

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

DATE : 07-Aug-85
TIME : 10:57 AM
TIME INTERVAL : FROM: 0100 06-May TO: 0700 06-May
NUMBER OF AVERAGED HOURS : 6
RUN ID NUMBER : EU-X754
FEED GAS TYPE: CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (deg.C) : 146.7
OIL/SLURRY INLET TEMP. (deg.C) : 244.5
AVE. REACTOR TEMPERATURE (deg.C) : 249.6
REACTOR OUTLET TEMP. (deg.C) : 247.7
REACTOR GAS INLET PRESSURE (kPa) : 5468
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5242
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.8
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 4.9
SLURRY CONCENTRATION (wt%): 27.7
SPACE VELOCITY (1/hr) : 10027
RECYCLE/FRESH FEED RATIO : 3.27
OIL/SLURRY CIRCULATION RATE (m3/hr) : 44.7
PROD. SEPARATOR GAS FLOWRATE <S0> + <SS> (kmol/hr) : 87.80
PURGE GAS FLOW RATE <S0> (kmol/hr) : 4.11

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	MEDM PRODUCT
ON-LINE SC#	1	2	1	2	2	1		
COMPOSITION								
	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<WT>
H2	59.45	26.97	33.96	33.81	25.09	25.00	5.73	—
CO	36.72	52.68	49.26	49.28	48.96	48.99	23.60	—
CO2	1.92	11.97	9.87	9.85	11.33	11.35	66.75	—
N2	0.82	6.13	5.03	4.95	5.71	5.71	0.37	—
CH4	0.06	0.84	0.70	0.69	0.76	0.81	0.92	—
H2O	0.00	0.00	0.00	0.00	0.00	0.00	9.12	0.75
CH3OH	0.00	0.48	0.40	0.38	7.28	6.79	7.43	95.18
BME	0.00	0.03	0.02	0.02	0.02	0.02	0.21	0.99
C2H5OH	—	—	—	—	—	—	—	1.09
C3OH'S	—	—	—	—	—	—	—	0.32
C4OH'S	—	—	—	—	—	—	—	0.31
C5OH'S	—	—	—	—	—	—	—	0.15
ALKANES	—	—	—	—	—	—	—	0.00
ESTERS	—	—	—	—	—	—	—	1.90
ALDEHYDES	—	—	—	—	—	—	—	0.00
BTL	—	—	—	—	—	—	—	1.30
TOTAL :	98.97	99.10	99.24	98.99	99.16	98.69	99.13	100.00
DENS/g/cc	0.005	0.049	0.632	0.032	0.029	0.029	0.004	0.790
AV. MOL.WT	12.70	22.79	20.64	20.66	23.47	23.45	36.53	32.63
M3/hr	574.1	1876.1	2419.2	2406.4	2118.4	2120.1	4.7	—
kmol/hr	25.61	83.70	107.93	107.36	94.51	94.59	0.21	6.49
1/hrprod	—	—	—	—	—	—	—	267.91

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0100 06-May-85 - 0700 05-May-85

CONVERSIONS ACROSS REACTOR :

		<u>GC#1</u>	<u>GC#2</u>
HYDROGEN CONVERSION	(Z) :	35.5	34.7
CARBON MONOXIDE CONVERSION	(Z) :	12.8	12.5
CARBON DIOXIDE CONVERSION	(Z) :	-0.8	-1.3
RATIO H2 CONSUMED/CO CONSUMED	:	1.91	1.99

*** 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) :	94.2	94.2
CO (+CO2) SELECTIVITY TO ETHANOL	(Z) :		0.7

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

METHANOL PRODUCTIVITIES & YIELDS

<u>MEDH SOURCE</u>	<u>smol/hr-kg cat</u>	<u>kg/1000 kg3 fresh feed</u>	<u>kg/1000 kg3 reactor feed</u>
As calculated ACROSS REACTOR	25.97	347.3	83.0
As Net MeOH produced, OVERALL balance	26.35	353.0	84.2

REACTOR FEED (H2/(CO+1.SCO2)) :	0.53
REACTOR FEED (H2-CO2)/(CO+CO2) :	0.41
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	22.0
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	100.9
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	6.23

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0100 06-May-85 - 0700 06-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	-5.13765	3.96708	0.08932
CO	-1.58218	1.10355	0.04090
CO2	-168.33000	-0.54791	1.80179
H2	n.a.	0.44805	-0.62211
CH4	n.a.	-2.98643	-20.14030
H2O	—	n.a.	n.a.
CH3OH	—	-2.09274	2.29430

