

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
ENTRAINED MODE
PROCESS VARIABLES & ANALYTICAL SUMMARY

DATE :	22-Jun-85
TIME :	04:31 PM
TIME INTERVAL:	FROM: 0000 27-May
	TO: 2400 27-May
NUMBER OF AVERAGED HOURS :	24
RUN ID NUMBER :	EU-X754
FEED GAS TYPE:	CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (deg.C) :	145.3
OIL/SLURRY INLET TEMP. (deg.C) :	245.0
AVE. REACTOR TEMPERATURE (deg.C) :	250.0
REACTOR OUTLET TEMP. (deg.C) :	247.7
REACTOR GAS INLET PRESSURE (kPa) :	5467
PRIMARY SEPARATOR GAS PRESSURE (kPa) :	5275
GAS SUPERFICIAL VELOCITY (cm/sec) :	9.5
LIQUID SUPERFICIAL VELOCITY (cm/sec) :	4.9
SLURRY CONCENTRATION (wt%) :	25.2
SPACE VELOCITY (1/ks-hr) :	10402
RECYCLE/FRESH FEED RATIO :	3.54
OIL/SLURRY CIRCULATION RATE (m3/hr) :	44.9
PROD.SEPARATOR GAS FLOWRATE <S0> + <SS> (ksmol/hr) :	87.23
PURGE GAS FLOW RATE <S0> (ksmol/hr) :	5.30

STREAM #	1	SS	10	15	258	258	62	68
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	V/L SEP	V/L SEP	FLASH GAS	NEOH PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<WT>
H2	58.69	29.62	35.68	35.65	27.69	27.58	5.73	
CO	36.62	54.27	50.74	50.77	50.78	50.78	23.60	
CO2	3.11	13.87	11.68	11.70	13.22	13.22	60.76	
H2	0.14	0.91	0.75	0.75	0.84	0.85	0.37	
CH4	0.10	0.69	0.58	0.57	0.65	0.66	0.92	
H2O	0.00	0.00	0.11	0.00	0.04	0.06	0.12	1.03
CH3OH	0.00	0.49	0.42	0.38	6.92	6.81	7.43	95.66
DME	0.00	0.02	0.01	0.02	0.01	0.01	0.21	0.00
C2H5OH								0.72
C3OH'S								0.30
C4OH'S								0.18
C5OH'S								0.13
ALKAHENES								0.00
ESTERS								0.65
ALDEHYDES								0.00
OIL								1.32
TOTAL :	98.66	99.87	99.97	99.85	100.15	99.96	99.13	100.00
DENSrs/cc	0.005	0.046	0.032	0.032	0.029	0.029	0.004	0.790
AV.MOL.WT	13.04	22.46	20.54	20.55	23.13	23.15	36.53	32.45
M3/hr	518.0	1836.3	2352.3	2350.8	2088.7	2087.6	5.0	
ksmol/hr	23.11	81.93	104.95	104.88	93.19	93.14	0.22	5.87
l/hrprod								241.16

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 27-May-85 - 2400 27-May-85

CONVERSIONS ACROSS REACTOR :

		<u>GC#1</u>	<u>GC#2</u>
HYDROGEN CONVERSION	(Z) :	31.4	31.0
CARBON MONOXIDE CONVERSION	(Z) :	11.2	11.1
CARBON DIOXIDE CONVERSION	(Z) :	-0.4	-0.4
RATIO H2 CONSUMED/CO CONSUMED	:	1.97	1.95

*** See next page for conversions as calc. by overall bal.

SELECTIVITIES :

		<u>ACROSS REACTOR</u> <u>GC Average</u>	<u>OVERALL</u> <u>8</u>
CO (+CO2) SELECTIVITY TO METHANOL	(Z) :	101.3	97.3
CO (+CO2) SELECTIVITY TO ETHANOL	(Z) :	-----	0.5

* Methanol in flashed sas not measured
Ethanol only measured in product flow

METHANOL PRODUCTIVITIES & YIELDS

METH SOURCE	<u>mol/hr-ks cat</u>	<u>ks/1000 Na3 fresh feed</u>	<u>ks/1000 Na3 reactor feed</u>
As calculated ACROSS REACTOR	26.43	369.5	81.4
As Net MeOH produced, OVERALL balance	25.37	354.6	78.1

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.38
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	28.5
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	95.3
CALCULATED METHANOL PRODUCTION RATE (Kmol/hr) :	5.97

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 27-May-85 - 2400 27-May-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	[PURE GASES - 1] FRESH FEED GAS	[(1+55)-15] REACTOR FEED	[25 - (50+51+62+68)] REACTOR EFFLUENT
	<Z diff.>	<Z diff.>	<Z diff.>
H2	-2.80604	1.14513	-0.17873
CO	-0.82068	-0.62420	-0.03311
CO2	-93.06840	-1.58340	1.75596
N2	-135.47700	-1.30049	-7.32987
CH4	n.a.	-1.50905	-22.02310
H2O		100.00000	-165.03200
CH3OH		0.70958	4.84729

OVERALL ELEMENTAL BALANCE (Kg-atoms/hr) :

