	1.17	0.78	0.86	5.75	4.00	25.9
14	BlendA	20.0	29.3	1.41	10.1	1.6	86.3	2.02	0.77	0.86	2.23	1.35	23.1
15	CO.034	13.0	27.5	1.54	10.4	1.6	87.2	0.80	0.78	0.84	2.21	1.40	21.0
16	CAL.04	16.1	26.3	1.34	7.1	1.3	90.3	1.38	0.80	0.85	4.80	3.18	32.9
17	CAL.08	15.0	16.9	0.93	5.9	1.0	91.7	1.36	0.82	0.88	5.20	3.33	28.7
18	CAL.07	15.0	20.6	1.03	7.7	1.2	90.0	1.09	0.81	0.88	5.00	3.00	32.2
19	CAL.05	15.7	26.6	1.22	7.3	1.3	90.2	1.19	0.82	0.86	4.11	3.00	28.7
20	CAL.06	15.0	5.6	0.26	3.1	2.1	92.0	2.86	0.80	0.90	4.50	3.50	30.8
21	CO.004	15.9	39.3	1.80	15.2	2.3	81.2	1.38	0.74	0.80	1.16	0.73	23.1
23	CAL.09	15.0	17.4	0.84	0.0	1.2	97.9	0.95	0.83	0.88	5.40	3.33	29.4
24	CO.053	28.5	50.4	1.28	14.1	2.1	81.8	2.03	0.75	0.79	1.14	0.68	21.7
25	CO.056	15.0	11.4	0.55	7.8	3.6	87.2	1.43	0.67	0.87	3.60	2.30	20.3
26	CAL.10	15.6	21.9	1.01	5.4	1.5	91.9	1.25	0.79	0.85	3.60	2.27	25.9
27	Co.050	14.6	20.4	1.01	6.8	1.9	90.2	1.04	0.78	0.87	2.50	1.69	18.9

Note: Catalysts for Runs 3 thru 15 (except 8) screened through 150 x 400 mesh.

Catalyst for Run 8 screened thru 100 x 400 mesh.

Cat. Nos. CAL.08 and CAL.07 were prereduced and coated with wax.

H<sub>2</sub> to CO ratio for Runs 16 and 17 was 1.76/1.0.

Cat. No. CAL.06 was H<sub>2</sub> reduced and air stabilized.

Cat. No. CAL.09 was prereduced and coated with Soya.

Table VII  
(Continued)

DATE: 03/31/95

M4 SBCR RUN RESULTS

COMPARISON OF CATALYST ACTIVITY AT SIMILAR RUN CONDITIONS

Period No.	Temp.	Pres.	H2/CO Ratio
-----	-----	-----	-----
1	240 C	450psi	2.0

a) Total flow is ca.15 L/min. STP, or 3 cm/sec linear gas flow.

Flows: N2-563 SLH, H2-225 SLH, CO-112.5 SLH

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons C1+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf Olefin		
-----	-----	-----	-----	-----	%CH4	%C2	%C3+	%CO2	-----	-----	C3	C4	C6-18, %
28	CO.057	15.8	18.7	0.86	5.3	1.5	92.2	0.98	0.81	0.85	3.27	2.36	23.1
29	Co.061	45.4	29.0	0.46	14.4	2.6	81.6	1.53	0.72	0.80	1.49	0.94	18.9
30	Co.011	15.9	8.0	0.36	5.8	3.9	87.8	2.49	0.71	0.89	5.75	3.00	22.4
31	CAL.12	15.9	27.6	1.26	7.9	1.0	90.0	1.11	0.79	0.84	3.50	2.07	25.2
32	CAL.11	15.9	30.6	1.40	7.8	1.4	89.6	1.18	0.80	0.84	3.91	3.33	26.6
33	CAL.13	15.9	28.1	1.28	6.4	1.4	90.9	1.29	0.81	0.85	3.64	2.15	23.8

Note: Catalysts for all runs were screened thru 150 x 400 mesh.  
Catalyst No. Co.061 contains 30 % cobalt.

DATE: 03/31/95

## M4 SBCR RUN RESULTS

## COMPARISON OF CATALYST ACTIVITY AT SIMILAR RUN CONDITIONS

Period No.	Temp.	Pres.	H <sub>2</sub> /CO Ratio
2	220 C	450psi	2.0

a) Total flow is ca.15 L/min. STP, or 3 cm/sec linear gas flow.

