APPENDIX B

Fischer-Tropsch III Mass Balances

Start Date / Time	10/17/1996	0.00
End Date / Time	10/17/1996	12.00

On-stream Time From Start-up (hr)

Start	52.00
End	64.00

Reaction Conditions:

Temperature	average	deg F	440.2	deg C	226.8
Pressure	PIC-201	psig	706.9	bara	49.75
Space Velocity		sL/kg-hr	7444		
Superficial Gas Vel. - Inlet		ft/sec	0.43	cm/sec	12.98
(based on average reactor temp)					
Recycle Ratio			3.24		

Slurry Data:

Catalyst Oxide Wt (Reactor)	lbs	862	kg	391.0
Slurry Concentration by NDG	wt%	43.9		
Slurry Concentration by DP	wt%	40.5		
Slurry Level by NDG % NDG Span		95.8		
Slurry Height	ft	20.66	meters	6.30
Average Gas Holdup by NDG	Vol%	43.4		
Average Gas Holdup by DP	Vol%	37.4		

Performance Results

CO Conversion per pass, mole %	9.5
H2 Conversion per pass, mole %	12.1
CO + H2 Conversion per pass, mole %	11.0
Plant CO Conversion, mole%	39.2
Plant H2 Conversion, mole%	55.9
Plant CO+H2 Conversion, mole%	49.7
CO Conversion Rate, gmole CO converted/kg cat oxide-hr	12.3
HC Production Rate, grams of HC (CH2.1) produced/kg cat oxide-hr	171.3
Reactor Productivity (STY) grams of H C (CH2.1)/lit of reactor vol. - hr	45.88
H2/CO in Fresh Feed, mole/mole	1.73
H2/CO in Reactor Feed, mole/mole	1.32
H2/CO Usage Ratio, mole/mole	1.69
H2/CO in Outlet, mole/mole	1.28
CO2 Selectivity, mole %	1.30
HC Selectivity (CO2 free) wt%:	
CH4	26.31
C2H6	3.07
C2H4	1.13
C3H8	4.48
C3H6	7.44
SUM C4H10	4.77
SUM C4H8	7.85
SUM C5H11	8.25

Reactor Heat Balance

	Btu/hr	kW
Chemical Heat Production by Reaction	746477	218.77
Sensible Gas Heat	-102535	-30.05
Sensible Oil Heat	-502539	-147.28
Sensible Wax Heat	-85097	-24.94
Estimate of Heat Loss from Catalyst Drying Data	-35000	-10.26
% Heat Balance based on Reaction Heat	97.15	

Mass Balance	Reactor lb/hr	Plant lb/hr	Feed lb/hr	Prod Gas lb/hr
Fresh Feed		832	832	
HP H2 Feed				
Recycle Feed			3345	3345
Reactor Feed	4173		4173	
Total In	4173	832		
Prod Gas	3892			3892
Main Purge		520		520
22.11 Purge	70.6	70.6		
HC Phase	38.3	38.3		
AQ Phase	208.2	208.2		
Heavy Wax	34.0	34.0		
Light Wax				
Total Out	4243	871		
Mass Balance, %	101.7	104.8	99.9	99.3