STREAM # STREAM NAME	INPUTS		OUTPUTS				(IN-OUT)/IN
	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	62 FLASH GAS	68 MeOH PRODUCT	TOTAL	Z
CARBON:							
CO	53.2511	44.4570	2.8768	0.0527	—	47.3865	11.0130
CO2	12.2747	11.3642	0.7354	0.1356	—	12.2352	0.3221
CH3OH	0.3993	0.4019	0.0260	0.0166	5.6898	6.1343	-1436.3400
OTHERS	0.6183	0.5858	0.0379	0.0025	0.1644	0.7905	-27.8571
TOTAL C	66.5434	56.8089	3.6761	0.2074	5.8542	66.5466	-0.0048
HYDROGEN:							
H2	74.7861	48.5262	3.1402	0.0256	—	51.6920	30.8803
H2O	0.0000	0.0000	0.0000	0.0005	0.2174	0.2180	n.a.
OTHERS	4.1073	3.9845	0.2578	0.0773	23.1819	27.5015	-569.5780
TOTAL H	78.8934	52.5107	3.3980	0.1034	23.3993	79.4115	-0.6567
OXYGEN:							
TOTAL O	78.2183	67.6043	4.3747	0.3412	5.8855	78.2057	0.0161
NITROGEN:							
TOTAL N	1.5718	1.4884	0.0963	0.0016	—	1.5863	-0.9248
TOTAL MASS FLOW (kg/hr)	2155.7000	1840.3900	119.0920	8.1527	188.0690	2155.7000	-0.0001

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.996	100.209
HYDROGEN	99.988	101.312
OXYGEN	99.987	100.293
NITROGEN	100.094	100.179

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
ENTRAINED MODE
PROCESS VARIABLES & ANALYTICAL SUMMARY

DATE : 22-Jun-85
TIME : 04:40 PM
TIME INTERVAL: FROM: 0000 28-May
TO: 2400 28-May
NUMBER OF AVERAGED HOURS : 24
RUN ID NUMBER : EU-X754
FEED GAS TYPE: CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (des.C) : 145.4
OIL/SLURRY INLET TEMP. (des.C) : 244.8
AVE. REACTOR TEMPERATURE (des.C) : 249.9
REACTOR OUTLET TEMP. (des.C) : 247.7
REACTOR GAS INLET PRESSURE (kPa) : 5464
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5273
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.5
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 4.9
SLURRY CONCENTRATION (wt%): 25.2
SPACE VELOCITY (1/ks-hr) : 10471
RECYCLE/FRESH FEED RATIO : 3.58
OIL/SLURRY CIRCULATION RATE (m3/hr) : 44.7
PROD.SEPARATOR GAS FLOWRATE <S0> + <S5> (ksmol/hr) : 87.40
PURGE GAS FLOW RATE <S0> (ksmol/hr) : 5.19

STREAM #	1	55	10	15	25*	25*	62	68
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	V/L SEP	V/L SEP	FLASH GAS	MEDH PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
	<MOL%>	<MOL%>	<MOL%>	<MOL%>	<MOL%>	<MOL%>	<MOL%>	<WT%>
H2	58.57	29.90	35.94	35.89	27.93	27.79	5.73	—
CO	36.55	54.07	50.50	50.53	50.49	50.58	23.60	—
CO2	3.10	13.67	11.53	11.55	13.01	13.01	60.76	—
N2	0.15	1.32	0.34	0.85	0.95	0.95	0.37	—
CH4	0.11	0.81	0.67	0.67	0.76	0.76	0.92	—
H2O	0.00	0.00	0.00	0.00	0.04	0.06	0.12	1.04
CH3OH	0.00	0.51	0.44	0.39	6.89	6.82	7.43	95.69
DME	0.01	0.02	0.01	0.02	0.01	0.02	0.21	0.00
C2H5OH	—	—	—	—	—	—	—	0.71
C3OH'S	—	—	—	—	—	—	—	0.29
C4OH'S	—	—	—	—	—	—	—	0.18
C5OH'S	—	—	—	—	—	—	—	0.13
ALKANES	—	—	—	—	—	—	—	0.00
ESTERS	—	—	—	—	—	—	—	0.64
ALDEHYDES	—	—	—	—	—	—	—	0.00
OIL	—	—	—	—	—	—	—	1.32
TOTAL :	98.48	100.00	99.93	99.90	100.08	100.00	99.13	100.00
DENS,g/cc	0.005	0.046	0.032	0.032	0.029	0.029	0.004	0.790
AV.MOL.WT	13.04	22.35	20.45	20.46	23.02	23.05	36.53	32.44
Mm3/hr	514.7	1842.6	2355.8	2355.9	2093.9	2091.2	5.4	—
ksmol/hr	22.95	82.21	105.10	105.11	93.42	93.30	0.24	5.87
L/hr,Prod	—	—	—	—	—	—	—	241.00

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 28-May-85 - 2400 28-May-85

CONVERSIONS ACROSS REACTOR :

		<u>GC#1</u>	<u>GC#2</u>
HYDROGEN CONVERSION	(Z) :	31.4	30.8
CARBON MONOXIDE CONVERSION	(Z) :	11.1	11.2
CARBON DIOXIDE CONVERSION	(Z) :	-0.2	-0.1
RATIO H ₂ CONSUMED/CO CONSUMED	:	2.01	1.96

*** See next page for conversions as calc. by overall bal.

SELECTIVITIES :

		<u>ACROSS REACTOR</u> <u>GC Average</u>	<u>OVERALL</u> <u>%</u>
CO (+CO ₂) SELECTIVITY TO METHANOL	(Z) :	101.1	98.8
CO (+CO ₂) SELECTIVITY TO ETHANOL	(Z) :		0.5

* Methanol in flashed gas not measured
Ethanol only measured in product flow

METHANOL PRODUCTIVITIES & YIELDS

<u>METH SOURCE</u>	<u>smol/hr-kg cat</u>	<u>kg/1000 Mo3 fresh feed</u>	<u>kg/1000 Mo3 reactor feed</u>
As calculated ACROSS REACTOR	26.52	371.4	81.1
As Net MeOH produced, OVERALL balance	25.48	356.8	78.0

REACTOR FEED (H ₂ /(CO+1.5CO ₂)) :	0.53
REACTOR FEED ((H ₂ -CO ₂)/(CO+CO ₂)) :	0.39
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	28.9
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	95.3
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	5.97