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	52.9076	44.0915	2.1629	0.0498	—	46.3042	12.4810
CO2	10.5710	10.0213	0.4916	0.1281	—	10.6410	-0.6627
CH3OH	0.4069	0.3986	0.0196	0.0157	6.2890	6.7228	-1552.6809
OTHERS	0.7674	0.7286	0.0357	0.0024	0.2530	1.0197	-32.2767
TOTAL C	64.6529	55.2400	2.7098	0.1960	6.5420	54.6877	-0.0538
HYDROGEN:							
H2	72.6022	45.1489	2.2148	0.0242	—	47.3879	34.7295
H2O	0.0000	0.0000	0.0000	0.0005	0.1761	0.1767	n.a.
OTHERS	4.7454	4.5553	0.2235	0.0731	25.8008	30.6526	-545.9460
TOTAL H	77.3476	49.7042	2.4382	0.0978	25.9770	78.2172	-1.1242
OXYGEN:							
TOTAL O	74.4804	64.5560	3.1668	0.3224	6.5131	74.5583	-0.1046
NITROGEN:							
TOTAL N	10.6288	10.2590	0.5033	0.0016	—	10.7638	-1.2707
TOTAL MASS FLOW (Ksl/hr)	2217.8400	1907.6000	93.5765	7.7053	208.9710	2217.8500	-0.0004

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	98.863	99.903
HYDROGEN	97.420	100.754
OXYGEN	99.113	100.140
NITROGEN	99.515	101.561

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

DATE : 07-AUG-85
 TIME : 11:06 AM
 TIME INTERVAL: FROM: 2100 06-May TO: 0900 07-May
 NUMBER OF AVERAGED HOURS : 12
 RUN ID NUMBER : EU-X754
 FEED GAS TYPE: CO-RICH GAS
 REACTOR FEED GAS INLET TEMP. (deg.C) : 146.5
 OIL/SLURRY INLET TEMP. (deg.C) : 244.6
 AVE. REACTOR TEMPERATURE (deg.C) : 249.8
 REACTOR OUTLET TEMP. (deg.C) : 247.8
 REACTOR GAS INLET PRESSURE (kPa) : 5491
 PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5273
 GAS SUPERFICIAL VELOCITY (cm/sec) : 9.6
 LIQUID SUPERFICIAL VELOCITY (cm/sec) : 4.9
 SLURRY CONCENTRATION (wt%): 26.7
 SPACE VELOCITY (1/ks-hr) : 10144
 RECYCLE/FRESH FEED RATIO : 3.23
 OIL/SLURRY CIRCULATION RATE (m3/hr) : 44.8
 PROD. SEPARATOR GAS FLOWRATE <SO> + <SS> (ksmol/hr) : 95.35
 PURGE GAS FLOW RATE <SO> (ksmol/hr) : 4.19

STREAM #	1	55	10	15	25*	25*	52	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>	<MT>
H2	61.10	28.04	35.40	35.12	25.77	25.86	5.73	—
CO	35.64	54.27	50.27	50.26	50.11	50.19	23.60	—
CO2	2.11	14.64	11.94	11.92	13.84	13.78	60.72	—
N2	0.11	1.33	1.07	1.06	1.24	1.23	0.37	—
CH4	0.07	1.00	0.80	0.79	0.93	0.92	0.92	—
H2O	0.00	0.00	0.00	0.00	0.01	0.03	0.12	0.69
CH3OH	0.00	0.48	0.43	0.39	7.79	7.60	7.43	95.33
INE	0.00	0.03	0.02	0.03	0.02	0.02	0.21	0.00
C2H5OH	—	—	—	—	—	—	—	0.95
C3OH'S	—	—	—	—	—	—	—	0.30
C4OH'S	—	—	—	—	—	—	—	0.31
C5OH'S	—	—	—	—	—	—	—	0.10
ALKANES	—	—	—	—	—	—	—	0.00
ESTERS	—	—	—	—	—	—	—	1.02
ALDEHYDES	—	—	—	—	—	—	—	0.00
OIL	—	—	—	—	—	—	—	1.30
TOTAL :	99.04	99.80	99.92	99.56	99.72	99.64	99.13	100.00
DENS, g/cc	0.005	0.049	0.032	0.033	0.030	0.030	0.004	0.790
AV. MOL. WT	12.31	22.96	20.64	20.68	23.72	23.67	36.53	32.63
M3/hr	562.9	1819.2	2378.1	2373.7	2070.0	2073.7	6.1	—
ksmol/hr	25.11	81.16	106.10	105.90	92.35	92.51	0.27	6.85
l/hr prod	—	—	—	—	—	—	—	282.82

* Compositions correspond to STREAM#32

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

2100 06-Mar-85 - 0900 07-Mar-85

CONVERSIONS ACROSS REACTOR :

		GC#1	GC#2
HYDROGEN CONVERSION	(Z) :	36.3	36.0
CARBON MONOXIDE CONVERSION	(Z) :	12.9	13.1
CARBON DIOXIDE CONVERSION	(Z) :	-0.6	-1.2
RATIO H2 CONSUMED/CO CONSUMED	:	1.98	1.73

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

SELECTIVITIES :

