TABLE 1

FISCHER-TROPSCH III DEMONSTRATION RUN PLAN

SSFI Proprietary Catalyst Pre-cursor: 1043 lbs
Callista-158 Wax 1489 lbs

Pressure Range: 520 - 710 psig
Temperature Range: 210 - 250 deg C

Run No.	Description	H2/CO in Reactor Feed	Sup. Gas Vel (in), ft/sec	Plant CO Conv. mole%	Reactor Prod., g HC/lit-hr	Wax Production gpd	Days on-stream
AF-A11	Activation		0.31				1
AF-R15.1	Start-up	1.18	0.41	80	75	664	2.5
AF-R15.2	Baseline	1.44	0.34	80	150	1327	2.5
AF-R15.3 to AF-R15.9	Process Variables	0.65 to 2.07	0. 32 to 0.85	80 to 90	150	1327	17.5
AF-R15.10	Baseline Repeat	1.44	0.34	80	150	1327	2.5
AF-R15.11 to AF-R15.12	Tracer Studies	1.19 to 01.44	0.34 to 0.73	80	150	1327	3
AF-R15.13 to AF-R15.14	Dynamic Gas Disengagement Tests	1.19 to	0.34 to 0.73	80	150	1327	2
AF-R15.15	Filter Tests w/o Syngas						3

TABLE 2

Run Time Table								
F-T III:			Drying Started		11-Oct-96	20:00		
			Activation Started		12-Oct-96	23:00		
			Syngas Started		14-Oct-96	20:00		
Run No.	**Avg. Time On-stream, Hrs.**	**Start Date**	**Start Time**	**Time On-stream, Hrs.**	**End Date**	**End Time**	**Time On-stream, Hrs.**	**Time Period, Hrs.**
R15.1B	58	17-Oct	0:00	52	17-Oct	12:00	64	12
R15.1C	76	17-Oct	12:00	64	18-Oct	12:00	88	24

TABLE 3 (page 1/3)

SUMMARY OF RESULTS FOR FT-III DEMONSTRATION RUN AT LAPORTE

Run No.	On-stream Time, Hrs.	Temperature (average) deg F	Pressure psig	Space Velocity sL/kg-hr	Recycle Ratio	Superficial Gas Vel. Inlet, ft/sec	Catalyst in Reactor lbs	CO Conv. per pass mole%	H2 Conv. per pass mole%	CO+H2 Conv. per pass mole%	CO Conv. plant mole%	H2 Conv. plant mole%
AF-R15.1B	58	440.2	706.9	7444	3.24	0.43	862	9.5	12.1	11.0	39.2	55.9
AF-R15.1C	76	440.1	710.0	7612	3.20	0.43	860	9.1	15.8	13.0	36.8	54.7

TABLE 3 (page 2/3)

SUMMARY OF RESULTS FOR FT-III DEMONSTRATION RUN AT LAPORTE

Run No.	CO+H2 Conv. plant mole%	CO Conv. Rate gmole/kg-hr	HC Prodtn. Rate grams/kg-hr	Reactor Productivity (STY) grams HC/lit. react. vol.-hr	H2/CO in Fresh Feed mole/mole	H2/CO in Reactor Feed mole/mole	H2/CO Usage Ratio mole/mole	H2/CO in Outlet mole/mole	C02 Select. mole%
AF-R15.1B	49.7	12.3	171.3	45.9	1.73	1.32	1.69	1.28	1.30
AF-R15.1C	48.4	11.6	163.4	43.9	1.82	1.41	2.43	1.30	0.41

TABLE 3 (page 3/3)

SUMMARY OF RESULTS FOR FT-III DEMONSTRATION RUN AT LAPORTE

Run No.	CH4	<------- HC Selectivity (CO2 free) wt% --------->							< ----- PRODUCT DISTRIBUTION, WT% ----- >					HC Prodtn Rate based on liquid data grams HC/kg-hr	Alpha C3-C9	Alpha C10-C50
		C2H6	C2H4	C3H8	C3H6	C4H10 Sum	C4H8 Sum	C5H11 Sum	METHANE C1	GAS C2-C4	GASOLINE C5-C11	DIESEL C12-C18	WAX C19+			
AF-Rl5.lB	26.31	3.07	1.13	4.48	7.44	4.77	7.85	8.25								
AF-Rl5.lC	13.88	1.50	1.01	1.90	3.57	2.57	3.40	5.47	15.6	17.9	24.3	11.5	30.6	138.5	0.74	0.90