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 28-May-85 - 2400 28-May-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	PURE GASES - 13 FRESH FEED GAS	[(1+55)-15] REACTOR FEED	[25 - (50+51+62+68)] REACTOR EFFLUENT
	<Z diff.>	<Z diff.>	<Z diff.>
H2	-2.68298	0.78580	-0.19279
CO	-0.66146	-0.50643	-0.19583
CO2	-95.61360	-1.59550	1.64449
N2	-153.73200	-2.20832	-6.62583
CH4	n.a.	-0.96674	-21.05650
H2O	—	100.00000	-165.95400
CH3OH	—	2.18317	4.41368

OVERALL ELEMENTAL BALANCE (Ks-atoms/hr) :

STREAM # STREAM NAME	INPUTS		OUTPUTS				(IN-OUT)/IN
	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	62 FLASH GAS	68 MeOH PRODUCT	TOTAL	Z
CARBON:							
CO	53.1122	44.4507	2.8068	0.0571	—	47.3146	10.9157
CO2	12.1388	11.2372	0.7096	0.1469	—	12.0936	0.3720
CH3OH	0.4123	0.4210	0.0266	0.0180	5.6878	6.1533	-1392.5000
OTHERS	0.7191	0.6866	0.0434	0.0027	0.1608	0.8934	-24.2431
TOTAL C	66.3823	56.7955	3.5863	0.2246	5.8485	66.4550	-0.1094
HYDROGEN:							
H2	75.4521	49.1493	3.1035	0.0277	—	52.2805	30.7104
H2O	0.0000	0.0000	0.0000	0.0006	0.2205	0.2211	n.a.
OTHERS	4.5606	4.4640	0.2819	0.0838	23.1645	27.9941	-513.8210
TOTAL H	80.0127	53.6133	3.3854	0.1121	23.3850	80.4957	-0.6036
OXYGEN:							
TOTAL O	77.8196	67.3629	4.2536	0.3696	5.8829	77.8690	-0.0635
NITROGEN:							
TOTAL N	1.7793	1.6740	0.1057	0.0018	—	1.7815	-0.1258
TOTAL MASS FLOW (ks/hr)	2150.3800	1837.5700	116.0330	8.8321	187.9450	2150.3800	0.0002

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	100.069	100.115
HYDROGEN	100.082	101.103
OXYGEN	100.163	100.168
NITROGEN	100.671	99.826

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
ENTRAINED NODE
PROCESS VARIABLES & ANALYTICAL SUMMARY

DATE : 22-Jun-85
TIME : 04:49 PM
TIME INTERVAL: FROM: 0000 29-May TO: 1100 29-May
NUMBER OF AVERAGED HOURS : 11
RUN ID NUMBER : EU-X754
FEED GAS TYPE: CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (des.C) : 145.7
OIL/SLURRY INLET TEMP. (des.C) : 244.7
AVE. REACTOR TEMPERATURE (des.C) : 249.9
REACTOR OUTLET TEMP. (des.C) : 247.6
REACTOR GAS INLET PRESSURE (kPa) : 5463
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5273
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.5
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 4.9
SLURRY CONCENTRATION (wt%): 25.2
SPACE VELOCITY (1/ks-hr) : 10484
RECYCLE/FRESH FEED RATIO : 3.61
OIL/SLURRY CIRCULATION RATE (m3/hr) : 44.7
PROD.SEPARATOR GAS FLOWRATE <S0> + <SS> (ksmol/hr) : 87.55
PURGE GAS FLOW RATE <S0> (ksmol/hr) : 4.99

STREAM #	1	55	10	15	25*	25*	62	68
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	V/L SEP	V/L SEP	FLASH GAS	MEDH PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<WTZ>
H2	58.56	29.80	35.78	35.76	27.85	27.76	5.73	
CO	36.46	53.93	50.36	50.40	50.40	50.42	23.60	
CO2	3.12	14.09	11.88	11.87	13.40	13.40	60.76	
N2	0.11	0.80	0.66	0.66	0.75	0.75	0.37	
CH4	0.10	0.83	0.69	0.68	0.78	0.78	0.92	
H2O	0.00	0.00	0.00	0.00	0.06	0.06	0.12	1.05
CH3OH	0.00	0.50	0.45	0.40	6.85	6.80	7.43	95.69
DME	0.00	0.02	0.02	0.02	0.01	0.02	0.21	0.00
C2H5OH								0.71
C3OH'S								0.29
C4OH'S								0.18
C5OH'S								0.13
ALKANES								0.00
ESTERS								0.63
ALDEHYDES								0.00
OIL								1.32
TOTAL :	98.34	99.99	99.83	99.80	100.08	99.99	99.13	100.00
DENS, g/cc	0.005	0.046	0.032	0.032	0.029	0.029	0.004	0.790
AV. MOL. WT	13.03	22.44	20.54	20.54	23.10	23.12	36.53	32.44
M3/hr	512.3	1850.4	2358.9	2358.9	2097.3	2095.6	5.7	
ksmol/hr	22.86	82.55	105.24	105.24	93.57	93.49	0.25	5.84
1/hr*prod								239.90

* Compositions correspond to STREAM#32

**LAPORE LP-METHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY**

0000 29-May-85 - 1100 29-May-85

CONVERSIONS ACROSS REACTOR :

	GC#1	GC#2
HYDROGEN CONVERSION (Z) :	31.1	30.8
CARBON MONOXIDE CONVERSION (Z) :	11.1	11.1
CARBON DIOXIDE CONVERSION (Z) :	-0.2	-0.4
RATIO H2 CONSUMED/CO CONSUMED :	2.00	1.97