		ACROSS REACTOR GC Average	OVERALL Z
CO (+CO2) SELECTIVITY TO METHANOL	(Z) :	98.2	97.0
CO (+CO2) SELECTIVITY TO ETHANOL	(Z) :		0.7

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

METHANOL PRODUCTIVITIES & YIELDS

METH SOURCE	smol/hr-kg cat	kg/1000 Na3 fresh feed	kg/1000 Na3 reactor feed
As calculated ACROSS REACTOR	28.57	380.5	90.2
As Net MeOH produced, OVERALL balance	28.59	380.9	90.3

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.37
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	22.1
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	99.5
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	6.68

LaPORTE LFMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

2100 06-May-85 - 0900 07-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	-6.29941	2.39109	-0.62140
CO	-2.07202	-0.41886	-0.11261
CO2	-163.17800	-1.67813	2.17893
N2	-284.89700	-1.19194	-4.72506
CH4	n.a.	-1.16324	-18.61070
H2O	—	n.a.	-538.01200
CH3OH	—	-5.95492	1.66320

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	53.2198	44.0473	2.2754	0.0646	—	46.3872	12.8384
CO2	12.6194	11.8818	0.6138	0.1662	—	12.6617	-0.3351
CH3OH	0.4121	0.3886	0.0201	0.0203	6.6497	7.0787	-1617.5400
OTHERS	0.8696	0.8368	0.0432	0.0031	0.2560	1.1391	-30.7929
TOTAL C	67.1210	57.1545	2.9525	0.2541	6.9057	67.2667	-0.2172
HYDROGEN:							
H2	74.3810	45.5155	2.3512	0.0313	—	47.8981	35.6043
H2O	0.0000	0.0000	0.0000	0.0007	0.1712	0.1718	n.a.
OTHERS	5.1854	4.9508	0.2557	0.0948	27.2493	32.5505	-527.7380
TOTAL H	79.5663	50.4663	2.6070	0.1268	27.4204	80.6205	-1.3249
OXYGEN:							
TOTAL O	78.9000	68.2239	3.5243	0.4181	6.8764	79.0428	-0.1810
NITROGEN:							
TOTAL N	2.2491	2.1663	0.1119	0.0020	—	2.2802	-1.3828
TOTAL MASS FLOW (kg/hr)	2190.1800	1863.3200	96.2553	9.9920	220.6060	2190.1800	0.0000

REACTOR GAS BALANCE (CUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.640	99.978
HYDROGEN	98.914	100.483
OXYGEN	99.826	100.191
NITROGEN	100.675	102.205

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

DATE : 07-Aug-85
TIME : 11:14 AM
TIME INTERVAL: FROM: 0000 08-May TO: 1100 08-May
11
NUMBER OF AVERAGED HOURS :
RUN ID NUMBER : EU-X734
FEED GAS TYPE: CO-RIC GAS
REACTOR FEED GAS INLET TEMP. (deg.C) : 134.9
OIL/SLURRY INLET TEMP. (deg.C) : 221.4
AVE. REACTOR TEMPERATURE (deg.C) : 225.0
REACTOR OUTLET TEMP. (deg.C) : 223.2
REACTOR GAS INLET PRESSURE (kPa) : 5488
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5274
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.1
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 5.0
SLURRY CONCENTRATION (wt%): 24.8
SPACE VELOCITY (1/kg-hr) : 11343
RECYCLE/FRESH FEED RATIO : 4.63
OIL/SLURRY CIRCULATION RATE (m3/hr) : 45.3
PROD.SEPARATOR GAS FLOWRATE <S0> + <S5> (ksmol/hr) : 90.89
PURGE GAS FLOW RATE <S0> (ksmol/hr) : 3.83

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	MEOH PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
H2	61.79	30.42	35.54	35.50	28.86	28.81	5.73	
CO	34.08	52.53	49.62	49.64	49.62	49.57	23.60	
CO2	2.77	13.88	12.19	12.18	13.31	13.31	60.76	
N2	0.11	1.54	1.33	1.33	1.46	1.47	0.37	
CH4	0.09	1.03	0.89	0.88	0.97	0.98	0.92	
H2O	0.00	0.00	0.00	0.00	0.02	0.03	0.12	0.85
CH3OH	0.00	0.53	0.50	0.44	5.71	5.67	7.43	96.80
IME	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00
C2H5OH								0.26
C3OH'S								0.08
C4OH'S								0.07
C5OH'S								0.04
ALKANES								0.00
ESTERS								0.61
ALDEHYDES								0.00
OIL								1.30
TOTAL :	98.84	99.94	100.06	99.98	99.96	99.85	99.13	100.00
DENS, g/cc	0.005	0.047	0.033	0.033	0.030	0.030	0.004	0.790
AV. MOL. WT	12.20	22.22	20.64	20.64	22.75	22.75	36.53	32.36
M3/hr	421.4	1951.4	2369.4	2370.7	2151.2	2150.9	4.1	
ksmol/hr	18.80	87.06	105.71	105.77	95.97	95.95	0.18	4.91
l/hrxprod								201.19

