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		LIQUID COMPOSITION FOR FT-IIA (1994) AT LAPORTE																										
		CARBON NO. ----->										UNIDENTIFIED, WT%																
DATE	TIME	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	TOTAL	GRAND TOTAL		
5/28/94	11:50																											
5/28/94	22:20																											
5/29/94	23:30	3	0.1	0.5	1.1	0.8	0.5	0.3	0.6	0	0.1	0.3	0.1	0.3	1	1.3	1.3	1.4	1	1.7	1.5	0.6	0.1	0	17.6	99.8		
5/30/94	12:00																											
5/30/94	23:59	3	0	0.3	0.9	1.2	1.2	0.7	0.1	0.1	0	0	0	0	0	0	0.1	0.4	0.7	1.4	1.5	0.9	0	0	12.5	100.0		
5/31/94	12:00	1.4	1	0	0.6	0.6	0.8	0.3	0	0	0	0	0.1	0.3	0.6	0.9	1.2	1.7	2.2	2.9	2.6	2	0.6	0.2	20.0	100.5		
5/31/94	21:30	2	2.9	0	0.6	1.4	1.4	0.7	0.2	0	0	0	0	0	0	0	0.2	0.2	0.6	1.7	2.2	2.2	0.8	0.3	0	17.4	100.2	
6/1/94	13:30	1	1.2	0	0.2	0.4	0.5	0	0.1	0	0	0	0.3	0.2	1.1	1.6	1.8	2.5	3.4	4.2	3.7	2.8	1.4	0.8	27.2	101.0		
6/1/94	23:45	0.9	1.1	0	0.4	0.5	0.7	0.3	0.1	0	0	0	0.3	0.3	0.9	1.7	1.8	2.5	3.5	3.1	3.2	2.5	1.2	0.5	25.5	100.3		

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APPENDIX F

F-T II / IIA Demonstration Mass Balances

RUN NO: AF-R11.1A

TITLE: LIQUID PHASE FISCHER-TROPSCH (II) SYNTHESIS IN LAPORTE AFDU

On-stream Time From Start-up (hr)			
Start	7.00		
End	13.00		
Slurry Data:			
Catalyst Weight (lb oxide)	985		
Iron content In Catalyst (wt %)	60.57		
Slurry Concentration (wt %)	43.5		
Slurry Level (% of NDG Span)	73.3		
Slurry Height (ft)	17.13		
Average Gas Holdup (vol %)	18.7		
Reaction Conditions:			
Temperature (°F)	508.2		
Pressure (psig)	200.1		
Space Velocity (sL/kg-Fe hr)	2440		
Superficial Gas Velocity - Inlet (ft/sec)	0.35		
Performance Results			
CO Conversion, mole %	34.7		
H2 Conversion, mole %	37.9		
CO + H2 Conversion, mole %	36.0		
CO Conversion Rate, gmole CO converted/kg-Fe hr	21.5		
HC Production Rate, grams of HC (CH2.8) produced/kg-Fe hr	163.9		
Reactor Productivity grams of HC (CH2.8) /hr - lit of reactor vol.	36.64		
H2/CO Usage Ratio, mole/mole	0.76		
H2/CO in Outlet, mole/mole	0.66		
CO2 Selectivity, mole %	48.6		
HC Selectivity (CO2 free) mole % C :			
CH4	19.24		
C2H6	14.76		
C2H4	0.62		
C3H8	15.14		
C3H6	5.74		
SUM C4H10	7.44		
SUM C4H8	7.53		
SUM C5H11	8.51		

TITLE: LIQUID PHASE FISCHER-TROPSCH (II) SYNTHESIS IN LAPORTE AFDU

RUN NO: AF-R11.1A

Compositions (mole%):

Components	REACTOR FEED GAS	MAIN GAS OUTLET
1 H2	39.82	31.36
2 N2	3.19	4.04
3 CO	57.00	47.16
4 CH4	0.00	2.48
5 CO2	0.00	12.18
6 ETHANE	0.00	0.95
7 ETHYLENE	0.00	0.04
8 PROPANE	0.00	0.65
9 PROPYLENE	0.00	0.25
10 ISOBUTATNE	0.00	0.01
11 N-BUTANE	0.00	0.23
12 T-BUTENE-2	0.00	0.10
13 BUTENE-1	0.00	0.05
14 ISOBUTYLENE	0.00	0.03
15 C-BUTENE-2	0.00	0.07
16 SUM C5	0.00	0.22
17 SUM C6	0.00	0.11
18 SUM C7	0.00	0.05
19 SUM C8	0.00	0.03
20 SUM C9	0.00	0.00
21 SUM C10	0.00	0.00
TOTAL	100.00	100.00