Compositions (mole%):		**LP FRESH FEED**	**HP FRESH FEED (H2)**	**RECYCLE FEED**	**REACTOR FEED GAS**	**PRODUCT GAS**	**MAIN (22.10) PURGE**	**22.11 PURGE**	**REACTOR OUTLET (estimated)**
Components									
1	H2	61.10	100.00	49.79	51.67	49.79	49.79	37.40	47.57
2	N2	3.49	0.00	6.94	6.18	6.94	6.94	6.35	6.63
3	CO	35.41	0.00	38.74	39.17	38.74	38.74	40.31	37.01
4	CH4	0.00	0.00	3.09	2.04	3.09	3.09	5.72	2.95
5	CO2	0.00	0.00	0.14	0.08	0.14	0.14	0.57	0.13
6	ETHANE	0.00	0.00	0.17	0.11	0.17	0.17	0.85	0.16
7	ETHYLENE	0.00	0.00	0.02	0.00	0.02	0.02	0.11	0.02
8	PROPANE	0.00	0.00	0.16	0.11	0.16	0.16	1.10	0.15
9	PROPYLENE	0.00	0.00	0.28	0.19	0.28	0.28	2.09	0.27
10	ISOBUTANE	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
11	N-BUTANE	0.00	0.00	0.14	0.10	0.14	0.14	1.12	0.13
12	T-BUTENE-2	0.00	0.00	0.01	0.00	0.01	0.01	0.09	0.01
13	BUTENE-1	0.00	0.00	0.16	0.11	0.16	0.16	1.34	0.15
14	ISOBUTYLENE	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
15	C-BUTENE-2	0.00	0.00	0.01	0.00	0.01	0.01	0.07	0.01
16	SUM C5	0.00	0.00	0.19	0.13	0.19	0.19	1.60	0.18
17	SUM C6	0.00	0.00	0.10	0.08	0.10	0.10	0.99	0.10
18	SUM C7	0.00	0.00	0.05	0.03	0.05	0.05	0.23	0.05
19	SUM C8	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.01
20	SUM C9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	SUM C10	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
	H2O								4.35
	He								0.10
	LIGHT WAX								0.000
	TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Mole Wt	lb/lb mole	12.13	2.02	15.07	14.58	15.07	15.07	20.39	15.32
Flows	SCFH	26510.97	0.00	85839.92	110631.77	99873.85	13347.86	1338.98	104527.63
	lb mole/hr	68.57	0.00	222.01	286.13	258.31	34.52	3.46	270.35
	lb/hr	831.78	0.00	3345.10	4172.97	3891.99	520.15	70.62	4142.36
	Nm3/hr	697.67	0.00	2258.98	2911.41	2628.30	351.26	35.24	2750.77
	kgmol/hr	31.10	0.00	100.70	129.79	117.17	15.66	1.57	122.63
	kg/hr	377.30	0.00	1517.33	1892.85	1765.39	235.94	32.03	1878.96
Temperature	deg F	284.6	84.9	127.7	260.4	88.5	86.5	79.2	
	deg C	140.3	29.4	53.2	126.9	31.4	30.3	26.2	
Pressure	psig	762.2	781.4	814.6	749.2	663.7	672.1	17.3	
	bara	53.56	54.89	57.18	52.67	46.77	47.35	2.21	

Reactor Heat Balance

Gas:		**deg F**	**deg C**			**lb/hr**	**kg/hr**		**Btu/lb-deg F**	**J/gm-deg C**		
Inlet Temp	TI-1-12A	391.6	199.8	Inlet Flow	RXT FEED	4173	1892.8	Inlet Ht Cap.	0.506	2.116		
Outlet Temp	RXT AVG	440.2	226.8	Outlet Flow	RXT FEED-WAXPROD	4139	1877.4	Outlet Ht Cap.	0.500	2.091		
Oil:												**lb/ft3** **kg/m3**
Inlet Temp	TI-1-14B	407.5	208.6	Inlet Flow	*FI-619	49874	22622.9	Inlet Ht Cap.	0.657	2.749	Inlet Density	45.39 727.06
Outlet Temp	TI-1780	423.0	217.2	Outlet Flow	*FI-619	49874	22622.9	Outlet Ht Cap.	0.665	2.784		
Slurry:												
Inlet Temp	TI-1783	425.5	218.6	Inlet Flow	*FI-1768-61	11625	5273.0	Inlet Ht Cap.	0.500	2.092		
Outlet Temp	RXT AVG	440.2	226.8	Outlet Flow	*FI-1768	11659	5288.4	Outlet Ht Cap.	0.500	2.092		

*based on

Reactor Differential Pressures

	DP NOZZLES		**Differential Pressures:**		**Heights:**		**Density - 3 Phase:**		**Gas Hold-up**
			psi	**mbar**	**ft**	**meters**	**lb/ft3**	**kg/m3**	**vol%**
					(based on flange loc.)				
Reactor Height:									
13.75 to 9.25 ft	Kl -K3	PDI-1778	1.30	89.9	4.56	1.391	41.14	659.1	36.92
9.25 ft to 4.33 ft	K3-K5	PDI-1779	1.43	98.7	5.08	1.549	40.54	649.4	37.87
Total Reactor	K6-OUT	PDI-631	4.87	335.8	95.80	29.200	8.07	129.3	88.97
Sparger	K6-IN	PDI-633	4.04	278.4					