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 08-May-85 - 1100 08-May-85

CONVERSIONS ACROSS REACTOR :

		<u>GC#1</u>	<u>GC#2</u>
HYDROGEN CONVERSION	(Z) :	26.4	26.2
CARBON MONOXIDE CONVERSION	(Z) :	9.3	9.3
CARBON DIOXIDE CONVERSION	(Z) :	0.9	0.8
RATIO H ₂ CONSUMED/CO CONSUMED	:	2.03	2.02

*** 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) :	99.4	99.7
CO (+CO ₂) SELECTIVITY TO ETHANOL (Z) :		0.2

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

METHANOL PRODUCTIVITIES & YIELDS

<u>MEOH SOURCE</u>	<u>gmol/hr-kg cat</u>	<u>kg/1000 Nm³ fresh feed</u>	<u>kg/1000 Nm³ reactor feed</u>
As calculated ACROSS REACTOR	23.75	377.4	67.1
As Net MeOH produced, OVERALL balance	23.14	367.8	65.4

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) :	59.9
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	96.8
CALCULATED METHANOL PRODUCTION RATE (Kgmol/hr) :	4.96

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 08-May-85 - 1100 08-May-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	CPURE GASES - 11 FRESH FEED GAS	[(1+55)-15] REACTOR FEED	[25 - (50+51+62+68)] REACTOR EFFLUENT
	<Z diff.>	<Z diff.>	<Z diff.>
H2	-2.37949	1.44747	0.13912
CO	-4.44949	-0.70385	-0.25552
CO2	-157.11900	-2.15825	1.23803
N2	-144.67500	-2.67811	-3.42572
CH4	n.a.	-2.25741	-12.31450
H2O	_____	n.a.	-297.45600
CH3OH	_____	-2.15733	3.29834

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	
							2
CARBON:							
CO	52.5041	45.7305	2.0127	0.0437	_____	47.7868	8.9846
CO2	12.8794	12.0861	0.5319	0.1124	_____	12.7305	1.1564
CH3OH	0.4700	0.4601	0.0202	0.0137	4.8030	5.2971	-1026.9800
OTHERS	0.9342	0.8973	0.0395	0.0021	0.0666	1.0055	-7.6348
TOTAL C	66.7877	59.1740	2.6043	0.1720	4.8696	66.8200	-0.0483
HYDROGEN:							
H2	75.1014	52.9729	2.3314	0.0212	_____	55.3255	26.3322
H2O	0.0000	0.0000	0.0000	0.0005	0.1500	0.1505	n.a.
OTHERS	5.6169	5.4298	0.2390	0.0641	19.3720	25.1049	-346.9510
TOTAL H	80.7183	58.4027	2.5704	0.0858	19.5220	80.5809	0.1703
OXYGEN:							
TOTAL O	78.7329	70.3628	3.0968	0.2829	4.9227	78.6653	0.0860
NITROGEN:							
TOTAL N	2.8051	2.6890	0.1183	0.0014	_____	2.8087	-0.1290
TOTAL MASS FLOW (ks/hr)	2183.0700	1934.2600	85.1295	6.7608	156.9310	2183.0800	-0.0004

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.888	100.036
HYDROGEN	99.888	100.459
OXYGEN	99.797	99.926
NITROGEN	100.103	99.777

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

DATE : 22-Jun-85
TIME : 01:26 PM
TIME INTERVAL: FROM: 0000 09-May
TO: 2400 09-May
NUMBER OF AVERAGED HOURS : 24
RUN ID NUMBER : EU-X754
FEED GAS TYPE: CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (deg.C) : 146.5
OIL/SLURRY INLET TEMP. (deg.C) : 245.1
AVE. REACTOR TEMPERATURE (deg.C) : 250.2
REACTOR OUTLET TEMP. (deg.C) : 248.3
REACTOR GAS INLET PRESSURE (kPa) : 5499
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5278
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.6
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 5.0
SLURRY CONCENTRATION (wt%): 25.9
SPACE VELOCITY (1/kg-hr) : 10542
RECYCLE/FRESH FEED RATIO : 3.20
OIL/SLURRY CIRCULATION RATE (m3/hr) : 45.5
PROD.SEPARATOR GAS FLOWRATE <SO> + <SS> (kmol/hr) : 86.43
PURGE GAS FLOW RATE <SO> (kmol/hr) : 4.89