TABLE 4

Heat and Mass Balance Summary for F-T III									
Run No.	**Prod Gas Flow Factor**	**Purge1 Flow Factor**	**01.20 Discharge Flow Factor**	**Water/Oxygen Balance, %**	**Reactor Balance, %**	**Plant Balance, %**	**Feed Balance, %**	**Prod Gas Balance, %**	**Heat Balance, %**
AF-R15.1B	1.067	1.215	0.940	98.3	101.7	104.8	99.9	99.3	97.1
AF-R15.1C	1.046	1.194	0.915	101.0	99.8	104.2	100.5	100.5	96.3
Average	1.057	1.205	0.928	99.6	100.8	104.5	100.2	99.9	96.7

TABLE 5

Elemental Balance (Reactor) Summary for F-T III					
Run No.	**Total, %**	**C, %**	**H, %**	**O, %**	**N, %**
AF-Rl5.lC	98.7	97.6	96.9	100.0	99.0

TABLE 6

Catalyst Inventory in the Reactor During F-T III

Assumptions:

Catalyst lost to prep tank and piping during transfer	15	lbs
Catalyst lost in nozzles and dead legs	15	lbs
Physical Water in the Catalyst	30	lbs
Catalyst Loss Rate with Gas Flow	2	lb/day
Catalyst Loss Rate with Product Wax	0.01	lb/day
Catalyst Loss due to sampling	0.5	lb/sample

Date	Days in the Reactor	Run	Assumed Gas Hold-up, vol%	Estimated Catalyst Amount in the Reactor	No. of Slurry Samples	Comments
10/11/1996	0	Drying		1043		As Loaded
10/12/1996	1	Drying/Activating		981		Catalyst lost in transfer, dead legs and loss of physical water
10/13/1996	2	Activating		979		
10/14/1996	3	Activating/Syngas Start-up	40	868		Filtration brought on-stream
10/15/1996	4	Start-up	40	866		
10/16/1996	5	Start-up	40	864	1	
10/17/1996	6	R15.1	40	861	1	
10/18/1996	7	R15.1	40	859		
10/19/1996	8	Transition	40	857		
10/20/1996	9	Transition	40	854	2	
10/21/1996	10	Transition	40	852		Shut Down

TABLE 7

Catalyst Concentration and Gas Hold-up Estimates for F-T III

Run No.	Time On-stream, Hours	Cat Conc. by NDG, wt%	Cat Conc. by DP, wt%	Cat Conc. by 2-Phase Density, wt%	Reduced Cat Conc. by 2-Phase Density, wt%	Assumed Cat. Inventory in Reactor, lbs	Gas Hold-up by NDG, vol%	Gas Hold-up by DP, vol%	2-Phase Density, g/cc	Cat Conc. by DGD, wt%	Gas Hold-up by DGD, vol%	Calculated Cat. Inventory in Reactor based on DGD data
AF-R15.1B	58	43.87	40.48	39.04	36.04	862	43.43	37.39	1.001			
AF-R15.1C	76	42.38	39.87	38.43	35.46	860	41.36	35.83	0.995			
	165	33.12	31.77			852	29.66	24.90		29.60	22.53	792

TABLE 8

Heat Transfer Coefficient Estimates for F-T III									
Run No.	**Time On-stream, Hours**	**Cat Conc. by DP, wt%**	**Gas Hold-up by DP, vol%**	**Superficial Gas Vel. (In), ft/sec**	**Reactor Heat Duty, BTU/hr**	**Log Mean Temp. Diff., deg F**	**Overall HT Coeff., BTU/hr-ft2-deg F**	**Measured Slurry Side HT Coeff., BTU/hr-ft2-deg F**	**Predicted Slurry Side HT Coeff., BTU/hr-ft2-deg F**
AF-Rl5.lB	58	40.48	37.39	0.43	502,470	24.1	96	324	263
AF-Rl5.lC	76	39.87	35.83	0.43	453,211	22.5	92	286	264

TABLE 9

Catalyst Productivity data extrapolated to 200°C for F-T III		
Applied activation energy	121.6	kJ/gmole
Run No.	15.1B	15.1C
Average Reactor Temperature (T), °C	226.8	226.7
CO Conversion Rate, rCO, mol/l cat/h	18.3	17.3
C02 selectivity, %mol	1.300	0.410
CO Conversion Rate for Hydrocarbon Synthesis only, rCO*, mol/l cat/h	18.1	17.3
productivity @T°C, NI CO/l cat/h	405.5	386.8
productivity @200°C, NI CO/lcat/h	77.2	74.1
* Fischer-Tropsch only		