DEGASSER

Temperatures:		**deg F**	**deg C**		
6.5 ft Height	TI-1762	314.1	156.7		
3.5 ft Height	TI-1763	412.2	211.2		
0.5 ft Height	TI-1764	435.6	224.2		
Liquid Level:					
% Level	LI-1765	17.5			
Slurry Height	ft	2.26	meters	0.688	

SLURRY PUMP

			deg F	**deg C**
Temperature:	Slurry Inlet	TI-1755	434.0	223.4
	Seal Oil Outlet	TI-1795	119.8	48.8
			psig	**bara**
Pressure:	Seal Oil Outlet	PI-1794	870.7	61.05
			lb/hr	**kg/hr**
Flow Rate:	Slurry Outlet	FI-1768	11658.9	5288.7
			g/cc	
Density:	Slurry Outlet	DI-1768	1.001	

SLURRY COOLER

Temperatures:		**deg F**	**deg C**
Slurry Outlet	TIC-1754	431.3	221.8

Oil Inlet	TI-1780	423.0	217.2

FILTERS

			deg F	deg C				lb/hr	kg/hr
Temperature:	Slurry Outlet	TI-1783	425.5	218.6	Flow Rate:	Wax	FI-1761	34.044	15.442
			psig	**bara**				**g/cc**	
Pressure:	Slurry Inlet	PI-1756	752.4	52.89	Density:	Wax	DI-1761	0.718	
								ft/sec	**m/sec**
Diff. Press.:	Longitudinal		**psi**	**mbar**					
	Thru D & C	PDI-1772	16.2	1117	Linear Vel.:	Slurry thru	Calculated	9.50	2.896
	Thru B & A	PDI-1773	14.9	1025		Each Element			
	Trans-membrane							**ft/sec**	**mm/sec**
	Membrane A	PDI-1774	0.4	26	Superfic. Vel.:	Liquid Upflow	Calculated	0.21	6.302
	Membrane B	PDI-1775	8.8	607		thru Reactor			
	Membrane C	PDI-1776	15.9	1096					
	Membrane D	PDI-1777	23.5	1622					

Reactor Temperatures

	Reactor Ht, Ft		Deg F	Deg C
Nozzle N1	24.25	TI-626-1	433.6	223.1
Nozzle N2	20.25	TI-626-2	441.0	227.2
Nozzle N3	18.25	TI-190-2A	440.9	227.2
Nozzle N4	16.25	TI-626-3	440.4	226.9
Nozzle N5	14.25	TI-190-3	439.9	226.6
Nozzle N7	10.25	TI-1781A	441.0	227.2
		TI-1781B	440.8	227.1
		TI-1781C	440.7	227.0
		TI-1781D	440.6	227.0
Nozzle N8	8.083	TI-626-5	436.2	224.6
Nozzle K4	7.75	TI-190-4	443.1	228.4
Nozzle O	4.792	TI-626-6	438.3	225.7
Reactor Temp. Avg. (Noz N3 thru Noz O)			440.2	226.8

Product Separation

			deg F	deg C
Temperatures	27.11 In	TI-1-08	-22.0	-30.0
	2138 Tube In	TI-723	415.7	213.2
	22.14 Out	TIC-725	281.9	138.8
	21.65 Out	TIC-1-11A	74.6	23.7
	27.13 Lt Wax	TI-744	109.9	43.3
	28.30 Hv Wax	TI-515	309.7	154.3
			%	
Levels	27.12	LIC-639	5.1	
	22.14	LIC-688	26.2	
	22.10	LIC-220	40.0	
	22.15	LIC-242	43.8	
	27.13	LI-203	64.9	
	28.30	LI-1792	28.1	
			psig	**bara**
Pressure	27.13	PIC-202	16.50	2.15