Mole Wt lb/lb mole

22.03

Flows SCFH lb mole/hr lb/hr

19802.52
51.22
1128.40

RUN NO: AF-R11.1B

TITLE: LIQUID PHASE FISCHER-TROPSCH (II) SYNTHESIS IN LAPORTE AFDU

Start Date / Time	5/13/94	4.00	On-stream Time From Start-up (hr)	
End Date / Time	5/13/94	8.00		
Start		31.00		
End		35.00		
Reaction Conditions:			Slurry Data:	
Temperature (°F)	521.0		Catalyst Weight (lb oxide)	985
Pressure (psig)	300.0		Iron content in Catalyst (wt %)	60.57
Space Velocity (sl/kg-Fe hr)	2433		Slurry Concentration (wt %)	41.1
Superficial Gas Velocity - Inlet (ft/sec)	0.24		Slurry Level (% of NDG Span)	91.9
			Slurry Height (ft)	20.05
			Average Gas Holdup (vol %)	24.5
Performance Results				
CO Conversion, mole %	25.7			
H2 Conversion, mole %	27.5			
CO + H2 Conversion, mole %	26.4			
CO Conversion Rate, gmole CO converted/kg-Fe hr	15.9			
HC Production Rate, grams of HC (CH2.8) produced/kg-Fe hr	153.6			
Reactor Productivity, grams of HC (CH2.8) /hr - lit of reactor vol.	29.34			
H2/CO Usage Ratio, mole/mole	0.74			
H2/CO In Outlet, mole/mole	0.68			
CO2 Selectivity, mole %	34.8			
HC Selectivity (CO2 free) mole % C :				
CH4	12.26			
C2H6	9.83			
C2H4	0.44			
C3H8	11.06			
C3H6	2.31			
SUM C4H10	5.80			
SUM C4H8	3.56			
SUM C5H11	2.54			

TITLE: LIQUID PHASE FISCHER-TROPSCH (II) SYNTHESIS IN LAPORTE AFDU

RUN NO: AF-R11.1B

Compositions (mole%):

Components

	REACTOR FEED GAS	MAIN GAS OUTLET
1 H2	39.66	35.07
2 N2	3.29	4.02
3 CO	57.05	51.70
4 CH4	0.00	1.43
5 CO2	0.00	6.23
6 ETHANE	0.00	0.57
7 ETHYLENE	0.00	0.03
8 PROPANE	0.00	0.43
9 PROPYLENE	0.00	0.09
10 ISOBUTANE	0.00	0.01
11 N-BUTANE	0.00	0.16
12 T-BUTENE-2	0.00	0.04
13 BUTENE-1	0.00	0.02
14 ISOBUTYLENE	0.00	0.01
15 C-BUTENE-2	0.00	0.03
16 SUM C5	0.00	0.06
17 SUM C6	0.00	0.07
18 SUM C7	0.00	0.01
19 SUM C8	0.00	0.02
20 SUM C9	0.00	0.00
21 SUM C10	0.00	0.00
TOTAL	100.00	100.00

Mole Wt lb/lb mole

Flows SCFH
lb mole/hr
lb/hr

25023.06	20514.53
64.72	53.06
1145.71	1060.42

RUN NO: AF-R12.1A **TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU**

On-stream Time From Start-up (hr)

Start Date / Time 5/27/94 17.00
End Date / Time 5/28/94 1.00

Start 5.00
End 13.00

Reaction Conditions:

Temperature (°F) 517.9
Pressure (psig) 175.0
Space Velocity (sl/kg-Fe hr) 2534
Superficial Gas Velocity - Inlet (ft/sec) 0.19

Slurry Data:

Catalyst Weight (lb oxide) 445
Iron content in Catalyst (wt %) 61.06
Slurry Concentration (wt %) 25
Slurry Level (% of NDG Span) 78.1
Slurry Height (ft) 17.88
Average Gas Holdup (vol %) 23.5

Performance Results

CO Conversion, mole % 84.7
H₂ Conversion, mole % 79.6
CO + H₂ Conversion, mole % 82.5

CO Conversion Rate,
gmole CO converted/kg-Fe hr 53.1

HC Production Rate,
grams of HC (CH₂.5) produced/kg-Fe hr 424.1

Reactor Productivity
grams of HC (CH₂.5) /hr - lit of reactor vol. 41.38

H₂/CO Usage Ratio, mole/mole 0.70
H₂/CO in Outlet, mole/mole 1.00

CO₂ Selectivity, mole % 44.9

HC Selectivity (CO₂ free) mole % C :

CH₄ 13.42
C₂H₆ 11.65
C₂H₄ 0.49
C₃H₈ 13.29
C₃H₆ 4.65
SUM C₄H₁₀ 7.46
SUM C₄H₈ 5.69
SUM C₅H₁₁ 7.92

TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU

RUN NO: AF-R12.1A

Compositions (mole%):		REACTOR FEED GAS	MAIN GAS OUTLET
Components			
1	H2	41.36	17.14
2	N2	3.20	6.49
3	CO	55.44	17.14
4	CH4	0.00	7.04
5	CO2	0.00	42.79
6	ETHANE	0.00	3.06
7	ETHYLENE	0.00	0.13
8	PROPANE	0.00	2.32
9	PROPYLENE	0.00	0.81
10	ISOBUTANE	0.00	0.04
11	N-BUTANE	0.00	0.94
12	T-BUTENE-2	0.00	0.19
13	BUTENE-1	0.00	0.25
14	ISOBUTYLENE	0.00	0.11
15	C-BUTENE-2	0.00	0.19
16	SUM C5	0.00	0.83
17	SUM C6	0.00	0.36
18	SUM C7	0.00	0.14
19	SUM C8	0.00	0.04
20	SUM C9	0.00	0.00
21	SUM C10	0.00	0.00
	TOTAL	100.00	100.00
Mole Wt	lb/lb mole	17.26	31.31
Flows	SCFH	11871.13	5857.36
	lb mole/hr	30.70	15.15
	lb/hr	529.96	474.37