Flows: N<sub>2</sub>-563 SLH, H<sub>2</sub>-225 SLH, CO-112.5 SLH

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N<sub>2</sub> as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons C<sub>1</sub>+ (kg/kg cat.,hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf		Olefin
					%CH <sub>4</sub>	%C <sub>2</sub>	%C <sub>3</sub> +	%CO <sub>2</sub>			C <sub>3</sub>	C <sub>4</sub>	C <sub>6-18</sub> , %
3	CO.002	15.2	11.8	0.56	4.7	1.0	93.7	0.59	0.81	0.90	2.71	1.63	--
4	CO.024	15.4	9.5	0.45	0.0	2.1	97.6	0.27	0.83	0.91	5.33	4.00	--
5	CO.035	15.4	8.8	0.42	0.0	2.3	97.4	0.31	0.82	--	5.33	4.00	--
6	CO.028	15.4	6.6	0.31	0.0	1.9	97.4	0.72	0.83	0.90	5.50	4.00	--
7	CO.043	15.4	4.3	0.20	0.0	1.4	96.3	2.25	0.81	0.91	4.00	3.00	--
9	CO.048	15.4	6.1	0.28	1.8	1.0	95.2	1.93	0.80	0.91	3.67	3.00	--
10	CAL.02	15.9	14.9	0.68	4.6	0.9	94.0	0.47	0.81	0.88	4.40	2.29	--
12	CO.053	15.9	14.4	0.66	4.3	1.0	94.3	0.48	0.81	0.89	4.20	2.67	--
13	CO.054	15.7	0.2	0.01	0.0	20.	60.8	19.5	0.33	0.94	8.00	5.00	--
14	Blend A	20.0	12.4	0.60	4.3	0.9	93.9	0.95	0.81	0.91	3.80	2.33	--
15	CO.034	13.0	11.0	0.61	4.0	0.9	94.5	0.59	0.82	0.90	4.00	3.00	--
16	CAL.04	16.1	8.4	0.42	2.6	1.0	94.1	2.31	0.80	0.88	5.00	4.00	--
17	CAL.08	15.0	5.4	0.28	0.1	0.8	96.9	2.23	0.83	--	4.00	3.00	--
18	CAL.07	15.0	6.7	0.33	1.8	1.4	95.0	1.81	0.85	--	4.00	3.00	--
19	CAL.05	15.7	9.0	0.41	2.3	1.4	94.8	1.56	0.84	--	5.50	3.00	--
20	CAL.06	15.0	3.5	0.16	0.0	3.3	92.8	3.87	0.80	0.85	3.00	2.50	--
21	CO.004	15.9	16.1	0.74	8.1	1.2	90.2	0.48	0.78	0.86	3.38	2.22	--
23	CAL.09	15.0	6.6	0.32	0.2	0.9	98.0	0.92	0.90	--	4.00	3.00	--
25	CO.056	15.0	4.5	0.22	0.3	2.7	95.7	1.27	0.73	--	4.67	3.00	--
27	Co.050	14.6	8.1	0.39	0.0	4.8	92.6	2.56	0.79	0.87	8.50	3.00	--
28	Co.057	15.8	6.0	0.28	0.0	1.8	97.2	0.93	0.79	--	5.50	4.00	--
29	Co.061	45.4	11.8	0.19	3.9	1.9	93.5	0.73	0.77	--	3.67	2.29	--

Note: Catalysts for Runs 3 through 15 screened thru 150 x 400 mesh.

Blend A contains 15.0 gm of Cat. No. CO.005 plus 5.0 gm of Cat. No. WGS.03.

Cat. NOs. CAL.08 and CAL.07 were prereduced and wax coated.

H<sub>2</sub> to CO for Runs 16 and 17 was 1.76/1.0.

Cat. No. CAL.06 was H<sub>2</sub> reduced and air stabilized before charging.

Cat. No. CAL.09 was prereduced and coated with Soya.

Cat. No. Co.061 contains 30 % cobalt.



DATE: 03/31/95

## M4 SBCR RUN RESULTS

## COMPARISON OF CATALYST ACTIVITY AT SIMILAR RUN CONDITIONS

Period No.	Temp.	Pres.	H2/CO Ratio
4	240 C	450psi	1.0

a) Total flow is ca.15 L/min. STP, or 3 cm/sec linear gas flow.