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								
H2	60.27	28.92	35.69	35.54	26.76	26.49	5.73	—
CO	36.29	54.92	50.73	50.89	50.81	50.75	23.60	—
CO2	2.24	13.92	11.37	11.37	13.19	13.11	60.76	—
N2	0.11	1.08	0.86	0.87	1.00	1.00	0.37	—
CH4	0.10	1.05	0.84	0.84	0.97	0.96	0.92	—
H2O	0.00	0.00	0.00	0.00	0.00	0.03	0.12	0.78
CH3OH	0.00	0.51	0.45	0.40	7.54	7.60	7.43	95.22
DME	0.00	0.03	0.02	0.02	0.01	0.02	0.21	0.00
C2H5OH	—	—	—	—	—	—	—	0.92
C3OH'S	—	—	—	—	—	—	—	0.30
C4OH'S	—	—	—	—	—	—	—	0.26
C5OH'S	—	—	—	—	—	—	—	0.21
ALKANES	—	—	—	—	—	—	—	0.00
ESTERS	—	—	—	—	—	—	—	1.00
ALDEHYDES	—	—	—	—	—	—	—	0.00
OIL	—	—	—	—	—	—	—	1.30
TOTAL :	99.02	100.42	99.96	99.93	100.28	99.95	99.13	100.00
DENS,g/cc	0.005	0.048	0.032	0.032	0.029	0.029	0.004	0.790
AV.MOL.WT	12.54	22.64	20.47	20.51	23.37	23.41	36.53	32.62
m3/hr	571.0	1827.8	2387.1	2382.4	2050.6	2086.5	5.5	—
kmol/hr	25.47	81.54	106.50	106.29	93.27	93.09	0.25	4.63
l/hr=prod	—	—	—	—	—	—	—	273.81

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 09-May-85 - 2400 09-May-85

CONVERSIONS ACROSS REACTOR :

		GC#1	GC#2
HYDROGEN CONVERSION	(Z) :	35.1	33.9
CARBON MONOXIDE CONVERSION	(Z) :	12.6	12.4
CARBON DIOXIDE CONVERSION	(Z) :	-0.8	-1.8
RATIO H2 CONSUMED/CO CONSUMED	:	1.97	1.91

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

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL %
CO (+CO2) SELECTIVITY TO METHANOL (Z) :	100.3	100.3
CO (+CO2) SELECTIVITY TO ETHANOL (Z) :		9.7

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

METHANOL PRODUCTIVITIES & YIELDS

MEOH SOURCE	smol/hr-ks cat	ks/1000 Na3 fresh feed	ks/1000 Na3 reactor feed
As calculated ACROSS REACTOR	29.22	370.6	88.8
As Net MeOH produced, OVERALL balance	28.64	365.3	87.1

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.39
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	24.4
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	97.4
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	6.60

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 09-May-85 - 2400 09-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+52+68)] REACTOR EFFLUENT
	<Z diff.>	<Z diff.>	<Z diff.>
H2	-7.48708	2.98002	-0.22614
CO	-4.28574	-0.11491	-0.17201
CO2	-145.00200	-1.42564	2.19499
N2	-110.28700	-1.87669	-5.98326
CH4	n.a.	-1.19729	-16.64870
H2O	—	100.00000	n.a.
CH3OH	—	-1.41468	2.00798

OVERALL ELEMENTAL BALANCE (Ks-atoms/hr) :

	INPUTS		OUTPUTS				(IN-OUT)/IN
STREAM # STREAM NAME	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	62 FLASH GAS	68 MeOH PRODUCT	TOTAL	Z
CARBON:							
CO	54.0917	44.7847	2.6858	0.0590	————	47.5285	12.1334
CO2	12.0875	11.3470	0.6805	0.1494	————	12.1769	-0.7394
CH3OH	0.4231	0.4162	0.0250	0.0183	6.4301	6.8895	-1528.5000
OTHERS	0.9151	0.8772	0.0526	0.0028	0.2522	1.1848	-29.4698
TOTAL C	67.5173	57.4251	3.4439	0.2284	6.6823	67.7796	-0.3885
HYDROGEN:							
H2	75.5524	47.1691	2.8288	0.0282	————	50.0260	33.7863
H2O	0.0000	0.0000	0.0000	0.0006	0.1875	0.1881	n.a.
OTHERS	5.3976	5.2161	0.3128	0.0852	26.3589	31.9730	-492.3590
TOTAL H	80.9500	52.3852	3.1416	0.1139	26.5463	82.1871	-1.5282
OXYGEN:							
TOTAL O	78.7122	67.9162	4.0730	0.3758	6.6596	79.0247	-0.3969
NITROGEN:							
TOTAL N	1.8477	1.7556	0.1053	0.0018	————	1.8626	-0.0084
TOTAL MASS FLOW (ks/hr)	2179.5100	1846.2300	110.7210	8.9812	213.5730	2179.5000	0.0004

REACTOR GAS BALANCE (OUT/IN) :

	GC81	GC82
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.868	100.166
HYDROGEN	99.645	100.978
OXYGEN	100.047	100.411
NITROGEN	100.799	100.951