RUN NO: AF-R122A **TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU**

Start Date / Time	5/28/94	13.00	On-stream Time From Start-up (hr)	
End Date / Time	5/29/94	0.00		
Reaction Conditions:			Slurry Data:	
Temperature (°F)	576.0		Catalyst Weight (lb oxide)	445
Pressure (psig)	750.0		Iron content in Catalyst (wt %)	61.06
Space Velocity (sL/kg-Fe hr)	12266		Slurry Concentration (wt %)	23
Superficial Gas Velocity - Inlet (ft/sec)	0.24		Slurry Level (% of NDG Span)	78.7
			Slurry Height (ft)	17.97
			Average Gas Holdup (vol %)	9
Performance Results				
CO Conversion, mole %	54.2			
H ₂ Conversion, mole %	56.3			
CO + H ₂ Conversion, mole %	55.0			
CO Conversion Rate, gmole CO converted/kg-Fe hr	172.2			
HC Production Rate, grams of HC (CH _{2.5}) produced/kg-Fe hr	1405.9			
Reactor Productivity grams of HC (CH _{2.5}) /hr - lit of reactor vol.	136.43			
H ₂ /CO Usage Ratio, mole/mole	0.71			
H ₂ /CO in Outlet, mole/mole	0.65			
CO ₂ Selectivity, mole %	43.7			
HC Selectivity (CO₂ free) mole % C :				
CH ₄	11.78			
C ₂ H ₆	11.95			
C ₂ H ₄	0.39			
C ₃ H ₈	14.45			
C ₃ H ₆	3.66			
SUM C ₄ H ₁₀	8.16			
SUM C ₄ H ₈	3.96			
SUM C ₅ H ₁₁	8.45			

TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU

RUN NO: AF-R12.2A

Compositions (mole%):

Components	REACTOR FEED GAS	MAIN GAS OUTLET
1 H2	39.61	26.49
2 N2	2.29	3.52
3 CO	58.10	40.78
4 CH4	0.00	3.21
5 CO2	0.00	21.16
6 ETHANE	0.00	1.63
7 ETHYLENE	0.00	0.05
8 PROPANE	0.00	1.31
9 PROPYLENE	0.00	0.33
10 ISOBUTANE	0.00	0.03
11 N-BUTANE	0.00	0.53
12 T-BUTENE-2	0.00	0.16
13 BUTENE-1	0.00	0.07
14 ISOBUTYLENE	0.00	0.04
15 C-BUTENE-2	0.00	0.00
16 SUM C5	0.00	0.46
17 SUM C6	0.00	0.15
18 SUM C7	0.00	0.05
19 SUM C8	0.00	0.02
20 SUM C9	0.00	0.00
21 SUM C10	0.00	0.00
TOTAL	100.00	100.00
Mole Wt	lb/lb mole	
	17.71	25.00
Flows	SCFH	
	57464.38	37336.89
	148.62	96.57
	2632.83	2414.32

RUN NO: AF-R12.3F (Rev. 1)

TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU

On-stream Time From Start-up (hr)

Start Date / Time 5/30/94 16.00
End Date / Time 5/31/94 8.00

Start 76.00
End 92.00

Reaction Conditions:

Temperature (°F) 577.5
Pressure (psig) 750.0
Space Velocity (sL/kg-Fe hr) 18529
Superficial Gas Velocity - Inlet (ft/sec) 0.24

Slurry Data:

Catalyst Weight (lb oxide) 297
Iron content in Catalyst (wt %) 61.06
Slurry Concentration (wt %) 14.4
Slurry Level (% of NDG Span) 95.6
Slurry Height (ft) 20.63
Average Gas Holdup (vol %) 8.9

Performance Results

CO Conversion, mole % 24.6
H₂ Conversion, mole % 32.2
CO + H₂ Conversion, mole % 27.8

Mass/Elemental Balance:

Reactor Feed Gas
Total lb/hr 2674.69
C lb/hr 1051.73
H lb/hr 118.31
O lb/hr 1401.14
N lb/hr 103.52

CO Conversion Rate, gmole CO converted/kg-Fe hr 118.7
HC Production Rate, grams of HC (CH_{2.5}) produced/kg-Fe hr 1230.8
Reactor Productivity, grams of HC (CH_{2.5}) /hr - lit of reactor vol. 69.46

Main Gas Outlet
27.10 Reactor Wax 0.00
22.14 Light Wax 0.00
22.18 HC Phase 38.53
22.18 AQ Phase 12.29
Total Out 2546.82
% Balance 95.2

H₂/CO Usage Ratio, mole/mole 0.88
H₂/CO In Outlet, mole/mole 0.60

Total Out 2546.82
% Balance 95.2

CO₂ Selectivity, mole % 28.5

HC Selectivity (CO₂ free) mole % C :

CH₄ 5.52
C₂H₆ 5.59
C₂H₄ 3.13
C₃H₈ 3.42
C₃H₆ 11.16
SUM C₄H₁₀ 2.16
SUM C₄H₈ 8.49
SUM C₅H₁₁ 6.24

Product Distribution: Selectivity (wt%)

Methane (C₁) 10.3
Gas (C₂ - C₄) 49.9
Gasoline (C₅ - C₁₁) 33.3
Diesel (C₁₂ - C₁₈) 3.0
Wax (C₁₉+) 3.5
Total 100.0

Alpha Estimate:

Carbon No. Alpha
C₁-C₁₆ Single 0.63

TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU

RUN NO: AF-R12.3F (Rev. 1)