Miscellaneous Data

Overall Plant Material Balance	%	104.75
100*(22.10 Purge+22.11 Purge+Heavy Wax+Light Wax+Light HC+Water)/ (LP Fresh Feed+HP H2)		
Reactor GHSV	Nm3 Rxt Feed/m3 3-phase slurry volume/hr	1994
Catalyst GHSV	Nm3 Rxt Feed/m3 particle volume/hr	11092
Catalyst Volume in the Reactor	litres particle volume	262.4
Inlet Superfic. Vel. based on Avg Reactor Temp.	cm/sec	12.98
Inlet Sup. Vel. based on Rxt Inlet Temp (TI-1-12A)	cm/sec	12.28
CO Conversion Rate, gmole CO converted/lit particle volume/hr		18.34
grams of HC (CH2.1) produced/lit particle volume/hr		255.21

N2 Balance Across Reactor (vary prod gas flow factor-step1)	**Plant N2 Balance** (vary purge1 flow factor-step2)	**Feed N2 Balance** (vary 01.20 discharge flow factor-step3)
101.35	100.03	99.35 (Redundancy converges both to 100%)
Water/Oxygen Balance		**Prod. Gas N2 Balance** (vary 01.20 discharge flow factor-step3)
98.30		99.31

Wax/Liquid Production Rates

	lbs/hr	**kg/hr**
Heavy Wax (27.10/28.30, Reactor Temp. Cut)	34.04	15.44
Light Wax (22.14/27.13, 392 deg F Cut)	0.00	0.00
Light HCs (22.10/22.16, 100 deg F Cut)	38.34	17.39
Water (22.10/22.16, 100 deg F Cut)	208.16	94.42

Slurry Conc. Based on Density Measurements

2-Phase Slurry Concentration	reduced particle vol %	25.51
	catalyst wt%	36.04

Water Saturation Calculations for the Reactor

	Based on CO, CO2 Meas.:		**Based on Water Production:**	
	psia	**mbara**	**psia**	**mbara**
Calculated Water Partial Pressure @ Reactor Outlet	30.76	2121	30.26	2086
Saturated Water Pressure @ Reactor Outlet	382.9	26403	382.9	26403
Water Partial Pressure as % of Sat. Pressure @ Reactor Outlet	8.03%		7.90%	
	deg F	**deg C**	**deg F**	**deg C**
Saturated Water Temperature @ Reactor Outlet	251.4	121.9	250.4	121.3

RUN NO.: AF-R15.1C **TITLE: LIQUID PHASE FISCHER-TROPSCH (III) SYNTHESIS IN LAPORTE AFDU**

Start Date / Time	10/17/1996	12.00
End Date / Time	10/18/1996	12.00

On-stream Time From Start-up (hr)	
Start	64.00
End	88.00

Reaction Conditions:					
Temperature	average	deg F	440.1	deg C	226.7
Pressure	PIC-201	psig	710.0	bara	49.97
Space Velocity		sL/kg-hr	7612		
Superficial Gas Vel. - Inlet		ft/sec	0.43	cm/sec	13.18
(based on average reactor temp)					
Recycle Ratio			3.20		

Slurry Data:				
Catalyst Oxide Wt (Reactor)	lbs	860	kg	390.1
Slurry Concentration by NDG	wt%	42.4		
Slurry Concentration by DP	wt%	39.9		
Slurry Level by NDG % NDG Span		95.2		
Slurry Height	ft	20.57	meters	6.27
Average Gas Holdup by NDG	Vol%	41.4		
Average Gas Holdup by DP	Vol%	35.8		

Performance Results	
CO Conversion per pass, mole %	9.1
H2 Conversion per pass, mole %	15.8
CO + H2 Conversion per pass, mole %	13.0
Plant CO Conversion, mole%	36.8
Plant H2 Conversion, mole%	54.7
Plant CO+H2 Conversion, mole%	48.4
CO Conversion Rate, gmole CO converted/kg cat oxide-hr	11.6
HC Production Rate, grams of HC (CH2.1) produced/kg cat oxide-hr	163.4
Reactor Productivity (STY) grams of H C (CH2.1)/lit of reactor vol. - hr	43.85
H2/CO in Fresh Feed, mole/mole	1.82
H2/CO in Reactor Feed, mole/mole	1.41
H2/CO Usage Ratio, mole/mole	2.43
H2/CO in Outlet, mole/mole	1.30
CO2 Selectivity, mole %	0.41
HC Selectivity (CO2 free) wt%:	
CH4	13.88
C2H6	1.50
C2H4	1.01
C3H8	1.90
C3H6	3.57
SUM C4H10	2.57
SUM C4H8	3.40
SUM C5H11	5.47