TABLE 10

Analysis of F-T III product water samples					
Sample ID (SSFI)	#1	#2	#3	#4	#5
Date	10/16/1996 4:00	10/17/1996 3:25	10/18/1996 2:40	10/18/1996 14:00	11/4/1996 0:00
Condition	15.1	15.1	15.1	15.1	from trailer
pH	3.7	2.9	2.8	2.8	2.9
Inorganics (ICP):					
Co, ppmw					<10
Fe, ppmw					40-45
Total Organic Content (TOC), ppmw carbon			9564		

TABLE 11

Analysis of F-T III product hydrocarbon samples

Sample ID (SSFI)	#6	#7	#8
Date	11/4/96	10/18/1996 9:15	10/16/1998 9:30
Type	light hydrocarbon	light wax from sep. 27.13	heavy wax from sep. 28.30
Condition	from trailer	15.1	15.1
C-distribution (HT-GC)	see Appendix C	see Appendix C	see Appendix C
alpha C40-59			0.916
alpha C60-79			0.952
Avg. carbon no. (GC)	12	24	33
Olefins Content	see Appendix C		
Alcohols Content	see Appendix C		
lnorganics (ICP):			
Co, ppmw		<10	<10
Fe, ppmw		15-20	<10
C/H (PCME)			
C, %w		85.25	85.46
H, %w		15.04	15.27
H/C, at/at		2.12	2.14
Fixed Carbon, %w		0.07	0.16

TABLE 12

Analysis of F-T III slurry samples

Sample	fresh catalyst	#9	#10	#11	#12	#13	#14	#15
Date/time	10/15/1996 0:00	10/16/1996 17:30	10/17/1996 14:00	10/20/1996 00:25	10/20/1996 15:00	10/23/1996 15:30	10/29/1996	10/29/1996
Comment		from pump 10.62	from pump 10.62	from pump 10.62	from pump 10.62	end reactor drain	from reactor fibre probe nozzle	from reactor bottom
PCME								
fixed C, %w		1.13	1.22	1.26	0.37	0.12	0.36	0.52
residue, %w		63.3	64.9	94.9	69.1	22.2	59.9	60.6
Particle Size Distribution:								
diameter (vol. avg)/ diameter (vol. avg) fresh	1	0.44	0.32	0.39	0.17	0.56		
fines, %w	3.7	66.4	77.2	51.7	83.4	61.8		

TABLE 13

FISCHER-TROPSCH IV DEMONSTRATION RUN PLAN

SSFI Proprietary Catalyst Pre-cursor:	500	lbs		**Plant CO Conv:**	80	mole%
Callista-158 Wax + Durasyn-164 Oil:	1350	lbs		**Reactor Productivity:**	150	g HC/lit-hr
				Total Production:		
Reactor Pressure:	710	psig	strm 1	**Heavy Wax (C14+)**	11500	gallons
Reactor Temp:	250-260	deg C	strm 1	**Light Wax (C11-C26)**	2600	gallons
Slurry Conc.:	24-25	wt%	strm 2	**Hydrocarbons (C4-C21)**	14900	gallons
Slurry Height:	20	ft	strm 2	**Water:**	31100	gallons

Run No.	Description	H2/CO in Fresh Feed	H2/CO in Reactor Feed	Recycle Ratio	Space Velocity sl/hr-kg cat	Days on-stream	Sup. Gas Vel (in), ft/sec	CO Conv. per Pass mole%
AF-R16.1	Mid H2/CO in Fresh Feed, Low Recycle (Baseline)	1.85	1.21	1.19	13460	4	0.41	33.7
AF-R16.2	Low H2/CO in Fresh Feed, Low Recycle	1.78	1.01	1.20	13103	3	0.40	31.7
AF-R16.3	Low H2/CO in Fresh Feed, High Recycle	1.80	0.81	3.01	23950	3	0.72	17.0
AF-R16.4	High H2/CO in Fresh Feed, Mid Recycle	2.18	2.11	1.99	20346	2	0.62	31.2
AF-R16.5	Activity Check, Repeat Baseline (AF-R16.1)	1.85	1.21	1.19	13460	2	0.41	33.7
AF-R16.6	Tracer Study at Low Velocity (AF-R16.1)	1.85	1.21	1.19	13460	1.5	0.41	33.7
AF-R16.7	Tracer Study at High Velocity (AF-R16.3)	1.8	0.81	3.01	23950	1.5	0.72	17.0
AF-R16.8	Dynamic Gas Disengagement Test at High Velocity (AF-R16.3)	1.8	0.81	3.01	23950	1	0.72	17.0
	TOTAL					**18**		