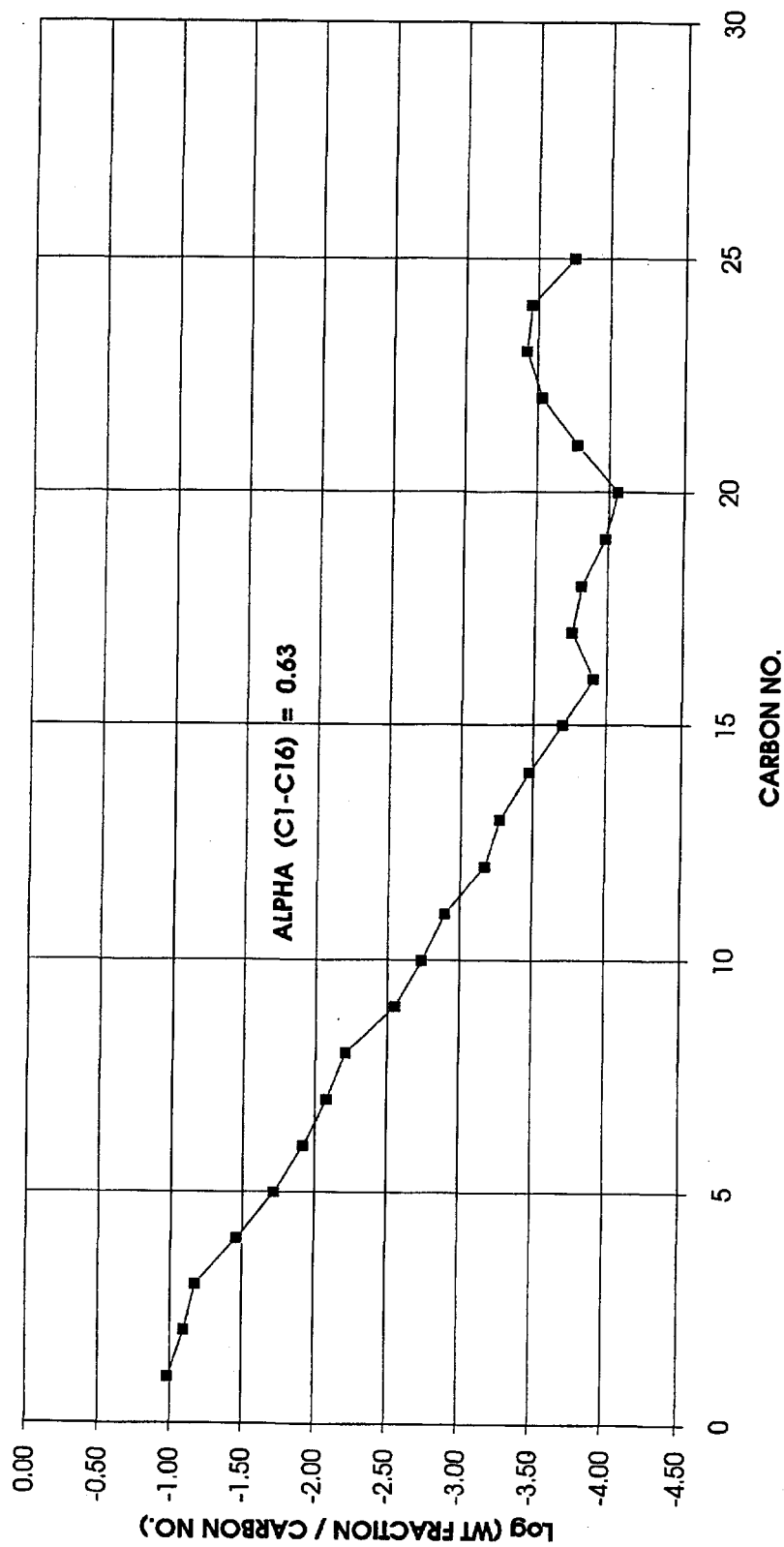
Compositions (mole%):		REACTOR FEED GAS	MAIN GAS OUTLET
Components			
1	H2	39.09	33.48
2	N2	2.47	3.12
3	CO	58.44	55.66
4	CH4	0.00	0.72
5	CO2	0.00	5.17
6	ETHANE	0.00	0.36
7	ETHYLENE	0.00	0.20
8	PROPANE	0.00	0.15
9	PROPYLENE	0.00	0.48
10	ISOBUTANE	0.00	0.00
11	N-BUTANE	0.00	0.07
12	T-BUTENE-2	0.00	0.08
13	BUTENE-1	0.00	0.11
14	ISOBUTYLENE	0.00	0.01
15	C-BUTENE-2	0.00	0.07
16	SUM C5	0.00	0.16
17	SUM C6	0.00	0.08
18	SUM C7	0.00	0.04
19	SUM C8	0.00	0.02
20	SUM C9	0.00	0.00
21	SUM C10	0.00	0.00
	TOTAL	100.00	100.00
Mole Wt	lb/lb mole	17.85	20.41
Flows	SCFH	57833.72	45859.61
	lb mole/hr	149.84	118.61
	lb/hr	2674.69	2421.20

TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU

RUN NO: AF-R12.3F (Rev. 1)