Reactor Heat Balance	**Btu/hr**	**kW**
Chemical Heat Production by Reaction	708882	207.75
Sensible Gas Heat	-114281	-33.49
Sensible Oil Heat	-453176	-132.81
Sensible Wax Heat	-80173	-23.50
Estimate of Heat Loss from Catalyst Drying Data	-35000	-10.26
% Heat Balance based on Reaction Heat	96.30	

Mass Balance	**Reactor lb/hr**	**Plant lb/hr**	**Feed lb/hr**	**Prod Gas lb/hr**
Fresh Feed		823	823	
HP H2 Feed				
Recycle Feed			3317	3317
Reactor Feed	4162		4162	
Total In	4162	823		
Prod Gas	3839			3839
Main Purge		541		541
22.11 Purge	45.7	45.7		
HC Phase	36.9	36.9		
AQ Phase	200.1	200.1		
Heavy Wax	34.0	34.0		
Light Wax				
Total Out	4156	857		
Mass Balance, %	99.8	104.2	100.5	100.5

Compositions (mole%):		**LP FRESH FEED**	**HP FRESH FEED (H2)**	**RECYCLE FEED**	**REACTOR FEED GAS**	**PRODUCT GAS**	**MAIN (22.10) PURGE**	**22.11 PURGE**	**REACTOR OUTLET (estimated)**
Components									
1	H2	62.08	100.00	50.14	52.89	50.14	50.14	48.34	48.04
2	N2	3.71	0.00	7.12	6.32	7.12	7.12	6.93	6.82
3	CO	34.20	0.00	38.47	37.62	38.47	38.47	38.24	36.85
4	CH4	0.00	0.00	2.93	2.18	2.93	2.93	3.12	2.81
5	CO2	0.00	0.00	0.12	0.09	0.12	0.12	0.16	0.11
6	ETHANE	0.00	0.00	0.17	0.13	0.17	0.17	0.23	0.16
7	ETHYLENE	0.00	0.00	0.02	0.00	0.02	0.02	0.03	0.02
8	PROPANE	0.00	0.00	0.15	0.11	0.15	0.15	0.29	0.14
9	PROPYLENE	0.00	0.00	0.27	0.20	0.27	0.27	0.51	0.26
10	ISOBUATNE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	N-BUTANE	0.00	0.00	0.13	0.10	0.13	0.13	0.38	0.13
12	T-BUTENE-2	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
13	BUTENE-1	0.00	0.00	0.15	0.12	0.15	0.15	0.20	0.15
14	ISOBUTYLENE	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00
15	C-BUTENE-2	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
16	SUM C5	0.00	0.00	0.19	0.13	0.19	0.19	0.63	0.18
17	SUM C6	0.00	0.00	0.08	0.08	0.08	0.08	0.51	0.08
18	SUM C7	0.00	0.00	0.04	0.03	0.04	0.04	0.14	0.04
19	SUM C8	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
20	SUM C9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	SUM C10	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
	H2O								4.11
	HC								0.10
	LIGHT WAX								0.000
	TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Mole Wt	lb/lb mole	11.87	2.02	14.96	14.26	14.96	14.96	16.15	15.21
Flows	SCFH	26798.58	0.00	85721.03	112858.42	99218.39	13971.76	1093.39	103576.37
	lb mole/hr	69.31	0.00	221.70	291.89	256.61	36.14	2.83	267.88
	lb/hr	823.03	0.00	3316.81	4162.20	3839.06	540.61	45.68	4074.36
	Nm3/hr	705.24	0.00	2255.85	2970.01	2611.05	367.68	28.77	2725.74
	kgmol/hr	31.44	0.00	100.56	132.40	116.40	16.39	1.28	121.51
	kg/hr	373.32	0.00	1504.49	1887.96	1741.39	245.22	20.72	1848.12
Temperature	deg F	277.9	86.7	124.9	247.0	85.0	83.2	79.3	
	deg C	136.6	30.4	51.6	119.5	29.4	28.5	26.3	
Pressure	psig	762.5	780.5	818.1	749.6	662.2	671.6	26.9	
	bara	53.59	54.83	57.42	52.69	46.67	47.32	2.86	