TABLE 14

Run Time Table

F-T IV:	Drying Started	23-Mar-98	19:00	
	Activation Started	24-Mar-98	22:00	
	Syngas Started	28-Mar-98	14:00	

Run No.	Avg. Time On-stream, Hrs-.	Start Date	Start Time	Time On-stream, Hrs.	End Date	End Time	Time On-stream, Hrs.	Time Period, Hrs.
R16.1A	109	2-Apr	0:00	106	2-Apr	6:00	112	6
R16.1B	152	3-Apr	12:00	142	4-Apr	8:00	162	20
R16.1C	172	4-Apr	8:00	162	5-Apr	4:00	182	20
R16.3A	229.5	6-Apr	23:00	225	7-Apr	8:00	234	9
R16.3B	237.5	7-Apr	8:00	234	7-Apr	15:00	241	7
R16.3C	247	7-Apr	18:00	244	8-Apr	0:00	250	6
R16.3D	257.5	8-Apr	2:00	252	8-Apr	13:00	263	11
R16.4A	284.5	9-Apr	8:00	282	9-Apr	13:00	287	5
R16.4B	298.5	9-Apr	18:00	292	10-Apr	7:00	305	13
R16.5A	323	10-Apr	14:00	312	11 -Apr	12:00	334	22
R16.5B	339.5	11-Apr	12:00	334	11 -Apr	23:00	345	11
R16.5C	392	13-Apr	9:00	379	14-Apr	11:00	405	26

TABLE 15 (page 1/3)

SUMMARY OF RESULTS FOR FT-IV DEMONSTRATION RUN AT LAPORTE

Run No.	On-stream Time, Hrs.	Temperature (average) deg F	Pressure psig	Space Velocity sL/kg-hr	Recycle Ratio	Superficial Gas Vel. Inlet ft/sec	Catalyst in Reactor lbs	CO Conv. per pass mole%	H2 Conv. per pass mole%	CO +H2 Conv. per pass mole%	CO Conv. plant mole%	H2 Conv. plant mole%
AF-R16.1A	109	495.5	710.0	15487	1.23	0.42	390	29.6	59.7	45.7	75.6	91.4
AF-R16.1B	152	498.1	710.0	14925	1.14	0.41	390	33.1	59.9	47.6	76.8	91.3
AF-R16.1C	172	498.0	710.0	14975	1.11	0.41	388	33.2	60.5	48.4	75.7	90.4
AF-R16.3A	230	502.2	710.1	22223	2.12	0.60	383	20.2	43.0	32.2	70.2	87.2
AF-R16.3B	237	502.1	710.1	22115	2.08	0.60	383	20.9	43.5	32.8	70.6	87.2
AF-R16.3C	247	502.1	710.2	22210	2.13	0.60	383	20.1	42.3	31.7	69.3	86.5
AF-R16.3D	257	502.1	710.0	22364	2.12	0.60	380	20.1	41.9	31.6	69.1	86.2
AF-R16.4A	284	479.8	709.9	17594	1.64	0.46	377	34.5	39.6	38.0	78.8	81.7
AF-R16.4B	298	480.0	710.0	18278	1.79	0.48	377	32.1	39.7	37.2	79.1	83.5
AF-R16.5A	323	498.3	710.1	15530	1.11	0.41	376	31.7	56.4	45.8	71.3	87.1
AF-R16.5B	339	497.7	710.0	15601	1.10	0.41	373	31.2	54.1	44.5	69.4	85.1
AF-R16.5C	392	498.2	710.0	17567	1.15	0.42	340	30.1	52.2	43.0	68.7	84.2

TABLE 15 (page 2/3)