Carbon No.	Compositions (wt%):				HC Phase				Aqueous Phase			
	Alcohols wt%	Cis 2-Olefin wt%	Trans 2-Olefin wt%	n-Paraffin wt%	1-Olefin wt%	Branched Aliphatic wt%	Other Olefins wt%	Unidentified wt%	Total wt%	Compound	wt%	
1	2.0								2.0	Methanol	6.3	
2	0.0								0.0	Ethanol	8.2	
3	1.9								1.9	1-Propanol	4.2	
4	1.7								1.7	1-Butanol	1.7	
5	2.1	0.5	0.7	0.6	0.7	0.0	0.0	3.0	7.6	1-Pentanol	0.8	
6	2.6	0.8	1.4	1.7	1.2	2.1	1.1	0.0	10.9	1-Hexanol	0.1	
7	1.5	1.0	1.7	3.1	1.2	3.0	1.2	0.3	13.0	1-Heptanol	0.0	
8	0.7	1.0	1.6	3.7	1.2	3.1	1.0	0.9	13.2	2-Propanol	0.6	
9	0.7	0.7	1.3	2.4	0.8	1.6	1.5	1.2	10.2	2-Butanol	0.4	
10	0.0	0.5	0.9	2.1	0.5	1.0	1.2	1.2	7.4	Isobutanol	0.1	
11	0.0	0.4	0.6	1.6	0.7	0.9	0.7	0.7	5.6	2-Pentanol	0.1	
12	0.0	0.2	0.3	1.3	0.4	0.6	0.4	0.1	3.3	Acetic Acid	4.9	
13	0.0	0.1	0.3	1.0	0.3	0.7	0.3	0.1	2.8	Propanoic Acid	1.3	
14	0.0	0.1	0.2	0.9	0.1	0.4	0.2	0.0	1.9	Butanoic Acid	0.6	
15	0.0	0.0	0.1	0.8	0.1	0.2	0.0	0.0	1.2	Pentanoic Acid	0.2	
16	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.8	Hexanoic Acid	0.0	
17	0.0	0.0	0.1	0.7	0.0	0.2	0.2	0.0	1.2	Methyl Acetate	0.1	
18	0.2	0.0	0.1	0.5	0.0	0.0	0.3	0.0	1.1	Ethyl Acetate	0.1	
19		0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.8	Ethyl Propanoate	0.0	
20		0.0	0.2	0.2	0.0	0.0	0.0	0.1	0.7	Propyl Acetate	0.0	
21		0.0	0.2	0.2	0.1	0.2	0.3	0.4	1.4	Butyl Acetate	0.0	
22		0.2	0.2	0.0	0.0	0.7	0.8	0.7	2.6	Acetaldehyde	0.1	
23		0.2	0.3	0.0	0.0	0.9	0.7	1.4	3.5	Propanaldehyde	0.1	
24		0.1	0.0	0.2	0.0	0.9	0.7	1.5	3.4	Butanaldehyde	0.0	
25			0.0	0.1	0.0	0.1	0.7	0.9	1.8	2-Propanone	0.4	
26			0.0	0.0	0.0	0.0	0.0	0.0	0.0	2-Pentanone	0.1	
27			0.0	0.0	0.0	0.0	0.0	0.0	0.0	2-Hexanone	0.0	
28			0.0	0.0	0.0	0.0	0.0	0.0	0.0	Uncalibrated	0.4	
29									0.0	Total Organics	31.0	
30									0.0	Water by diff.	69.0	
> 30									0.0			
Total	13.9	5.8	10.2	22.4	7.3	16.6	11.3	12.5	100.0	Total	100.0	

ALPHA ESTIMATION - RUN NO. AF-R12.3F



RUN NO: AF-R12.4 (Rev. 1)

TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU

Start Date / Time 5/31/94 10.00
End Date / Time 5/31/94 23.00

On-stream Time From Start-up (hr)
Start 94.00
End 107.00

Reaction Conditions:

Temperature (°F) 577.9
Pressure (psig) 500.0
Space Velocity (sL/kg-Fe hr) 18682
Superficial Gas Velocity - Inlet (ft/sec) 0.36

Slurry Data:

Catalyst Weight (lb oxide) 297
Iron content in Catalyst (wt %) 61.06
Slurry Concentration (wt %) 15
Slurry Level (% of NDG Span) 91.8
Slurry Height (ft) 20.03
Average Gas Holdup (vol %) 13

Performance Results

CO Conversion, mole % 15.6
H2 Conversion, mole % 18.6
CO + H2 Conversion, mole % 16.8

CO Conversion Rate, gmole CO converted/kg-Fe hr 75.4
HC Production Rate, grams of HC (CH2.5) produced/kg-Fe hr 874.7
Reactor Productivity grams of HC (CH2.5) /hr - lit of reactor vol. 50.85

H2/CO Usage Ratio, mole/mole 0.82
H2/CO In Outlet, mole/mole 0.66

CO2 Selectivity, mole % 20.0

Mass/Elemental Balance:

	Total lb/hr	C lb/hr	H lb/hr	O lb/hr	N lb/hr
Reactor Feed Gas	2677.49	1053.04	120.80	1402.88	100.77
Main Gas Outlet	2448.36	977.64	110.12	1259.84	100.75
27.13 Reactor Wax	0.00	0.00	0.00	0.00	0.00
22.14 Light Wax	0.00	0.00	0.00	0.00	0.00
22.18 HC Phase	74.80	61.80	10.96	2.03	0.00
22.18 AQ Phase	46.50	6.48	5.20	34.82	0.00
Total Out	2569.66	1045.93	126.29	1296.69	100.75
% Balance	96.0	99.3	104.5	92.4	100.0

HC Selectivity (CO2 free) mole % C:

CH4 5.55
C2H6 4.44
C2H4 4.72
C3H8 2.23
C3H6 11.11
SUM C4H10 1.38
SUM C4H8 7.68
SUM C5H11 5.09

Product Distribution: Selectivity (wt%)