Reactor Heat Balance

Gas:		**deg F**	**deg C**			**lb/hr**	**kg/hr**		**Btu/lb-deg F**	**J/gm-deg C**		
Inlet Temp	TI-1-12A	387.1	197.3	Inlet Flow	RXT FEED	4162	1888.0	Inlet Ht Cap.	0.518	2.168		
Outlet Temp	RXT AVG	440.1	226.7	Outlet Flow	RXT FEED-WAXPROD	4128	1872.6	Outlet Ht Cap.	0.501	0.098		
Oil:												**lb/ft3** **kg/m3**
Inlet Temp	TI-1-14B	409.9	210.0	Inlet Flow	*FI-619	50224	22781.5	Inlet Ht Cap.	0.658	2.754	Inlet Density	45.34 726.22
Outlet Temp	TI-1780	423.8	217.7	Outlet Flow	*FI-619	50224	22781.5	Outlet Ht Cap.	0.666	2.786		
Slurry:												
Inlet Temp	TI-1783	428.4	220.2	Inlet Flow	*FI-1768-61	13737	6230.9	Inlet Ht Cap.	0.500	2.092		
Outlet Temp	RXT AVG	440.1	226.7	Outlet Flow	*FI-1768	13771	6246.3	Outlet Ht Cap.	0.500	2.092		
					*based on							

Reactor Differential Pressures

	DP NOZZLES		**Differential Pressures:**		**Heights:**		**Density - 3 Phase:**		**Gas Hold-up**
			psi	**mbar**	**ft** (based on flange loc.)	**meters**	**lb/ft3**	**kg/m3**	**vol%**
Reactor Height:									
13.75 to 9.25 ft	Kl -K3	PDI-1778	1.33	91.5	4.56	1.391	41.88	670.9	35.43
9.25 ft to 4.33 ft	K3-K5	PDI-1779	1.46	100.7	5.08	1.549	41.38	662.8	36.23
Total Reactor	K6-OUT	PDI-631	5.77	398.1	95.23	29.026	9.48	151.9	86.69
Sparger	K6-IN	PDI-633	1.38	95.0					

DEGASSER

Temperatures:		**deg F**	**deg C**		
6.5 ft Height	TI-1762	322.6	161.4		
3.5 ft Height	TI-1763	420.0	215.5		
0.5 ft Height	TI-1764	436.0	224.4		
Liquid Level:					
% Level	LI-1765	18.1			
Slurry Height	ft	2.29	meters	0.698	

SLURRY PUMP

			deg F	**deg C**
Temperature:	Slurry Inlet	TI-1755	435.1	224.0
	Seal Oil Outlet	TI-1795	116.4	46.9
			psig	**bara**
Pressure:	Seal Oil Outlet	PI-1794	878.2	61.56
			lb/hr	**kg/hr**
Flow Rate:	Slurry Outlet	FI-1768	13770.6	6246.6
			g/cc	
Density:	Slurry Outlet	DI-1768	0.995	

SLURRY COOLER

Temperatures:		**deg F**	**deg C**
Slurry Outlet	TIC-1754	431.9	222.2

Oil Inlet	TI-1780	423.8	217.7

FILTERS

			deg F	deg C				lb/hr	kg/hr
Temperature:	Slurry Outlet	TI-1783	428.4	220.2	Flow Rate:	Wax	FI-1761	33.954	15.401
			psig	**bara**				**g/cc**	
Pressure:	Slurry Inlet	PI-1756	762.3	53.57	Density:	Wax	DI-1761	0.718	
Diff. Press.:	Longitudinal		**psi**	**mbar**				**ft/sec**	**m/sec**
	Thru D & C	PDI-1772	21.5	1485	Linear Vel.:	Slurry thru	Calculated	11.29	3.442
	Thru B & A	PDI-1773	18.9	1300		Each Element			
	Trans-membrane							**ft/sec**	**mm/sec**
	Membrane A	PDI-1774	-1.5	-105	Superfic. Vel.:	Liquid Upflow	Calculated	0.025	7.495
	Membrane B	PDI-1775	8.6	593		thru Reactor			
	Membrane C	PDI-1776	17.3	1191					
	Membrane D	PDI-1777	28.0	1931					