SUMMARY OF RESULTS FOR FT-IV DEMONSTRATION RUN AT LAPORTE									
Run No.	**CO+H2 Conv. plant mole%**	**CO Conv. Rate gmole/kg-hr**	**HC Prodtn. Rate grams/kg-hr**	**Reactor Productivity (STY) grams HC/lit. react. vol.-hr**	**H2/CO in Fresh Feed mole/mole**	**H2/CO in Reactor Feed mole/mole**	**H2/CO Usage Ratio mole/mole**	**H2/CO in Outlet mole/mole**	**C02 Select. mole%**
AF-R16.1A	85.9	78.2	1088.1	131.2	1.87	1.15	2.32	0.66	1.33
AF-R16.1B	86.3	83.0	1155.1	139.2	1.88	1.17	2.13	0.70	1.33
AF-R16.1C	85.3	81.5	1132.6	135.8	1.88	1.26	2.30	0.75	1.41
AF-R16.3A	81.2	76.9	1067.3	126.1	1.82	1.10	2.34	0.78	1.55
AF-R16.3B	81.4	78.6	1093.1	129.3	1.83	1.11	2.31	0.79	1.37
AF-R16.3C	80.4	76.6	1063.5	126.1	1.82	1.11	2.33	0.80	1.47
AF-R16.3D	80.1	77.1	1070.1	125.5	1.81	1.12	2.33	0.81	1.54
AF-R16.4A	80.8	69.5	971.0	113.4	2.27	2.12	2.44	1.96	0.96
AF-R16.4B	82.2	69.6	972.3	113.5	2.23	1.98	2.45	1.76	0.89
AF-R16.5A	81.6	79.8	1109.9	129.7	1.88	1.33	2.37	0.85	1.37
AF-R16.5B	79.6	78.3	1088.9	125.2	1.88	1.38	2.39	0.92	1.35
AF-R16.5C	78.8	84.1	1172.0	123.6	1.90	1.40	2.43	0.96	1.15

SUMMARY OF RESULTS FOR FT-IV DEMONSTRATION RUN AT LAPORTE

Run No.	< --------- HC Selectivity (CO2 free) wt% --------- >								< ----- PRODUCT DISTRIBUTION, WT% ----- >					HC Prodtn Rate based on liquid data grams HC/kg-hr	Alpha C3-C9	Alpha C10-C50
	CH4	C2H6	C2H4	C3H8	C3H6	C4Hl0 Sum	C4H8 Sum	C5H11 Sum	METHANE C1	GAS C2-C4	GASOLINE C5-C11	DIESEL C12-C18	WAX C19+			
AF-R16.1A	13.14	2.19	0.23	2.38	1.53	1.88	1.11	1.38								
AF-R16.1B	13.95	2.05	0.08	2.40	1.46	1.89	1.24	1.06								
AF-R16.1C	14.61	2.42	0.15	2.51	1.69	1.90	1.21	1.02	14.2	15.2	34.4	19.6	16.6	1187.4	0.86	0.87
AF-R16.3A	17.67	2.48	0.00	2.64	1.73	1.55	1.45	1.63								
AF-R16.3B	16.63	2.62	0.13	2.62	1.69	1.27	1.83	0.57								
AF-R16.3C	18.89	3.16	0.00	3.97	1.94	2.76	1.67	2.27								
AF-R16.3D	20.43	3.31	0.00	3.53	2.12	2.21	1.59	1.88	19.1	17.3	34.2	18.8	10.6	1164.5	0.83	0.83
AF-R16.4A	25.12	3.70	0.10	4.51	1.52	2.94	0.84	2.00	22.2	17.2	31.3	17.7	11.6	1125.4	0.81	0.85
AF-R16.4B	23.21	5.86	0.32	7.73	2.31	4.60	1.82	2.67								
AF-R16.5A	22.22	3.16	0.17	3.44	2.27	2.28	1.55	1.40								
AF-R16.5B	23.06	3.40	0.17	3.63	2.32	2.55	1.76	2.06								
AF-R16.5C	22.30	3.54	0.15	4.07	2.57	3.11	2.06	2.72	19.2	18.3	32.3	16.3	13.8	1393.0	0.79	0.87