Methane (C1) 7.9
Gas (C2 - C4) 37.2
Gasoline (C5 - C11) 35.5
Diesel (C12 - C18) 6.2
Wax (C19+) 13.2
Total 100.0

Alpha Estimate:

Carbon No. Alpha
C1-C16 Single 0.68

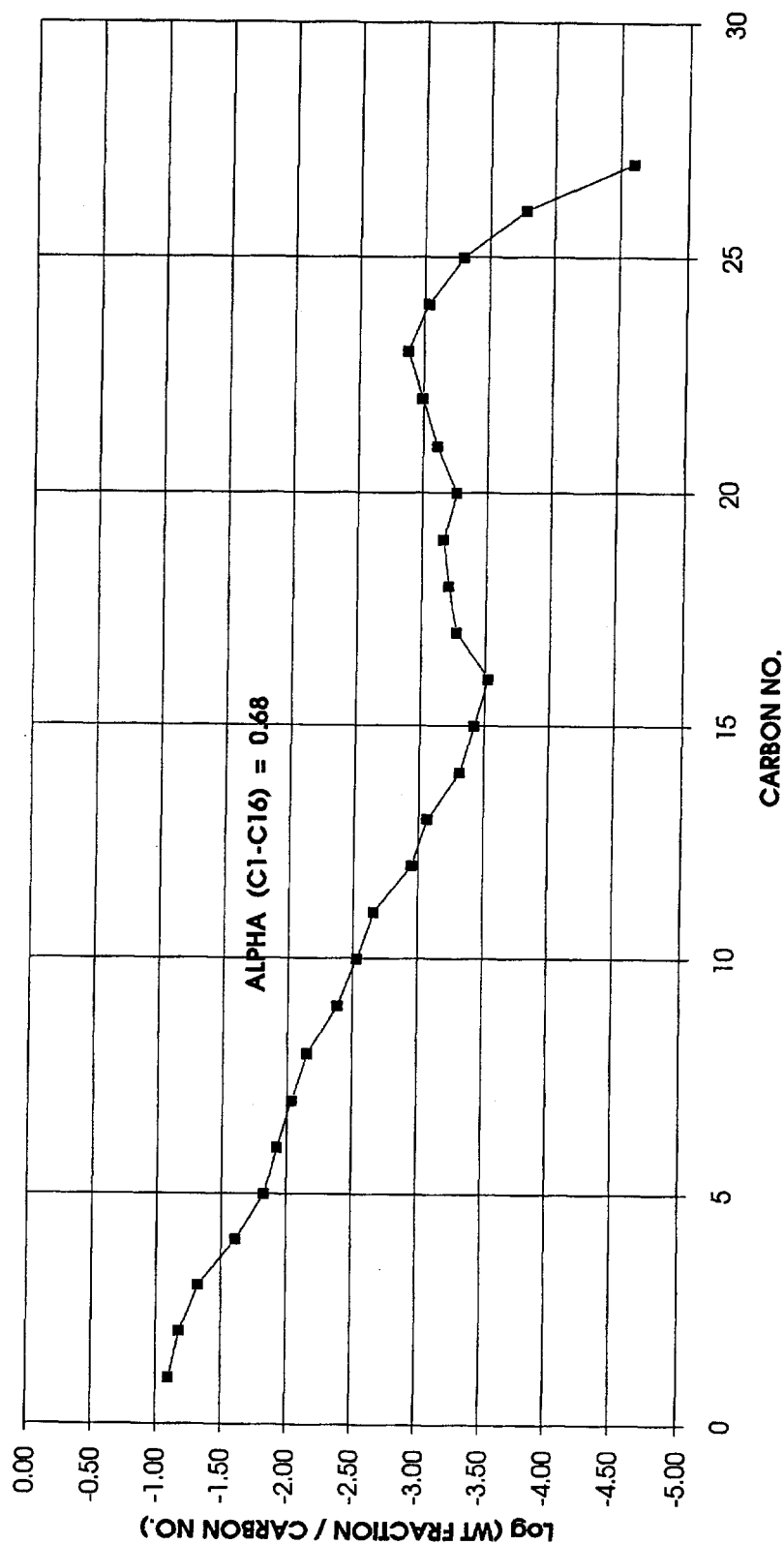
RUN NO: AF-R12.4 (Rev. 1) TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU

Compositions (mole%):

Components	REACTOR FEED GAS	MAIN GAS OUTLET
1 H2	39.58	37.09
2 N2	2.38	2.77
3 CO	58.04	56.43
4 CH4	0.00	0.47
5 CO2	0.00	2.11
6 ETHANE	0.00	0.19
7 ETHYLENE	0.00	0.20
8 PROPANE	0.00	0.06
9 PROPYLENE	0.00	0.31
10 ISOBUTANE	0.00	0.00
11 N-BUTANE	0.00	0.03
12 T-BUTENE-2	0.00	0.04
13 BUTENE-1	0.00	0.07
14 ISOBUTYLENE	0.00	0.01
15 C-BUTENE-2	0.00	0.04
16 SUM C5	0.00	0.09
17 SUM C6	0.00	0.05
18 SUM C7	0.00	0.03
19 SUM C8	0.00	0.01
20 SUM C9	0.00	0.00
21 SUM C10	0.00	0.00
TOTAL	100.00	100.00
Mole Wt lb/lb mole	17.72	18.86
Flows SCFH	58413.37	50190.71
lb mole/hr	151.08	129.81
lb/hr	2677.49	2448.47