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

DATE :	22-Jun-85
TIME :	01:36 PM
TIME INTERVAL:	FROM: 0000 10-May
	TO: 2400 10-May
NUMBER OF AVERAGED HOURS :	24
RUN ID NUMBER :	EU-X754
FEED GAS TYPE:	CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (deg.C) :	146.4
OIL/SLURRY INLET TEMP. (deg.C) :	245.0
Ave. REACTOR TEMPERATURE (deg.C) :	250.1
REACTOR OUTLET TEMP. (deg.C) :	248.0
REACTOR GAS INLET PRESSURE (kPa) :	5501
PRIMARY SEPARATOR GAS PRESSURE (kPa) :	5278
GAS SUPERFICIAL VELOCITY (cm/sec) :	9.6
LIQUID SUPERFICIAL VELOCITY (cm/sec) :	5.0
SLURRY CONCENTRATION (wt%) :	25.5
SPACE VELOCITY (1/kg-hr) :	10675
RECYCLE/FRESH FEED RATIO :	3.31
OIL/SLURRY CIRCULATION RATE (m3/hr) :	45.5
PROD. SEPARATOR GAS FLOWRATE <S0> + <SS> (kmol/hr) :	87.37
PURGE GAS FLOW RATE <S0> (kmol/hr) :	4.58

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	NEED: PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
H2	60.04	28.69	35.46	35.31	26.70	26.41	5.75	
CO	36.21	54.32	50.54	50.62	50.52	50.49	23.60	
CO2	2.46	14.38	11.87	11.86	13.64	13.60	60.76	
N2	0.12	1.07	0.87	0.87	1.00	1.00	0.37	
CH4	0.09	0.91	0.74	0.73	0.85	0.84	0.92	
H2O	0.00	0.00	0.00	0.00	0.01	0.04	0.12	0.81
CH3OH	0.00	0.57	0.47	0.45	7.73	7.36	7.43	95.21
BME	0.00	0.03	0.02	0.02	6.62	0.02	0.21	0.00
C2H5OH								0.90
C3OH'S								0.30
C4OH'S								0.31
C5OH'S								0.21
ALKAHENES								0.00
ESTERS								0.96
ALDEHYDES								0.00
OIL								1.30
TOTAL :	98.92	99.96	99.97	99.85	100.47	99.75	99.13	100.00
DENS: g/cc	0.005	0.048	0.032	0.033	0.029	0.029	0.004	0.790
AV. MOL. WT	12.62	22.77	20.62	20.65	23.48	23.51	36.53	32.61
M3/hr	560.3	1855.6	2393.3	2391.3	2103.0	2101.0	5.7	
kmol/hr	25.00	82.79	106.77	106.69	93.82	93.73	0.25	6.36
1/hr:prod								262.45

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 10-May-85 - 2400 10-May-85

CONVERSIONS ACROSS REACTOR :

		GC#1	GC#2
HYDROGEN CONVERSION	(%) :	34.6	33.5
CARBON MONOXIDE CONVERSION	(%) :	12.3	12.2
CARBON DIOXIDE CONVERSION	(%) :	-0.6	-1.1
RATIO H2 CONSUMED/CO CONSUMED	:	1.97	1.91

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

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL %
CO (+CO2) SELECTIVITY TO METHANOL (%) :	101.1	96.7
CO (+CO2) SELECTIVITY TO ETHANOL (%) :		0.6

* 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	29.40	376.6	88.2
As Net MeOH produced, OVERALL balance	27.71	355.0	83.2

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.38
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	23.6
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	93.6
CALCULATED METHANOL PRODUCTION RATE (Kmmol/hr) :	6.59

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 10-May-85 - 2400 10-May-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	[PURE GASES - 1] FRESH FEED GAS	[(1455)-15] REACTOR FEED	[25 - (50+51+62+68)] REACTOR EFFLUENT
	<Z diff.>	<Z diff.>	<Z diff.>
H2	-8.00383	2.82145	-0.11874
CO	-4.33071	0.04415	-0.12794
CO2	-131.20000	-1.08481	1.77431
N2	-135.88500	-1.59705	-5.49968
CH4	n.a.	-0.52892	-18.69260
H2O	---	n.a.	-597.09400
CH3OH	---	-1.29405	7.94364

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	54.0001	44.9716	2.4891	0.0597	---	47.5205	11.9992
CO2	12.6549	11.9048	0.6589	0.1538	---	12.7175	-0.4949
CH3OH	0.4750	0.4689	0.0260	0.0188	6.1629	6.6766	-1305.6700
OTHERS	0.7953	0.7733	0.0428	0.0029	0.2412	1.0602	-33.3071
TOTAL C	67.9252	58.1187	3.2168	0.2352	6.4041	67.9747	-0.9729
HYDROGEN:							
H2	75.3300	47.5001	2.6291	0.0290	---	50.1582	33.4154
H2O	0.0000	0.0000	0.0000	0.0006	0.1874	0.1980	n.a.
OTHERS	5.1143	5.0109	0.2773	0.0877	25.2631	30.6391	-499.0910
TOTAL H	80.4443	52.5110	2.9064	0.1173	25.4505	80.9853	-0.6725
OXYGEN:							
TOTAL O	79.8015	69.2712	3.8341	0.3869	6.3839	79.8761	-0.0935
NITROGEN:							
TOTAL N	1.8610	1.7717	0.0981	0.0019	---	1.8716	-0.5692
TOTAL MASS FLOW (kg/hr)	2203.3800	1885.0800	104.3360	9.2464	204.7150	2203.3800	-0.0003