TABLE 16

Heat and Mass Balance Summary for F-T IV									
Run No.	**Prod Gas Flow Factor**	**Purgel Flow Factor**	**01.20 Discharge Flow Factor**	**Water/Oxygen Balance, %**	**Reactor Balance, %**	**Plant Balance, %**	**Feed Balance, %**	**Prod Gas Balance, %**	**Heat Balance, %**
AF-R16.1A	1.085	1.247	1.062	105.4	100.8	102.0	99.9	99.9	102.2
AF-R16.1B	1.126	1.145	1.068	97.7	99.2	99.5	100.5	100.2	96.3
AF-R16.1C	1.119	1.146	1.060	96.1	99.0	97.6	100.2	100.0	97.7
AF-R16.3A	1.031	1.194	1.046	102.7	99.8	100.1	100.3	100.0	99.6
AF-R16.3B	1.025	1.182	1.043	98.0	99.2	98.3	100.5	100.0	97.0
AF-R16.3C	1.049	1.198	1.049	99.1	100.0	99.2	99.8	100.0	98.2
AF-R16.3D	1.035	1.189	1.049	100.5	100.0	99.8	99.9	100.1	98.9
AF-R16.4A	1.060	1.224	1.020	100.0	100.3	101.6	100.1	100.0	102.4
AF-R16.4B	1.049	1.227	1.040	95.9	100.4	98.9	99.3	100.0	101.5
AF-R16.5A	1.180	1.178	1.054	99.0	100.3	100.7	99.9	100.1	99.2
AF-R16.5B	1.185	1.185	1.046	99.7	100.8	101.8	99.8	100.0	99.0
AF-R16.5C	1.050	1.167	1.034	98.0	100.6	101.2	99.8	100.0	98.2
Average	1.083	1.190	1.048	99.3	100.0	100.1	100.0	100.0	99.2

TABLE 17

Elemental Balance (Reactor) Summary for F-T IV					
Run No.	**Total, %**	**C, %**	**H, %**	**O, %**	**N, %**
AF-R16.1C	99.0	99.9	96.2	98.3	100.0
AF-R16.3D	100.0	100.5	98.7	99.8	100.0
AF-R16.4A	100.3	101.5	98.7	99.5	100.0
AF-R16.5C	100.6	102.7	98.4	99.0	100.0
Average	100.0	101.2	98.0	99.1	100.0

TABLE 18

Catalyst Inventory in the Reactor during FT IV

Assumptions:		
Catalyst lost to prep tank and piping during transfer	10	lbs
Catalyst lost in nozzles and dead legs	10	lbs
Physical Water in the Catalyst	15	lbs
Catalyst Loss Rate with Gas Flow	1.5	lb/day
Catalyst Loss Rate with Product Wax	0.01	lb/day
Catalyst Loss due to sampling	0.5	lb/sample
Plant Trip on 4/12/98	30	lbs

Date	Days in the Reactor	Run	Assumed Gas Hold up, vol%	Estimated Catalyst Amount in the Reactor	No. of Slurry Samples	Comments
03/23/1998	0	Drying		501		As Loaded
03/24/1998	1	Drying/Activating		464.5		Catalyst lost in transfer, dead legs and loss of physical water
03/25/1998	2	Activating		463		
03/26/1998	3	Activating		461.5		
03/27/1998	4	Activating		460		
03/28/1998	5	Activating/Syngas Start-up	45	402	3	Filtration brought on-stream
03/29/1998	6	Start-up	45	400	1	
03/30/1998	7	Start-up	45	397	2	
03/31/1998	8	Start-up	45	395	1	
04/01/1998	9	Start-up	45	394		
04/02/1998	10	R16.1	45	392	1	
04/03/1998	11	R16.1	45	390		
04/04/1998	12	R16.1	45	388	1	
04/05/1998	13	Transition	45	387		
04/06/1998	14	Transition	45	385		
04/07/1998	15	R16.3	45	383	1	
04/08/1998	16	R16.3	45	380	3	
04/09/1998	17	R16.4	45	377	3	
04/10/1998	18	R16.5	45	376		
04/11/1998	19	R16.5	45	373	3	
04/12/1998	20	R16.5	45	341		Plant Trip
04/13/1998	21	R16.5	45	340		
04/14/1998	22	R16.6	45	338		
04/15/1998	23	R16.7	45	337		
04/16/1998	24	R16.8			3	Shut Down