RUN NO: AF-R12.4 (Rev. 1)										TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU									
Carbon No.	Compositions (wt%):					HC Phase					Aqueous Phase								
	Alcohols		Cis 2-Olefin	Trans 2-Olefin	n-Paraffin	1-Olefin	Branched Aliphatic	Other Olefins	Unidentified	Total	Compound	wt%							
	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%									
1	1.4										Methanol	5.1							
2	1.9									1.4	Ethanol	7.0							
3	0.0									1.9	1-Propanol	3.7							
4	1.5									0.0	1-Butanol	1.5							
5	1.7									0.0	1-Pentanol	0.6							
6	2.3									1.5	1-Hexanol	0.2							
7	1.4								1.7	5.2	1-Heptanol	0.1							
8	0.7								2.0	8.6	1-Octanol	0.0							
9	0.4								0.0	8.7	2-Propanol	0.5							
10	0.2								0.6	10.1	2-Butanol	0.3							
11	0.3								1.0	8.2	Isobutanol	0.1							
12	0.0								1.1	6.5	2-Pentanol	0.1							
13	0.0								0.5	5.4	Acetic Acid	5.2							
14	0.0								0.1	3.0	Propanoic Acid	1.6							
15	0.1								0.0	2.5	Butanoic Acid	0.7							
16	0.0								0.0	1.5	Pentanoic Acid	0.2							
17	0.0								0.0	1.3	Hexanoic Acid	0.0							
18	0.4								0.1	1.1	Methyl Acetate	0.1							
19									0.2	2.0	Ethyl Acetate	0.1							
20									0.3	2.5	Ethyl Propanoate	0.0							
21									0.6	2.9	Propyl Acetate	0.0							
22									0.7	2.4	Butyl Acetate	0.0							
23									1.2	3.6	Acetaldehyde	0.1							
24									2.0	5.0	Propanaldehyde	0.0							
25									2.6	6.8	Butanaldehyde	0.0							
26									2.4	5.0	2-Propanone	0.3							
27									1.4	2.8	2-Pentanone	0.1							
28									0.5	1.0	2-Hexanone	0.0							
29									0.1	0.2	Uncalibrated	0.3							
30										0.0	Total Organics	27.9							
> 30										0.0	Water by diff.	72.1							
Total	12.5		3.7	7.8	15.8	7.2	18.5	16.4	18.7	100.4	Total	100.0							

ALPHA ESTIMATION - RUN NO. AF-R12.4



RUN NO: AF-R12.5A

TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU

Start Date / Time	6/1/94	2.00
End Date / Time	6/1/94	14.00

On-stream Time From Start-up (hr)
Start 110.00
End 122.00

Reaction Conditions:

Temperature (°F)	517.8
Pressure (psig)	175.0
Space Velocity (sL/kg-Fe hr)	3665
Superficial Gas Velocity - Inlet (ft/sec)	0.18

Slurry Data:

Catalyst Weight (lb oxide)	297
Iron content in Catalyst (wt %)	61.06
Slurry Concentration (wt %)	13.8
Slurry Level (% of NDG Span)	93.0
Slurry Height (ft)	20.22
Average Gas Holdup (vol %)	6.7

Performance Results

CO Conversion, mole %	10.0
H2 Conversion, mole %	11.7
CO + H2 Conversion, mole %	10.7

CO Conversion Rate, gmole CO converted/kg-Fe hr	9.5
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HC Production Rate, grams of HC (CH2.5) produced/kg-Fe hr	106.3
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Reactor Productivity grams of HC (CH2.5) /hr - lit of reactor vol.	6.12
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H2/CO Usage Ratio, mole/mole	0.79
H2/CO In Outlet, mole/mole	0.66

CO2 Selectivity, mole %	22.4
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HC Selectivity (CO2 free) mole % C :

CH4	3.87
C2H6	3.00
C2H4	5.24
C3H8	1.26
C3H6	10.03
SUM C4H10	0.83
SUM C4H8	6.47
SUM C5H11	5.33

RUN NO: AF-R12.5A TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU

Compositions (mole%):		REACTOR	MAIN GAS
Components		FEED GAS	OUTLET
1	H2	39.23	37.80
2	N2	2.72	2.97
3	CO	58.05	57.03
4	CH4	0.00	0.19
5	CO2	0.00	1.42
6	ETHANE	0.00	0.07
7	ETHYLENE	0.00	0.13
8	PROPANE	0.00	0.02
9	PROPYLENE	0.00	0.16
10	ISOBUTANE	0.00	0.00
11	N-BUTANE	0.00	0.01
12	T-BUTENE-2	0.00	0.03
13	BUTENE-1	0.00	0.03
14	ISOBUTYLENE	0.00	0.00
15	C-BUTENE-2	0.00	0.02
16	SUM C5	0.00	0.05
17	SUM C6	0.00	0.03
18	SUM C7	0.00	0.02
19	SUM C8	0.00	0.02
20	SUM C9	0.00	0.00
21	SUM C10	0.00	0.00
	TOTAL	100.00	100.00
Mole Wt	lb/lb mole	17.81	18.51
Flows	SCFH	11458.52	10501.25
	lb mole/hr	29.64	27.16
	lb/hr	527.92	502.78

RUN NO: AF-R12.5B (Rev. 1)

TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU

Start Date / Time	6/1/94	18.00	On-stream Time From Start-up (hr)	
End Date / Time	6/2/94	1.00	Start	126.00
			End	133.00
Reaction Conditions:			Slurry Data:	
Temperature (°F)	589.4		Catalyst Weight (lb oxide)	297
Pressure (psig)	175.0		Iron content in Catalyst (wt %)	61.06
Space Velocity (sL/kg-Fe hr)	3771		Slurry Concentration (wt %)	14.1
Superficial Gas Velocity - Inlet (ft/sec)	0.20		Slurry Level (% of NDG Span)	93.0
			Slurry Height (ft)	20.22
			Average Gas Holdup (vol %)	6.1
Performance Results			Mass/Elemental Balance:	
CO Conversion, mole %	43.6		Total	
H ₂ Conversion, mole %	41.7		lb/hr	
CO + H ₂ Conversion, mole %	42.8		Reactor Feed Gas	
			lb/hr	
CO Conversion Rate,	41.2		Main Gas Outlet	
gmole CO converted/kg-Fe hr			27.13 Reactor Wax	
HC Production Rate,	322.2		22.14 Light Wax	
grams of HC (CH _{2.5}) produced/kg-Fe hr			22.18 HC Phase	
Reactor Productivity	18.55		22.18 AQ Phase	
grams of HC (CH _{2.5}) /hr - lit of reactor vol.			Total Out	
H ₂ /CO Usage Ratio, mole/mole	0.70		510.59	
H ₂ /CO In Outlet, mole/mole	0.76		% Balance	
			96.9	
CO ₂ Selectivity, mole %	46.1			

HC Selectivity (CO₂ free) mole % C :		Product Distribution: Selectivity (wt%)	
CH ₄	10.40	Methane (C1)	14.6
C ₂ H ₆	11.25	Gas (C ₂ - C ₄)	62.9
C ₂ H ₄	3.96	Gasoline (C ₅ - C ₁₁)	19.6
C ₃ H ₈	7.86	Diesel (C ₁₂ - C ₁₈)	0.7
C ₃ H ₆	13.20	Wax (C ₁₉ +))	2.2
SUM C ₄ H ₁₀	3.27		
SUM C ₄ H ₈	10.41	Total	100.0
SUM C ₅ H ₁₁	7.33		

Alpha Estimate:
Carbon No. Alpha
C1-C14 Single 0.49

RUN NO: AF-R12.5B (Rev. 1) TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU

Compositions (mole%):		REACTOR	MAIN GAS
Components		FEED GAS	OUTLET
1	H2	41.31	32.70
2	N2	2.45	3.32
3	CO	56.24	43.08
4	CH4	0.00	1.86
5	CO2	0.00	15.33
6	ETHANE	0.00	1.01
7	ETHYLENE	0.00	0.35
8	PROPANE	0.00	0.47
9	PROPYLENE	0.00	0.79
10	ISOBUTANE	0.00	0.01
11	N-BUTANE	0.00	0.14
12	T-BUTENE-2	0.00	0.19
13	BUTENE-1	0.00	0.11
14	ISOBUTYLENE	0.00	0.03
15	C-BUTENE-2	0.00	0.13
16	SUM C5	0.00	0.26
17	SUM C6	0.00	0.13
18	SUM C7	0.00	0.06
19	SUM C8	0.00	0.02
20	SUM C9	0.00	0.00
21	SUM C10	0.00	0.00
	TOTAL	100.00	100.00
Mole Wt	lb/lb mole	17.27	22.37
Flows	SCFH	11791.41	8688.02
	lb mole/hr	30.50	22.47
	lb/hr	526.81	502.71

RUN NO: AF-R12.5B (Rev. 1) TITLE: LIQUID PHASE FISCHER-TROPSCH (IIA) SYNTHESIS IN LAPORTE AFDU

Carbon No.	Compositions (wt%):					HC Phase				Aqueous Phase			
	Alcohols	Cis 2-Olefin	Trans 2-Olefin	n-Paraffin	1-Olefin	Branched Aliphatic	Other Olefins	Unidentified	Total	Compound	wt%		
	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%				
1	0.0									Methanol	3.1		
2	0.0									Ethanol	5.4		
3	0.0									1-Propanol	2.7		
4	1.4									1-Butanol	1.1		
5	3.0									1-Pentanol	0.5		
6	2.1									1-Hexanol	0.1		
7	1.3									1-Heptanol	0.0		
8	1.0									1-Octanol	0.0		
9	0.6									2-Propanol	0.4		
10	0.4									2-Butanol	0.2		
11	0.2									Isobutanol	0.1		
12	0.0									2-Pentanol	0.0		
13	0.2									Acetic Acid	3.1		
14	0.0									Propanoic Acid	1.1		
15	0.3									Butanoic Acid	0.5		
16	0.2									Pentanoic Acid	0.1		
17	0.0									Hexanoic Acid	0.0		
18	0.5									Methyl Acetate	0.0		
19										Ethyl Acetate	0.0		
20										Ethyl Propanoate	0.0		
21										Propyl Acetate	0.0		
22										Butyl Acetate	0.0		
23										Acetaldehyde	0.1		
24										Propanaldehyde	0.0		
25										Butanaldehyde	0.0		
26										2-Propanone	0.2		
27										2-Pentanone	0.1		
28										2-Hexanone	0.0		
29										Uncalibrated	0.2		
30										Total Organics	19.3		
> 30										Water by diff.	80.7		
Total	12.6	3.9	8.4	14.0	5.9	15.3	14.7	25.5	100.3	Total	100.0		

ALPHA ESTIMATION - RUN NO. AF-R12.5B