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.737	100.488
HYDROGEN	99.276	102.449
OXYGEN	99.917	100.584
NITROGEN	100.841	101.317

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

DATE : 22-Jun-85
TIME : 01:45 PM
TIME INTERVAL: FROM: 0000 11-May
TO: 2400 11-May
24
NUMBER OF AVERAGED HOURS :
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) : 244.9
AVE. REACTOR TEMPERATURE (des.C) : 249.9
REACTOR OUTLET TEMP. (des.C) : 247.8
REACTOR GAS INLET PRESSURE (kPa) : 5499
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5279
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.6
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 5.0
SLURRY CONCENTRATION (wt%) : 24.1
SPACE VELOCITY (1/ks-hr) : 11389
RECYCLE/FRESH FEED RATIO : 3.33
OIL/SLURRY CIRCULATION RATE (m3/hr) : 45.4
PROB. SEPARATOR GAS FLOWRATE <S0> + <S5> (ksmol/hr) : 87.32
PURGE GAS FLOW RATE <S0> (ksmol/hr) : 4.69

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	MEGH PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<WTZ>
H2	59.77	29.23	35.64	35.41	27.03	26.80	5.73	—
CO	36.47	54.45	50.66	50.72	50.70	50.63	23.60	—
CO2	2.47	13.80	11.43	11.43	13.08	13.07	60.76	—
N2	0.14	1.19	0.96	0.96	1.10	1.10	0.37	—
CH4	0.10	0.91	0.74	0.74	0.85	0.85	0.92	—
H2O	0.00	0.00	0.00	0.00	0.01	0.03	0.12	0.85
CH3OH	0.00	0.56	0.48	0.44	7.46	7.24	7.43	95.15
DNE	0.00	0.03	0.03	0.02	0.01	0.02	0.21	0.00
C2H5OH	—	—	—	—	—	—	—	0.87
C3OH'S	—	—	—	—	—	—	—	0.28
C4OH'S	—	—	—	—	—	—	—	0.30
C5OH'S	—	—	—	—	—	—	—	0.19
ALKAHENES	—	—	—	—	—	—	—	0.00
ESTERS	—	—	—	—	—	—	—	0.94
ALDEHYDES	—	—	—	—	—	—	—	0.00
OIL	—	—	—	—	—	—	—	1.41
TOTAL :	98.95	100.15	99.94	99.72	100.25	99.75	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	12.70	22.55	20.51	20.54	23.29	23.31	36.53	32.62
M3/hr	556.4	1852.1	2384.7	2380.3	2099.8	2097.5	5.2	—
ksmol/hr	24.83	82.63	106.39	106.19	93.68	93.58	0.23	6.35
l/hr:prod	—	—	—	—	—	—	—	262.14

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 11-May-85 - 2400 11-May-85

CONVERSIONS ACROSS REACTOR :

		<u>5C#1</u>	<u>6C#2</u>
HYDROGEN CONVERSION	(%) :	33.9	32.7
CARBON MONOXIDE CONVERSION	(%) :	12.1	11.8
CARBON DIOXIDE CONVERSION	(%) :	-0.6	-1.0
RATIO H2 CONSUMED/CO CONSUMED	:	1.97	1.93

*** 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 (+CO2) SELECTIVITY TO METHANOL	(%) :	100.8	99.4
CO (+CO2) SELECTIVITY TO ETHANOL	(%) :		0.6

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

METHANOL PRODUCTIVITIES & YIELDS

<u>MEDH SOURCE</u>	<u>smol/hr-ks cat</u>	<u>ks/1000 Na3 fresh feed</u>	<u>ks/1000 Na3 reactor feed</u>
As calculated ACROSS REACTOR	30.58	368.0	86.0
As Net MeOH produced, OVERALL balance	29.64	356.8	83.4

REACTOR FEED $\{H_2/(CO+1.5CO_2)\}$:	0.52
REACTOR FEED $\{(H_2-CO_2)/(CO+CO_2)\}$:	0.39
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	25.5
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	96.3
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	6.39

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 11-May-85 - 2400 11-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	-8.13234	3.55244	-0.82630
CO	-4.29384	0.34059	-0.10083
CO2	-130.83100	-0.97354	1.66095
N2	-153.00700	-0.85973	-6.34670
CH4	n.a.	-1.57004	-17.26130
H2O	—	n.a.	-676.29100
CH3OH	—	-0.86468	4.73286