*** See next page for conversions as calc. by overall bal.

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL *
CO (+CO2) SELECTIVITY TO METHANOL (Z) :	101.7	99.1
CO (+CO2) SELECTIVITY TO ETHANOL (Z) :		0.5

* Methanol in flashed gas not measured
Ethanol only measured in product flow

METHANOL PRODUCTIVITIES & YIELDS

METH SOURCE	mmol/hr-kg cat	kg/1000 Na3 fresh feed	kg/1000 Na3 reactor feed
As calculated ACROSS REACTOR	26.37	371.1	80.6
As Net MeOH produced, OVERALL balance	25.36	356.9	77.5

REACTOR FEED $\{H_2/(CO+1.5CO_2)\}$:	0.52
REACTOR FEED $\{(H_2-CO_2)/(CO+CO_2)\}$:	0.38
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	28.9
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.s.
METHANOL COLLECTED AS % OF CALCULATED :	95.4
CALCULATED METHANOL PRODUCTION RATE (Kmol/hr) :	5.93

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 29-May-85 - 1100 29-May-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	[PURE GASES - 1] FRESH FEED GAS	[(1+55)-15] REACTOR FEED	C25 - (50+51+62+68)] REACTOR EFFLUENT
	<Z diff.>	<Z diff.>	<Z diff.>
H2	-1.95411	0.90974	-0.16978
CO	-0.52294	-0.35917	-0.12305
CO2	-89.47460	-1.13646	1.53634
H2	-113.29800	-2.02885	-8.95119
CH4	n.a.	-0.68181	-21.04200
H2O		100.00000	-112.17200
CH3OH		-1.97933	4.47901

OVERALL ELEMENTAL BALANCE (Ks-atoms/hr) :

STREAM # STREAM NAME	INPUTS	OUTPUTS					(IN-OUT)/IN
	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	62 FLASH GAS	68 MeOH PRODUCT	TOTAL	%
CARBON:							
CO	53.0436	44.5216	2.6929	0.0596	-----	47.2740	10.8771
CO2	12.4882	11.6350	0.7037	0.1535	-----	12.4923	-0.0329
CH3OH	0.4241	0.4159	0.0252	0.0188	5.6618	6.1216	-1343.2800
OTHERS	0.7321	0.7066	0.0427	0.0028	0.1593	0.9115	-24.5032
TOTAL C	66.6880	57.2791	3.4645	0.2347	5.8211	66.7994	-0.1670
HYDROGEN:							
H2	75.2750	49.1984	2.9757	0.0289	-----	52.2031	30.6501
H2O	0.0000	0.0000	0.0000	0.0006	0.2210	0.2216	n.a.
OTHERS	4.6575	4.5277	0.2739	0.0875	23.0568	27.9459	-500.0250
TOTAL H	79.9325	53.7261	3.2496	0.1171	23.2778	80.3707	-0.5482
OXYGEN:							
TOTAL O	78.4604	68.2263	4.1266	0.3812	5.8565	78.5956	-0.1724
NITROGEN:							
TOTAL N	1.3993	1.3214	0.0799	0.0019	-----	1.4032	-0.2779
TOTAL MASS FLOW (Ks/hr)	2161.1100	1852.7200	112.0610	9.2298	187.0840	2161.1000	0.0005

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	100.061	100.204
HYDROGEN	100.281	101.092
OXYGEN	100.170	100.294
NITROGEN	101.034	99.740

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
ENTRAINED MODE
PROCESS VARIABLES & ANALYTICAL SUMMARY

DATE : 22-Jun-85
TIME : 04:56 PM
TIME INTERVAL: FROM: 0000 30-May
TO: 2400 30-May
24
NUMBER OF AVERAGED HOURS :
RUN ID NUMBER : EU-X754
FEED GAS TYPE: CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (deg.C) : 145.4
OIL/SLURRY INLET TEMP. (deg.C) : 244.7
AVE. REACTOR TEMPERATURE (deg.C) : 249.5
REACTOR OUTLET TEMP. (deg.C) : 247.6
REACTOR GAS INLET PRESSURE (kPa) : 5465
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5274
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.5
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 4.9
SLURRY CONCENTRATION (wt%) : 25.2
SPACE VELOCITY (1/ks-hr) : 10423
RECYCLE/FRESH FEED RATIO : 3.63
OIL/SLURRY CIRCULATION RATE (m3/hr) : 44.5
PROD. SEPARATOR GAS FLOWRATE <S0> + <SS> (ksmol/hr) : 87.59
PURGE GAS FLOW RATE <S0> (ksmol/hr) : 5.14

STREAM #	1	SS	10	15	25*	25*	62	68
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	V/L SEP	V/L SEP	FLASH GAS	MEOH PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<WT>
H2	58.27	29.58	35.57	35.55	27.69	27.59	5.73	—
CO	36.68	54.32	50.77	50.80	50.80	50.85	23.60	—
CO2	3.12	13.86	11.70	11.70	13.18	13.18	60.76	—
N2	0.13	0.87	0.72	0.72	0.82	0.82	0.37	—
CH4	0.11	0.80	0.65	0.66	0.75	0.75	0.92	—
H2O	0.00	0.00	0.00	0.00	0.05	0.05	0.12	1.06
CH3OH	0.00	0.55	0.47	0.43	6.73	6.75	7.43	95.71
BNE	0.00	0.02	0.01	0.02	0.01	0.02	0.21	0.00
C2H5OH	—	—	—	—	—	—	—	0.69
C3OH'S	—	—	—	—	—	—	—	0.29
C4OH'S	—	—	—	—	—	—	—	0.18
C5OH'S	—	—	—	—	—	—	—	0.13
ALKANES	—	—	—	—	—	—	—	0.00
ESTERS	—	—	—	—	—	—	—	0.63
ALDEHYDES	—	—	—	—	—	—	—	0.00
OIL	—	—	—	—	—	—	—	1.32
TOTAL :	98.31	99.99	99.90	99.88	100.02	99.99	99.13	100.00
DENSITY/cc	0.005	0.046	0.032	0.032	0.029	0.029	0.004	0.790
AV. MOL. WT	13.10	22.47	20.57	20.57	23.10	23.13	36.53	32.43
m3/hr	508.7	1848.2	2356.7	2355.6	2098.0	2095.4	5.2	—
ksmol/hr	22.69	82.45	105.14	105.09	93.60	93.48	0.23	5.79
l/hr*prod	—	—	—	—	—	—	—	237.69