Reactor Temperatures

	Reactor Ht, Ft		Deg F	Deg C
Nozzle N1	24.25	TI-626-1	432.7	222.6
Nozzle N2	20.25	TI-626-2	440.8	227.1
Nozzle N3	18.25	TI-190-2A	440.9	227.2
Nozzle N4	16.25	TI-626-3	440.3	226.8
Nozzle N5	14.25	TI-190-3	439.9	226.6
Nozzle N7	10.25	TI-1781A	440.9	227.2
		TI-1781B	440.8	227.1
		TI-1781C	440.3	226.8
		TI-1781D	440.5	226.9
Nozzle N8	8.083	TI-626-5	436.2	224.5
Nozzle K4	7.75	TI-190-4	443.1	228.4
Nozzle O	4.792	TI-626-6	438.3	225.7
Reactor Temp. Avg. (Noz N3 thru Noz O)			440.1	226.7

Product Separation

			deg F	deg C
Temperatures	27.11 In	TI-1-08	73.6	23.1
	2138 Tube In	TI-723	412.9	211.6
	22.14 Out	TIC-725	290.0	143.3
	21.65 Out	TIC-1-11A	77.8	25.4
	27.13 Lt Wax	TI-744	110.4	43.5
	28.30 Hv Wax	TI-515	231.3	110.7
			%	
Levels	27.12	LIC-639	5.5	
	22.14	LIC-688	41.2	
	22.10	LIC-220	49.8	
	22.15	LIC-242	50.0	
	27.13	LI-203	76.1	
	28.30	LI-1792	12.2	
			psig	**bara**
Pressure	27.13	PIC-202	17.00	2.19

Miscellaneous Data

Overall Plant Material Balance	%	104.15
100*(22.10 Purge+22.11 Purge+Heavy Wax+Light Wax+Light HC+Water)/ (LP Fresh Feed+HP H2)		
Reactor GHSV	Nm3 Rxt Feed/m3 3-phase slurry volume/hr	2043
Catalyst GHSV	Nm3 Rxt Feed/m3 particle volume/hr	11341
Catalyst Volume in the Reactor	litres particle volume	261.8
Inlet Superfic. Vel. based on Avg Reactor Temp.	cm/sec	13.18
Inlet Sup. Vel. based on Rxt Inlet Temp (TI-1-12A)	cm/sec	12.41
CO Conversion Rate, gmole CO converted AR particle	volume/hr	17.34
grams of HC (CH2.1) produced/Ift particle volume/hr		243.44

N2 Balance Across Reactor (vary prod gas flow factor-step1)	**Plant N2 Balance** (vary purgel flow factor-step2)	**Feed N2 Balance** (vary 01.20 discharge flow factor-step3)
99.01	99.97	100.51 (Redundancy converges both to 100%)
Water/Oxygen Balance		**Prod. Gas N2 Balance** (vary 01.20 discharge flow factor-step3)
100.97		100.48

Wax/Liquid Production Rates

	lbs/hr	kg/hr
Heavy Wax (27.10/28.30, Reactor Temp. Cut)	33.95	15.40
Light Wax (22.14/27.13, 392 deg F Cut)	0.00	0.00
Light HCs (22.10/22.16, 100 deg F Cut)	36.86	16.72
Water (22.10/22.16, 100 deg F Cut)	200.09	90.76

Slurry Conc. Based on Density Measurements

2-Phase Slurry Concentration	reduced particle vol %	24.95
	catalyst wt%	35.46

Water Saturation Calculations for the Reactor

	Based on CO, CO2 Meas.:		Based on Water Production:	
	psia	**mbara**	**psia**	**mbara**
Calculated Water Partial Pressure @ Reactor Outlet	29.18	2012	29.45	2031
Saturated Water Pressure @ Reactor Outlet	382.7	26383	382.7	26383
Water Partial Pressure as % of Sat. Pressure @ Reactor Outlet	7.63%		7.70%	
	deg F	**deg C**	**deg F**	**deg C**
Saturated Water Temperature @ Reactor Outlet	248.3	120.2	248.9	120.5