Flows: N2-562 SLH, H2-119 SLH, CO-119 SLH

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N2 as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons C1+ (kg/kg cat.,hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt,g	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf		Olefin C6-18,%
					%CH4	%C2	%C3+	%CO2			C3	C4	
3	CO.002	15.2	11.6	0.83	3.9	2.4	92.8	0.84	0.81	0.87	4.29	3.14	--
4	CO.024	15.4	10.3	0.73	0.5	1.6	97.2	0.71	0.83	0.87	8.33	4.75	--
5	CO.035	15.4	10.4	0.73	0.9	0.0	98.4	0.65	--	0.83	--	--	--
6	CO.028	15.4	9.2	0.65	0.0	1.3	97.3	1.46	0.85	0.88	9.50	3.75	--
7	CO.043	15.4	5.2	0.37	0.0	0.0	99.4	0.64	0.83	0.89	7.00	5.00	--
9	CO.048	15.4	8.2	0.57	2.3	1.0	93.8	3.00	0.82	0.90	8.50	4.33	--
10	CAL.02	15.9	14.6	1.00	4.6	1.0	93.3	0.97	0.80	0.88	7.20	4.00	--
12	CO.053	15.9	13.3	0.91	4.3	1.2	93.3	1.18	0.80	0.89	6.60	3.71	--
13	CO.054	15.7	5.2	0.36	0.0	1.2	97.0	1.85	0.83	0.95	6.00	4.50	--
14	BlendA	20.0	12.7	0.91	3.4	1.0	94.0	1.61	0.81	0.86	7.50	3.83	--
15	CO.034	13.0	11.2	0.94	3.9	1.0	94.0	1.02	0.82	0.87	8.33	4.00	--
21	CO.004	15.9	14.9	1.02	7.4	1.4	89.9	1.29	0.77	0.84	4.67	2.82	--
27	Co.050	14.6	8.4	0.61	1.1	2.9	93.3	2.78	0.79	0.90	6.25	5.00	--
28	Co.057	15.8	8.1	0.56	1.3	4.6	92.7	1.44	0.79	--	7.33	5.67	--

Note: Catalysts for Runs 3 through 21 screened thru 150 x 400 mesh.

DATE: 03/31/95

## M4 SBCR RUN RESULTS

## COMPARISON OF CATALYST ACTIVITY AT SIMILAR RUN CONDITIONS

Period No.	Temp.	Pres.	H <sub>2</sub> /CO Ratio
5	240 C	600psi	1.0

a) Total flow is ca.15 L/min. STP, or 3 cm/sec linear gas flow.

b) Conversion is total CO conversion over the period (%).

Flows: N<sub>2</sub>-562 SLH, H<sub>2</sub>-119 SLH, CO-119 SLH

c) Conversion and selectivities are calculated using N<sub>2</sub> as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons C<sub>1</sub>+ (kg/kg cat.,hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt,g	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Olefin/Paraf C <sub>3</sub>	Olefin C <sub>4</sub>	Olefin C <sub>5-18</sub> ,%
3	CO.002	15.2	12.9	0.92	4.0	1.5	93.5	0.91	0.81	0.82	4.29	2.75	24.5
4	CO.024	15.4	11.3	0.80	0.9	1.5	97.0	0.65	0.83	0.87	6.50	3.80	36.4
5	CO.035	15.4	10.7	0.76	0.7	1.4	97.1	0.75	0.84	0.88	6.25	4.50	27.3
6	CO.028	15.4	9.5	0.67	0.0	1.1	97.5	1.36	0.85	0.88	6.00	3.50	40.6
7	CO.043	15.4	5.9	0.41	0.0	2.2	94.8	2.99	0.82	0.89	6.00	3.75	30.1
9	CO.048	15.4	11.9	0.83	2.7	0.9	94.4	1.93	0.84	0.89	5.75	3.20	14.0
10	CAL.02	15.9	16.4	1.12	4.2	1.0	94.0	0.89	0.82	0.86	5.83	3.86	35.7
12	CO.053	15.9	15.6	1.06	4.0	0.9	94.0	1.0	0.82	0.87	5.50	3.57	32.2
13	CO.054	15.7	5.0	0.34	0.0	1.3	96.9	1.78	0.82	0.93	6.50	3.33	30.8
14	BlendA	20.0	14.1	1.02	3.7	1.0	93.8	1.45	0.82	0.89	6.40	3.43	32.9
15	CO.034	13.0	11.8	0.99	3.9	1.1	94.0	1.03	0.83	0.87	5.75	3.80	37.8
21	CO.004	15.9	18.4	1.26	6.1	1.1	91.9	0.94	0.81	0.84	5.25	2.91	32.2

Note: Catalysts for Runs 3 through 21 screened thru 150 x 400 mesh.