* Compositions correspond to STREAM#32

**LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY**

0000 30-May-85 - 2400 30-May-85

CONVERSIONS ACROSS REACTOR :

		<u>GC#1</u>	<u>GC#2</u>
HYDROGEN CONVERSION	(Z) :	31.0	30.6
CARBON MONOXIDE CONVERSION	(Z) :	10.9	10.9
CARBON DIOXIDE CONVERSION	(Z) :	-0.2	-0.3
RATIO H2 CONSUMED/CO CONSUMED	:	1.99	1.96

*** See next page for conversions as calc. by overall bal.

SELECTIVITIES :

		<u>ACROSS REACTOR GC Average</u>	<u>OVERALL %</u>
CO (+CO2) SELECTIVITY TO METHANOL	(Z) :	100.4	98.3
CO (+CO2) SELECTIVITY TO ETHANOL	(Z) :		0.5

* Methanol in flashed gas not measured
Ethanol only measured in product flow

METHANOL PRODUCTIVITIES & YIELDS

<u>MEOH SOURCE</u>	<u>mol/hr-ks cat</u>	<u>ks/1000 Na3 fresh feed</u>	<u>ks/1000 Na3 reactor feed</u>
As calculated ACROSS REACTOR	25.80	367.3	79.3
As Net MeOH produced, OVERALL balance	25.03	356.5	76.9

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED (H2-CO2)/(CO+CO2) :	0.38
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	29.7
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.s.
METHANOL COLLECTED AS % OF CALCULATED :	96.2
CALCULATED METHANOL PRODUCTION RATE (Kmol/hr) :	5.83

LaPORTE LPMEETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 30-May-85 - 2400 30-May-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	[PURE GASES - 1] FRESH FEED GAS	[(1+55)-15] REACTOR FEED	[25 - (50+51+62+68)] REACTOR EFFLUENT
	<Z diff.>	<Z diff.>	<Z diff.>
H2	-1.81310	0.66319	0.00468
CO	-0.49097	-0.52171	-0.06948
CO2	-91.45870	-1.29546	1.54747
N2	-80.06980	-1.60676	-7.12787
CH4	n.a.	-1.51211	-20.22720
H2O	-----	100.00000	-162.01800
CH3OH	-----	1.72281	3.02355

OVERALL ELEMENTAL BALANCE (Ks-atoms/hr) :

STREAM # STREAM NAME	INPUTS		OUTPUTS				(IN-OUT)/IN
	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	62 FLASH GAS	68 MeOH PRODUCT	TOTAL	Z
CARBON:							
CO	53.3902	44.7882	2.7917	0.0550	-----	47.6350	10.7795
CO2	12.2943	11.4283	0.7123	0.1416	-----	12.2823	0.0971
CH3OH	0.4475	0.4533	0.0284	0.0173	5.6106	6.1116	-1265.8100
OTHERS	0.7105	0.6729	0.0419	0.0026	0.1555	0.8729	-22.8582
TOTAL C	66.8424	57.3447	3.5744	0.2166	5.7661	66.9018	-0.0888
HYDROGEN:							
H2	74.7205	48.7717	3.0400	0.0267	-----	51.8384	30.6235
H2O	0.0000	0.0000	0.0000	0.0006	0.2216	0.2221	n.a.
OTHERS	4.6715	4.5461	0.2834	0.0808	22.8421	27.7523	-494.0820
TOTAL H	79.3919	53.3178	3.3234	0.1081	23.0636	79.8129	-0.5302
OXYGEN:							
TOTAL O	78.4460	68.1169	4.2458	0.3564	5.8036	78.5228	-0.0980
NITROGEN:							
TOTAL N	1.5165	1.4356	0.0895	0.0017	-----	1.5268	-0.6805
TOTAL MASS FLOW (ks/hr)	2162.1500	1852.7900	115.4870	8.5173	185.3620	2162.1600	-0.0002

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	100.007	100.055
HYDROGEN	100.169	100.738
OXYGEN	100.980	100.156
NITROGEN	100.766	100.650

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
ENTRAINED MODE
PROCESS VARIABLES & ANALYTICAL SUMMARY

DATE :	22-Jun-85
TIME :	05:03 PM
TIME INTERVAL:	FROM: 0000 31-May
	TO: 2400 31-May
NUMBER OF AVERAGED HOURS :	24
RUN ID NUMBER :	EU-X754
FEED GAS TYPE:	CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (des.C) :	145.5
OIL/SLURRY INLET TEMP. (des.C) :	244.9
Ave. REACTOR TEMPERATURE (des.C) :	249.9
REACTOR OUTLET TEMP. (des.C) :	247.6
REACTOR GAS INLET PRESSURE (kPa) :	5462
PRIMARY SEPARATOR GAS PRESSURE (kPa) :	5274
GAS SUPERFICIAL VELOCITY (cm/sec) :	9.5
LIQUID SUPERFICIAL VELOCITY (cm/sec) :	4.9
SLURRY CONCENTRATION (wt%) :	25.1
SPACE VELOCITY (1/ks-hr) :	10532
RECYCLE/FRESH FEED RATIO :	3.64
OIL/SLURRY CIRCULATION RATE (m3/hr) :	44.4
PROD.SEPARATOR GAS FLOWRATE <S0> + <SS> (ksmol/hr) :	87.53
PURGE GAS FLOW RATE <S0> (ksmol/hr) :	5.21