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	53.8584	44.9896	2.5533	0.0550	—	47.5979	11.6239	
CO2	12.1323	11.4024	0.6471	0.1416	—	12.1912	-0.4859	
CH3OH	0.4660	0.4619	0.0262	0.0173	6.1515	6.6569	-1328.5400	
OTHERS	0.8046	0.7718	0.0438	0.0026	0.2324	1.0506	-30.5768	
TOTAL C	67.2613	57.6256	3.2705	0.2166	6.3839	67.4967	-0.3500	
HYDROGEN:								
H2	75.2049	48.2978	2.7411	0.0267	—	51.0656	32.0981	
H2O	0.0000	0.0000	0.0000	0.0006	0.1956	0.1964	n.a.	
OTHERS	5.1163	4.9767	0.2824	0.0808	25.1949	30.5348	-496.8110	
TOTAL H	80.3212	53.2744	3.0235	0.1081	25.3907	81.7967	-1.8369	
OXYGEN:								
TOTAL O	78.6059	68.2773	3.8750	0.3564	6.3728	78.8815	-0.3507	
NITROGEN:								
TOTAL N	2.0488	1.9613	0.1113	0.0017	—	2.0743	-1.2456	
TOTAL MASS FLOW (ks/hr)	2181.6300	1863.1400	105.7400	8.5173	204.2360	2181.6300	-0.0000	

REACTOR GAS BALANCE (OUT/IN) :

	6C#1	6C#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.706	100.417
HYDROGEN	99.216	101.940
OXYGEN	99.891	100.524
NITROGEN	101.289	100.176

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

DATE : 22-Jun-85
TIME : 01:54 PM
TIME INTERVAL: FROM: 0000 12-May TO: 2400 12-May
NUMBER OF AVERAGED HOURS : 24
RUN ID NUMBER : EU-X754
FEED GAS TYPE: CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (des.C) : 145.6
OIL/SLURRY INLET TEMP. (des.C) : 245.1
AVE. REACTOR TEMPERATURE (des.C) : 250.0
REACTOR OUTLET TEMP. (des.C) : 247.9
REACTOR GAS INLET PRESSURE (kPa) : 5498
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5278
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.6
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 5.0
SLURRY CONCENTRATION (wt%) : 23.5
SPACE VELOCITY (1/ks-hr) : 11793
RECYCLE/FRESH FEED RATIO : 3.38
OIL/SLURRY CIRCULATION RATE (m3/hr) : 45.4
PROD-SEPARATOR GAS FLOWRATE <S0> + <SS> (ksmol/hr) : 87.57
PURGE GAS FLOW RATE <S0> (ksmol/hr) : 4.65

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	59.56	29.21	35.47	35.37	27.13	26.88	5.73	
CO	36.67	54.90	51.15	51.08	51.12	51.16	23.60	
CO2	2.49	13.52	11.27	11.22	12.85	12.86	60.76	
N2	0.12	0.97	0.80	0.79	0.91	0.91	0.37	
CH4	0.10	0.87	0.72	0.71	0.81	0.81	0.92	
H2O	0.00	0.00	0.00	0.00	0.01	0.03	0.12	0.83
CH3OH	0.00	0.59	0.49	0.45	7.28	7.12	7.43	95.04
DME	0.00	0.02	0.00	0.01	0.01	0.00	0.21	0.00
C2H5OH								0.90
C3OH'S								0.29
C4OH'S								0.30
C5OH'S								0.20
ALKANES								0.00
ESTERS								0.91
ALDEHYDES								0.00
OIL								1.54
TOTAL :	98.95	100.07	99.89	99.64	100.13	99.78	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	12.75	22.51	20.52	20.52	23.22	23.26	36.53	32.67
M3/hr	550.5	1858.6	2383.7	2382.2	2105.4	2101.9	5.1	
ksmol/hr	24.56	82.92	106.35	106.28	93.93	93.78	0.23	6.26
l/hr:prod								258.82

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 12-May-85 - 2400 12-May-85

CONVERSIONS ACROSS REACTOR :

		GC#1	GC#2
HYDROGEN CONVERSION	(Z) :	35.2	32.2
CARBON MONOXIDE CONVERSION	(Z) :	11.8	11.6
CARBON DIOXIDE CONVERSION	(Z) :	-0.6	-1.2
RATIO H2 CONSUMED/CO CONSUMED	:	1.95	1.93

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

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL *
CO (+CO2) SELECTIVITY TO METHANOL (Z) :	100.3	98.7
CO (+CO2) SELECTIVITY TO ETHANOL (Z) :		0.6

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

METHANOL PRODUCTIVITIES & YIELDS

METH SOURCE	kmol/hr-ks cat	ks/1000 Nm3 fresh feed	ks/1000 Nm3 reactor feed
As calculated ACROSS REACTOR	30.96	364.0	84.1
As Net MeOH produced, OVERALL balance	30.25	355.7	82.2

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.39
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	26.4
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	97.0
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	6.25