RUN NO.: AF-R15.1C **TITLE: LIQUID PHASE FISCHER-TROPSCH (III) SYNTHESIS IN LAPORTE AFDU**

Carbon No.	Compositions, wt% 1-Alcohols wt%	2-Olefins wt%	n-Paraffins wt%	Light HC Phase 1-Olefins wt%	iso-Paraffins wt%	Total wt%
1						0.00
2						0.00
3	0.01	0.00	0.01	0.00	0.00	0.03
4	0.13	0.02	0.12	0.05	0.00	0.31
5	0.35	0.09	0.82	0.54	0.04	1.83
6	0.47	0.22	2.30	1.88	0.14	5.02
7	0.51	0.30	3.93	3.42	0.30	8.45
8	0.49	0.34	4.73	4.29	0.48	10.33
9	0.42	0.36	4.87	4.32	0.65	10.62
10	0.39	0.39	4.78	3.89	0.64	10.10
11	0.26	0.33	4.64	3.29	0.57	9.09
12	0.22	0.35	4.35	2.69	0.50	8.11
13	0.23	0.33	4.00	1.96	0.54	7.06
14	0.20	0.29	3.54	1.38	0.55	5.96
15	0.14	0.25	3.00	0.92	0.51	4.83
16	0.12	0.19	2.43	0.73	0.37	3.83
17	0.00	0.13	1.99	0.49	0.28	2.90
18	0.00	0.13	1.54	0.33	0.36	2.36
19	0.00	0.12	1.16	0.20	0.23	1.71
20	0.00	0.06	0.93	0.11	0.30	1.40
21			1.14			1.14
22			0.88			0.88
23			0.90			0.90
24			0.84			0.84
25			0.61			0.61
26			0.50			0.50
27			0.49			0.49
28			0.30			0.30
29			0.15			0.15
30			0.10			0.10
> 30			0.17			0.17
Total	3.95	3.89	55.23	30.49	6.44	100.00

Composition, Wt% Compound	Aqueous Phase
Ethanol	1.82
Water by diff.	98.18
Total	100.00

Composition, wt% Carbon No.	Reactor Wax
12	0.02
13	0.05
14	0.15
15	0.28
16	0.45
17	0.64
18	0.86
19	1.14
20	1.33
21	1.53
22	1.79
23	2.05
24	2.34
25	3.02
26	6.79
27	22.97
28	10.73
29	2.65
30	2.40
31	2.30
32	2.36
33	3.55
34	6.68
35	2.16
36	1.64
37	1.31
38	1.18
39	1.10
40	1.08
41	0.93
42	0.82
43	0.73
44	0.77
45	0.64
46	0.61
47	0.58
48	0.54
49	0.50
50	0.46
> 50	8.89
Total	100.00

RUN NO.: AF-R15.1C **TITLE: LIQUID PHASE FISCHER-TROPSCH (III) SYNTHESIS IN LAPORTE AFDU**

Elemental Balance:

	Total lb/hr	C lb/hr	H lb/hr	O lb/hr	N lb/hr
Reactor Feed Gas	4162.30	1519.81	360.72	1765.13	516.63
Main Gas Outlet	3838.67	1421.47	316.71	1588.98	511.52
27.10 Reactor Wax	33.95	28.96	4.99	0.00	0.00
22.14 Light Wax	0.00	0.00	0.00	0.00	0.00
22.18 HC Phase	36.86	31.17	5.51	0.18	0.00
22.18 AQ Phase	200.09	1.90	22.30	175.89	0.00
Total Out	4109.57	1483.50	349.51	1765.05	511.52
% Balance	98.7	97.6	96.9	100.0	99.0

Product Distribution: Selectivity (wt%)

Methane (C1)	15.6
Gas (C2 - C4)	17.9
Gasoline (C5 - C11)	24.3
Diesel (C12 - C18)	11.5
Wax (C19+)	30.6
Total	100.0
HC Production Rate based on Liquid Data, grams HC produced/kg-cat oxide hr	138.5

Alpha Estimate:

C3 - C9	1	0.74
C10-C50	2	0.90