STREAM #	1	SS	10	15	25x	25x	62	68
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	V/L SEP	V/L SEP	FLASH GAS	MEDH PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<WT>
H2	57.95	29.43	35.39	35.39	27.57	27.51	5.73	
CO	36.87	54.46	50.96	50.97	51.00	51.04	23.60	
CO2	3.25	13.93	11.80	11.79	13.26	13.28	60.76	
N2	0.12	0.76	0.63	0.63	0.71	0.71	0.37	
CH4	0.11	0.77	0.64	0.63	0.72	0.72	0.92	
H2O	0.00	0.00	0.00	0.00	0.05	0.00	0.12	1.04
CH3OH	0.00	0.56	0.48	0.43	6.67	6.69	7.43	95.70
DME	0.00	0.02	0.01	0.02	0.01	0.02	0.21	0.00
C2H5OH								0.71
C3OH'S								0.30
C4OH'S								0.18
C5OH'S								0.13
ALKAHENES								0.00
ESTERS								0.62
ALDEHYDES								0.00
OIL								1.32
TOTAL :	98.28	99.92	99.90	99.86	99.98	99.98	99.13	100.00
DENS _{g/cc}	0.005	0.046	0.032	0.032	0.029	0.029	0.004	0.790
AV.MOL.WT	13.20	22.52	20.64	20.63	23.14	23.17	36.53	32.44
M ₃ /hr	506.9	1845.3	2348.5	2348.6	2093.8	2091.5	5.1	
ksmol/hr	22.62	82.33	104.78	104.78	93.41	93.31	0.23	5.70
1/hr _{prod}								234.06

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 31-May-85 - 2400 31-May-85

CONVERSIONS ACROSS REACTOR :

		<u>GC#1</u>	<u>GC#2</u>
HYDROGEN CONVERSION	(Z) :	30.8	30.5
CARBON MONOXIDE CONVERSION	(Z) :	10.8	10.8
CARBON DIOXIDE CONVERSION	(Z) :	-0.3	-0.2
RATIO H2 CONSUMED/CO CONSUMED	:	1.98	1.96

*** See next page for conversions as calc. by overall bal.

SELECTIVITIES :

		<u>ACROSS REACTOR GC Average</u>	<u>OVERALL %</u>
CO (+CO2) SELECTIVITY TO METHANOL	(Z) :	100.4	97.6
CO (+CO2) SELECTIVITY TO ETHANOL	(Z) :		0.5

* Methanol in flashed gas not measured
Ethanol only measured in product flow

METHANOL PRODUCTIVITIES & YIELDS

<u>MEDH SOURCE</u>	<u>mmol/hr-kg cat</u>	<u>kg/1000 Na3 fresh feed</u>	<u>kg/1000 Na3 reactor feed</u>
As calculated ACROSS REACTOR	25.82	364.0	78.6
As Net MeOH produced, OVERALL balance	24.98	352.1	76.0

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.38
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	29.5
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	95.9
CALCULATED METHANOL PRODUCTION RATE (Kmmol/hr) :	5.76

**LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY**

0000 31-May-85 - 2400 31-May-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	PURE GASES - 11 FRESH FEED GAS	[(1+55)-15] REACTOR FEED	[25 - (50+51+62+68)] REACTOR EFFLUENT
	<Z diff.>	<Z diff.>	<Z diff.>
H2	-1.33085	0.67443	-0.06707
CO	-0.57893	-0.44366	-0.06109
CO2	-91.92720	-1.29029	1.51907
N2	-63.47230	-0.85981	-8.40566
CH4	n.a.	-0.98654	-20.89770
H2O	_____	n.a.	-132.45600
CH3OH	_____	0.73764	3.22278

OVERALL ELEMENTAL BALANCE (Ks-atoms/hr) :

STREAM # STREAM NAME	INPUTS		OUTPUTS				(IN-OUT)/IN
	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	62 FLASH GAS	68 MeOH PRODUCT	TOTAL	Z
CARBON:							
CO	53.4033	44.8302	2.8347	0.0532	_____	47.7181	10.6458
CO2	12.3581	11.4667	0.7250	0.1370	_____	12.3287	0.2380
CH3OH	0.4540	0.4574	0.0289	0.0167	5.5244	6.0275	-1227.5300
OTHERS	0.6789	0.6506	0.0411	0.0025	0.1557	0.8500	-25.2045
TOTAL C	66.8943	57.4049	3.6298	0.2095	5.6801	66.9242	-0.0447
HYDROGEN:							
H2	74.1579	48.4521	3.0637	0.0258	_____	51.5416	30.4975
H2O	0.0000	0.0000	0.0000	0.0006	0.2146	0.2152	n.a.
OTHERS	4.5658	4.4702	0.2827	0.0781	22.4984	27.3293	-498.5710
TOTAL H	78.7237	52.9223	3.3463	0.1045	22.7130	79.0861	-0.4603
OXYGEN:							
TOTAL O	78.5906	68.2400	4.3149	0.3446	5.7135	78.6130	-0.0286
NITROGEN:							
TOTAL N	1.3226	1.2574	0.0795	0.0017	_____	1.3385	-1.2006
TOTAL MASS FLOW (Ks/hr)	2161.9400	1853.9400	117.2270	8.2356	182.5340	2161.9400	0.0001