TABLE 19

Catalyst Concentration Estimates for F-T IV

Run No.	Time On-stream, Hours	Cat Conc. by NDG, wt%	Cat Conc. by DP, wt%	Cat Conc. by 2-Phase Density, wt%	Reduced Cat Conc. by 2-Phase Density, wt%	Assumed Cat. Inventory in Reactor, lbs	Gas Hold-up by NDG, vol%	Gas Hold-up by DP, vol%	2-Phase Density, g/cc	Cat Conc. by DGD, wt%	Gas Hold-up DGD, vol%	Calculated Cat. Inventory in Reactor based on DGD data
AF-R16.1A	109	28.52	27.99	29.71	27.12	390	50.29	48.05	0.824			
AF-R16.1B	152	28.84	27.69	28.26	25.75	390	50.52	47.29	0.820			
AF-R16.1C	172	28.60	27.58	28.36	25.84	388	50.09	47.32	0.821			
AF-R16.3A	230	28.63	27.25	29.57	26.98	383	50.18	47.19	0.826			
AF-R16.3B	237	28.61	26.96	29.34	26.76	383	50.69	46.40	0.824			
AF-R16.3C	247	28.74	27.33	29.48	26.89	383	50.74	47.21	0.825			
AF-R16.3D	257	28.26	25.28	29.54	26.95	380	49.87	45.28	0.826			
AF-R16.4A	284	25.98	24.59	27.32	24.86	377	45.14	41.40	0.820			
AF-R16.4B	298	26.45	24.92	27.50	25.02	377	46.61	42.40	0.821			
AF-R16.5A	323	26.83	25.58	27.32	24.86	376	47.19	43.59	0.814			
AF-R16.5B	339	26.47	25.53	26.99	24.54	373	46.81	44.37	0.812			
AF-R16.5C	392	26.98	25.68	24.63	22.33	340	52.94	49.36	0.795			
AF-R16.8	445	26.42	25.81	23.98	21.72	337	52.27	48.84	0.813	22.2	44.94	304

TABLE 20

Heat Transfer Coefficient Estimates for F-T IV									
Run No.	**Time On-stream, Hours**	**Cat Conc. by DP, wt%**	**Gas Hold-up by DP, vol%**	**Superficial Gas Vel. (In), ft/sec**	**Reactor Heat Duty, BTU/hr**	**Log Mean Temp. Diff., deg F**	**Overall HT Coeff., BTU/hr-ft2-deg F**	**Measured Slurry Side HT Coeff., BTU/hr-ft2-deg F**	**Predicted Slurry Side HT Coeff., BTU/hr-ft2-deg F**
AF-R16.1A	109	27.99	48.05	0.42	1,787,544	60.2	136	533	243
AF-R16.1B	152	27.69	47.29	0.41	1,781,024	59.6	137	545	242
AF-R16.1C	172	27.58	47.32	0.41	1,762,756	58.7	138	554	241
AF-R16.3A	230	27.25	47.19	0.60	1,608,490	53.2	139	565	273
AF-R16.3B	237	26.96	46.40	0.60	1,605,273	53.3	138	557	273
AF-R16.3C	247	27.33	47.21	0.60	1,571,700	52.3	138	551	273
AF-R16.3D	257	25.28	45.28	0.60	1,585,463	52.6	138	556	276
AF-R16.4A	284	24.59	41.40	0.46	1,532,551	51.5	137	540	257
AF-R16.4B	298	24.92	42.40	0.48	1,521,470	51.0	137	544	259
AF-R16.5A	323	25.58	43.59	0.41	1,691,316	57.1	136	524	245
AF-R16.5B	339	25.53	44.37	0.41	1,625,940	55.1	136	516	245
AF-R16.5C	392	25.68	49.36	0.42	1,611,510	53.6	138	555	247

TABLE 21

Catalyst Productivity data extrapolated to 200°C for F-T IV												
				Applied activation energy	121.6	kJ/gmole (based on autoclave data)						
Run No.	16.1A	16.1B	16.1C	16.3A	16.3B	16.3C	16.3D	16.4A	16.4B	16.5A	16.5B	16.5C
Average Reactor Temperature (T), °C	257.5	259	258.9	261.2	261.2	261.1	261.2	248.8	248.9	259.1	258.7	259
CO Conversion Rate, rCO, mol/l cat/h	71.8	76.7	75.1	70.7	72.5	70.6	71.1	64.1	64.2	74.0	72.2	77.5
CO2 selectivity, %mol	1.330	1.330	1.410	1.550	1.37	1.47	1.54	0.96	0.89	1.37	1.35	1.15
CO Conversion Rate for Hydrocarbon Synthesis only, rCO*, mol/l cat/h	70.8	75.7	74.1	69.6	71.5	69.5	70.0	63.5	63.6	73.0	71.2	76.6
productivity @T°C, N1 CO/l cat/h	1586.7	1696.3	1658.9	1559.1	1601.0	1557.7	1567.4	1422.2	1424.3	1634.2	1594.7	1716.0
productivity @200°C, Nl CO/l cat/h	55.6	55.0	54.0	45.1	46.3	45.3	45.4	78.9	78.6	52.7	52.5	55.6
*Fischer -Tropsch only												