Table XI

DATE: 10/03/95

COMPARISON OF CONVERSION AND SELECTIVITY OF  
CALISICAT PRODUCED CATALYSTS AT STARTUP CONDITIONS

Period No.	Temp.	Pres.	H <sub>2</sub> /CO Ratio
1	240 C	450psi	2.0

a) Total flow is ca. 15 L/min. STP, or 3 cm/sec linear gas flow.

Flows: N<sub>2</sub>-563 SLH, H<sub>2</sub>-225 SLH, CO-112.5 SLH

b) Conversion is total CO conversion over the period (%).

c) Conversion and selectivities are calculated using N<sub>2</sub> as an internal standard in the GC analysis of the offgas.

d) Prod. rate: Rate for production of total hydrocarbons C<sub>1</sub>+ (kg/kg cat., hr).

e) Alpha: Based on GC analysis of offgas and liquid product.

Run No	Cat. No	Cat. wt, g	Conv. %	Prod. Rate	Selectivities				Alpha GC	Alpha Liq	Catalyst Prom%	Composit. Metal%	Suppt
					%CH <sub>4</sub>	%C <sub>2</sub>	%C <sub>3</sub> +	%CO <sub>2</sub>					
M-4 SBCR													
10	CAL.02	15.9	34.5	1.58	12.9	2.0	83.9	1.23	0.75	0.81	0.0	0.5Ru	Al
11	CAL.03	15.6	29.7	1.39	13.5	2.1	83.4	1.08	0.74	0.86	0.0	0.5Ru	Al
16	CAL.04	16.1	26.3	1.34	7.1	1.3	90.3	1.38	0.80	0.85	0.3K	0.5Ru	Al
17	CAL.08	15.0	16.9	0.93	5.9	0.8	91.7	1.36	0.82	0.88	0.3K	0.5Ru	Al
18	CAL.07	15.0	20.6	1.03	7.7	1.2	90.0	1.09	0.81	0.88	0.3K	0.5Ru	Al
19	CAL.05	15.7	26.6	1.22	7.3	1.3	90.2	1.19	0.82	0.86	0.3K	0.5Ru	Al
20	CAL.06	15.0	5.6	0.26	3.1	2.1	92.0	2.86	0.80	0.90	0.3K	0.5Ru	Al
23	CAL.09	15.0	17.4	0.84	0.1	1.2	97.9	0.95	0.83	0.88	0.3K	0.5Ru	Al
26	CAL.10	15.6	21.9	1.01	5.4	1.5	91.9	1.25	0.79	0.85	0.3K	0.5Ru	Al
31	CAL.12	15.9	27.6	1.26	7.9	1.0	90.0	1.11	0.79	0.84	0.3K	0.5Ru	Al
32	CAL.11	15.9	30.6	1.40	7.8	1.4	89.6	1.18	0.80	0.84	0.3K	0.5Ru	Al
33	CAL.13	15.9	28.1	1.28	6.4	1.4	90.9	1.29	0.81	0.85	0.3K	0.5Ru	Al
38	CAL.14	15.0	25.5	1.23	6.2	1.8	91.0	1.04	0.79		0.3K	0.5Ru	Al

## M-3 SBCR

12	CO.018	15.6	33.8	1.56	9.7	2.0	86.6	1.68	0.75	0.85	0.0	0.5Ru	Al
23	CO.047	15.8	28.2	1.29	7.7	1.5	89.3	1.47	0.79	0.84	0.3K	0.5Ru	Al

Note: Catalysts for all runs except Runs 17, 18, & 20 screened thru 150 x 400 mesh.

Catalyst CAL.04 was calcined in air; Catalyst CAL.05 processed in N<sub>2</sub>.

Cat. No. CAL.06 was H<sub>2</sub> reduced and air stabilized before charging.

Cat. Nos. CAL.08 and CAL.07 were prereduced and wax coated. CAL.08 was calcined in N<sub>2</sub>; CAL.07 was reduced in H<sub>2</sub> without prior calcination.

H<sub>2</sub> to CO ratio for Runs 16 and 17 was 1.76/1.

Cat. Nos. Co.018 & Co.047 were prepared by Pitt. Shown for comparison.

Cat. Nos. CAL.09 and CAL.14 were prereduced and coated with Soya.

Cat. No. CAL.10 was prepared on Condea Alumina.