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	100.023	100.034
HYDROGEN	100.221	100.661
OXYGEN	100.053	100.119
NITROGEN	100.797	100.660

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
ENTRAINED MODE
PROCESS VARIABLES & ANALYTICAL SUMMARY

DATE : 07-Aug-85
TIME : 11:26 AM
TIME INTERVAL: FROM: 1200 03-Jun
TO: 2400 03-Jun
NUMBER OF AVERAGED HOURS : 12
RUN ID NUMBER : EU-X754
FEED GAS TYPE: CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (deg.C) : 145.9
OIL/SLURRY INLET TEMP. (deg.C) : 245.3
AVE. REACTOR TEMPERATURE (deg.C) : 250.1
REACTOR OUTLET TEMP. (deg.C) : 247.9
REACTOR GAS INLET PRESSURE (kPa) : 5466
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5272
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.5
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 5.0
SLURRY CONCENTRATION (wt%): 24.6
SPACE VELOCITY (1/ks-hr) : 10623
RECYCLE/FRESH FEED RATIO : 3.37
OIL/SLURRY CIRCULATION RATE (m3/hr) : 45.4
PROD.SEPARATOR GAS FLOWRATE <50> + <55> (ksmol/hr) : 87.15
PURGE GAS FLOW RATE <50> (ksmol/hr) : 5.30

STREAM #	1	55	10	15	25x	25x	62	68
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	V/L SEP	V/L SEP	FLASH GAS	MEDH PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
H2	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<WT>
CO	57.55	29.76	35.79	35.80	27.88	27.73	5.73	—
CO2	37.05	54.22	50.64	50.68	50.71	50.65	23.60	—
N2	3.50	14.19	11.97	11.98	13.49	13.46	60.76	—
CH4	0.12	0.72	0.59	0.58	0.68	0.67	0.37	—
H2O	0.11	0.64	0.53	0.53	0.60	0.61	0.92	—
CH3OH	0.00	0.00	0.00	0.00	0.06	0.00	0.12	1.05
DME	0.00	0.57	0.48	0.43	6.78	6.79	7.43	95.73
C2H5OH	0.00	0.02	0.01	0.02	0.01	0.01	0.21	0.00
C3OH'S	—	—	—	—	—	—	—	0.68
C4OH'S	—	—	—	—	—	—	—	0.29
C5OH'S	—	—	—	—	—	—	—	0.17
ALIPHENES	—	—	—	—	—	—	—	0.11
ESTERS	—	—	—	—	—	—	—	0.00
ALDEHYDES	—	—	—	—	—	—	—	0.60
OIL	—	—	—	—	—	—	—	0.00
TOTAL :	98.33	100.11	100.02	100.03	100.21	99.93	99.13	100.00
DENS,g/cc	0.005	0.046	0.032	0.032	0.029	0.029	0.004	0.790
AV.MOL.WT	13.35	22.50	20.58	20.58	23.13	23.16	36.53	32.44
M3/hr	543.9	1834.7	2348.0	2347.8	2089.0	2086.6	5.4	—
ksmol/hr	24.26	81.85	104.75	104.74	93.20	93.09	0.24	5.81
l/hr:prod	—	—	—	—	—	—	—	238.56

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

1200 03-Jun-85 - 2400 03-Jun-85

CONVERSIONS ACROSS REACTOR :

	GC#1	GC#2
HYDROGEN CONVERSION (Z) :	31.2	30.7
CARBON MONOXIDE CONVERSION (Z) :	11.1	11.0
CARBON DIOXIDE CONVERSION (Z) :	0.0	-0.2
RATIO H ₂ CONSUMED/CO CONSUMED :	1.98	1.98

*** See next page for conversions as calc. by overall bal.

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL %
CO (+CO ₂) SELECTIVITY TO METHANOL (Z) :	99.8	98.2
CO (+CO ₂) SELECTIVITY TO ETHANOL (Z) :		0.5

* Methanol in flashed gas not measured
Ethanol only measured in product flow

METHANOL PRODUCTIVITIES & YIELDS

METH SOURCE	mmol/hr-kg cat	kg/1000 Nm ³ fresh feed	kg/1000 Nm ³ reactor feed
As calculated ACROSS REACTOR	26.42	344.1	79.7
As Net MeOH produced, OVERALL balance	25.70	334.7	77.5

REACTOR FEED (H ₂ /(CO+1.5CO ₂)) :	0.52
REACTOR FEED (H ₂ -CO ₂)/(CO+CO ₂) :	0.38
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	29.1
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	96.5
CALCULATED METHANOL PRODUCTION RATE (Kmmol/hr) :	5.84

**LaPORTE LPHETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY**

1200 03-Jun-85 - 2400 03-Jun-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	CPURE GASES - 13 FRESH FEED GAS	[(1455)-15] REACTOR FEED	[25 - (50+51+62+68)] REACTOR EFFLUENT
	<Z diff.>	<Z diff.>	<Z diff.>
H2	-2.07258	2.14907	0.13894
CO	-0.72892	0.52124	0.02337
CO2	-92.92860	-0.72286	1.68988
N2	-56.56950	1.49635	-8.51032
CH4	n.a.	-0.92724	-26.49040
H2O	—	n.a.	-111.42600
CH3OH	—	2.56429	2.73239

OVERALL ELEMENTAL BALANCE (Ks-atoms/hr) :