TABLE 22

Analysis Plan FT-IV Samples

Condition	Description	Water	Wax	Light HC	Slurry	Misc.
startup					10.62-4 10.62-7	Durasyn 164 Callista 158
R16-1	baseline	22.11-9	drum sample 22.62-14	drum sample	10.62-9	
R16-3	high velocity	22.11-13	22.62-20	22.11-12	10.62-11	
R16-4	high feed ratio	22.11-14	22.62-22		10.62-12	
R16-5	checkback		22.62-25		10.62-13	
R16-6	tracer 1 (=R16-1)		22.62-27	22.11-18		
R16-7	tracer 2 (= R16-3)			22.11-19		
shutdown					10.62-14 27.10-1 (rx btm) 27.10-2 (rx nzl)	

TABLE 23

Analysis of F-T IV product water samples			
Sample ID (SSFI)	22.11.9	22.11.13	22.11.14
Date	4/4/1998 22:15	4/8/1998 11:30	4/9/1998 20:30
Condition	16.1	16.3	16.4
pH	2.95	2.85	3.08
Total Organic Content (TOC), ppmw carbon	16936		

TABLE 24

Analysis of Light HC Product Samples for F-T IV				
Sample ID (SSFI)	22.11-12	22.11-18	22.11-19	Drum
Date	4/7/1998 1:00	4/14/1998 11:00	4/15/1998 13:30	4/4/1998 8:30
Condition	16.3	16.6	16.7	16.1
Oxygen content, %w				
Total (FNA)				0.598
Organic (IR)				0.319
Water (calc.)				0.279

TABLE 25

Analysis of Product Wax Samples for F-T IV

Sample ID (SSFI)	22.62-14	22.62-20	22.62-22	22.62-25	22.62-27	Drum Sample
Date	4/4/1998 23:15	4/8/1998 11:20	4/9/1998 20:30	4/11/1998 15:00	4/14/1998 2:15	4/4/1998 0:00
Condition	16.1	16.3	16.4	16.5	16.6	16.1
Density 150°C, kg/m3	730.5	734.9	735.6	730.9	740.6	730
Density 175°C, kg/m3	714.7	720.7	716.6	714.9	715.1	713.7
Inorganics (ICP)						
Co, ppmw						3
Olefins (NMR)						
total olefins, mol%						12.7
alpha olefins, mol%						1.1
Oxygen						
Total (FNA), %w						0.172
Organic (IR), %w						0.145
Water (calc.), %w						0.027
C/H						
C, %w						85.29
H, %w						14.71
H/C, at/at						2.05

TABLE 26

Analysis of Slurry Samples for F-T IV

PCME										
Sample ID (SSFI)	Fresh cat. precursor	10.62-4	10.62-7	10.62-9	10.62-11	10.62-12	10.62-13	10.62-14	27.10-1	27.10-2
Date	3/28/98 14:15	3/29/98 3:15	3/31/98 8.20	4/4/98 3:10	8/4/98 11:15	9/4/98 20:30	11/4/98 3:30	4/16/98 15:30	5/21/98 0:00	4/21/98 0:00
Comment		Startup, 13 h on syngas	Startup, 66 h on syngas	Condition 16.1	Condition 16.3	Condition 16.4	Condition 16.5	@ shutdown	Reactor Bottom	Reactor Nozzle
PCME on slurry samp.										
fixed C, %w		0.1	0.1	0.1	0.1	0	0	0	0.2	0.2
inorganic residue, %w		4.5	1.1	0.8	13.6	2.7	0.5	0	52.6	50.9
PCME on recovered cat.										
fixed C, %w		0.5	1	1	0.5	0.5	0.5	1.2	0.5	0.2
Dewaxing and Particle Size Distribution										
diameter (vol. avg)/ diameter (vol. avg) fresh	1	0.89	0.94	0.92	0.94	0.86	0.93	0.94	1.26	0.77
fines, %w	0.8	2.2	1.7	1.4	1.4	3	2.1	1.4	0.1	2.1
solids content*, %w	-	24.3	22.5	24.5	25.1	22.7	21.1	19.0	52.6	56.8
*corrected for remaining wax in dewaxed sample										