STREAM # STREAM NAME	INPUTS		OUTPUTS				(IN-OUT)/IN
	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	62 FLASH GAS	68 MeOH PRODUCT	TOTAL	Z
CARBON:							
CO	53.0872	44.3756	2.8735	0.0567	—	47.3059	10.8903
CO2	12.5498	11.6106	0.7518	0.1461	—	12.5085	0.3290
CH3OH	0.4524	0.4643	0.0301	0.0179	5.6326	6.1449	-1258.2900
OTHERS	0.5776	0.5437	0.0352	0.0027	0.1511	0.7327	-26.8495
TOTAL C	66.6671	56.9942	3.6906	0.2234	5.7838	66.6919	-0.0373
HYDROGEN:							
H2	74.9999	48.7178	3.1547	0.0275	—	51.9000	30.7999
H2O	0.0000	0.0000	0.0000	0.0006	0.2198	0.2204	n.a.
OTHERS	4.1610	4.0668	0.2633	0.0833	22.9200	27.3334	-556.8920
TOTAL H	79.1609	52.7846	3.4180	0.1114	23.1398	79.4538	-0.3700
OXYGEN:							
TOTAL O	78.6596	68.0785	4.4083	0.3675	5.8223	78.6767	-0.0217
NITROGEN:							
TOTAL N	1.2174	1.1777	0.0763	0.0018	—	1.2557	-3.1456
TOTAL MASS FLOW (ks/hr)	2155.6600	1841.6700	119.2550	8.7824	185.9500	2155.6600	0.0001

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.884	100.065
HYDROGEN	99.909	100.592
OXYGEN	99.890	100.170
NITROGEN	100.422	103.512

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
ENTRAINED NODE
PROCESS VARIABLES & ANALYTICAL SUMMARY

DATE : 22-Jun-85
TIME : 05:19 PM
TIME INTERVAL: FROM: 0200 04-Jun
TO: 2400 04-Jun
22
NUMBER OF AVERAGED HOURS :
RUN ID NUMBER : EU-X754
FEED GAS TYPE: CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (deg.C) : 145.7
OIL/SLURRY INLET TEMP. (deg.C) : 245.1
AVE. REACTOR TEMPERATURE (deg.C) : 250.0
REACTOR OUTLET TEMP. (deg.C) : 247.7
REACTOR GAS INLET PRESSURE (kPa) : 5466
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5271
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.5
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 5.0
SLURRY CONCENTRATION (wt%): 24.7
SPACE VELOCITY (L/kg-hr) : 10698
RECYCLE/FRESH FEED RATIO : 3.40
OIL/SLURRY CIRCULATION RATE (m3/hr) : 45.7
PROD.SEPARATOR GAS FLOWRATE <S0> + <SS> (kmol/hr) : 87.59
PURGE GAS FLOW RATE <S0> (kmol/hr) : 5.29

STREAM #	1	SS	10	15	25*	25*	62	68
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	V/L SEP	V/L SEP	FLASH GAS	MEDH PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<WTZ>
H2	57.36	29.97	35.82	35.82	28.05	27.91	5.73	—
CO	37.07	54.02	50.47	50.55	50.58	50.54	23.60	—
CO2	3.52	14.05	11.88	11.89	13.37	13.37	60.76	—
N2	0.14	0.79	0.65	0.65	0.74	0.73	0.37	—
CH4	0.11	0.67	0.55	0.55	0.63	0.63	0.92	—
H2O	0.00	0.00	0.00	0.00	0.05	0.00	0.12	1.07
CH3OH	0.00	0.56	0.48	0.43	6.69	6.71	7.43	95.76
DME	0.00	0.02	0.02	0.02	0.01	0.01	0.21	0.00
C2H5OH	—	—	—	—	—	—	—	0.67
CDON'S	—	—	—	—	—	—	—	0.28
CAON'S	—	—	—	—	—	—	—	0.17
CSOH'S	—	—	—	—	—	—	—	0.11
ALKAHENES	—	—	—	—	—	—	—	0.00
ESTERS	—	—	—	—	—	—	—	0.60
ALDEHYDES	—	—	—	—	—	—	—	0.00
OIL	—	—	—	—	—	—	—	1.33
TOTAL :	98.21	100.06	99.88	99.90	100.11	99.90	99.13	100.00
DENS:g/cc	0.005	0.046	0.032	0.032	0.029	0.029	0.004	0.790
AV.MOL.WT	13.39	22.42	20.55	20.55	23.05	23.09	36.53	32.42
m3/hr	542.8	1844.8	2353.8	2353.6	2098.1	2094.8	5.3	—
kmol/hr	24.22	82.30	105.01	105.00	93.60	93.46	0.24	5.80
L/hr:prod	—	—	—	—	—	—	—	238.00

* Compositions correspond to STREAM#32

LaFORTE LPMEETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0200 04-Jun-85 - 2400 04-Jun-85

CONVERSIONS ACROSS REACTOR :

	GC#1	GC#2
HYDROGEN CONVERSION (Z) :	30.7	30.2
CARBON MONOXIDE CONVERSION (Z) :	10.9	10.8
CARBON DIOXIDE CONVERSION (Z) :	-0.2	-0.2
RATIO H2 CONSUMED/CO CONSUMED :	2.00	1.98

*** See next page for conversions as calc. by overall bal.

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL %
CO (+CO2) SELECTIVITY TO METHANOL (Z) :	101.0	99.5
CO (+CO2) SELECTIVITY TO ETHANOL (Z) :		0.5

* Methanol in flashed gas not measured
Ethanol only measured in product flow

METHANOL PRODUCTIVITIES & YIELDS

METH SOURCE	mmol/hr-kg cat	kg/1000 Nm3 fresh feed	kg/1000 Nm3 reactor feed
As calculated ACROSS REACTOR	26.29	341.5	78.8
As Net MeOH produced, OVERALL balance	25.76	334.6	77.2

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.38
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	29.9
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	97.2
CALCULATED METHANOL PRODUCTION RATE (Kmmol/hr) :	5.78