

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 12-May-85 - 2400 12-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	-7.44636	3.22210	-0.40384
CO	-4.18256	0.43213	-0.11876
CO2	-131.35400	-0.88935	1.90670
N2	-108.44000	-0.05926	-6.02820
CH4	n.a.	-1.12897	-18.12600
H2O		100.00000	-811.13400
CH3OH		0.87528	3.55838

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	54.2874	45.5175	2.5536	0.0539	————	48.1250	11.3514
CO2	11.9252	11.2079	0.6288	0.1386	————	11.9753	-0.4200
CH3OH	0.4821	0.4861	0.0273	0.0169	6.0667	6.5971	-1268.4300
OTHERS	0.7687	0.7387	0.0414	0.0026	0.2312	1.0140	-31.8990
TOTAL C	67.4634	57.9503	3.2511	0.2120	6.2979	67.7113	-0.3674
HYDROGEN:							
H2	75.1877	48.4335	2.7172	0.0261	————	51.1769	31.9345
H2O	0.0000	0.0000	0.0000	0.0006	0.1877	0.1883	n.a.
OTHERS	5.0345	4.9369	0.2770	0.0791	24.8543	30.1473	-498.8150
TOTAL H	80.2222	53.3705	2.9942	0.1057	25.0421	81.5125	-1.6084
OXYGEN:							
TOTAL O	78.6354	68.4382	3.8395	0.3488	6.2821	78.9086	-0.3474
NITROGEN:							
TOTAL N	1.6753	1.6138	0.0905	0.0017	————	1.7060	-1.8318
TOTAL MASS FLOW (ks/hr)	2180.8200	1866.3700	104.7070	8.3350	201.4000	2190.8100	0.0006

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.712	100.342
HYDROGEN	99.558	101.558
OXYGEN	99.888	100.484
NITROGEN	100.254	102.011

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

DATE : 22-Jun-85
TIME : 02:03 PM
TIME INTERVAL: FROM: 0000 14-May
TO: 0700 14-May
NUMBER OF AVERAGED HOURS : 7
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) : 247.9
REACTOR GAS INLET PRESSURE (kPa) : 5499
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5278
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.6
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 4.9
SLURRY CONCENTRATION (wt%): 25.4
SPACE VELOCITY (1/ks-hr) : 10551
RECYCLE/FRESH FEED RATIO : 3.45
OIL/SLURRY CIRCULATION RATE (m3/hr) : 45.2
PROD.SEPARATOR GAS FLOWRATE <S0> + <S5> (ksmol/hr) : 87.59
PURGE GAS FLOW RATE <S0> (ksmol/hr) : 4.04

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	MEDW PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<WTZ>
H2	60.07	28.68	35.20	35.12	26.69	26.52	5.73	—
CO	36.09	54.37	50.67	50.66	50.64	50.63	23.60	—
CO2	2.55	14.40	11.99	11.98	13.65	13.66	60.76	—
N2	0.11	1.13	0.92	0.92	1.05	1.05	0.37	—
CH4	0.08	0.82	0.67	0.67	0.77	0.76	0.92	—
H2O	0.00	0.00	0.00	0.00	0.02	0.04	0.12	0.85
CH3OH	0.00	0.54	0.50	0.45	7.11	7.15	7.43	95.05
DME	0.00	0.03	0.02	0.02	0.01	0.02	0.21	0.00
C2H5OH	—	—	—	—	—	—	—	0.86
C3OH'S	—	—	—	—	—	—	—	0.29
C4OH'S	—	—	—	—	—	—	—	0.29
C5OH'S	—	—	—	—	—	—	—	0.19
ALKATENES	—	—	—	—	—	—	—	0.00
ESTERS	—	—	—	—	—	—	—	0.88
ALDEHYDES	—	—	—	—	—	—	—	0.00
OIL	—	—	—	—	—	—	—	1.59
TOTAL :	98.89	99.96	99.96	99.82	99.94	99.83	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	12.62	22.79	20.72	20.73	23.45	23.49	36.53	32.66
Mm3/hr	542.4	1872.7	2384.8	2384.4	2107.5	2103.7	5.5	—
ksmol/hr	24.20	83.55	106.39	106.38	94.02	93.85	0.25	6.22
L/hr, Prod	—	—	—	—	—	—	—	257.25

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 14-May-85 - 0700 14-May-85

CONVERSIONS ACROSS REACTOR :

		<u>GC#1</u>	<u>GC#2</u>
HYDROGEN CONVERSION	(Z) :	33.5	32.8
CARBON MONOXIDE CONVERSION	(Z) :	11.9	11.7
CARBON DIOXIDE CONVERSION	(Z) :	-0.5	-0.7
RATIO H2 CONSUMED/CO CONSUMED	:	1.96	1.95

*** 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) :	99.0	97.3
CO (+CO2) SELECTIVITY TO ETHANOL	(Z) :		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	27.42	366.1	83.3
As Net MeOH produced, OVERALL balance	26.86	358.6	81.6

REACTOR FEED $\{H_2/(CO+1.5CO_2)\}$:	0.51
REACTOR FEED $\{(H_2-CO_2)/(CO+CO_2)\}$:	0.37
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	26.0
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	97.3
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	6.20

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 14-May-85 - 0700 14-May-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	[PURE GASES - 1] FRESH FEED GAS	[(1+55)-15] REACTOR FEED	[25 - (56+51+62+68)] REACTOR EFFLUENT
	<Z diff.>	<Z diff.>	<Z diff.>
H2	-7.28847	2.95503	-0.16532
CO	-3.95587	0.48830	-0.02462
CO2	-130.55900	-0.79124	1.73644
N2	-102.88300	-1.46502	-6.02949
CH4	n.a.	-0.92272	-20.14320
H2O	—	n.a.	-517.59100
CH3OH	—	-5.76560	2.46515

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	58 MeOH PRODUCT	TOTAL	Z
CARBON:							
CO	53.8938	45.4258	2.1988	0.0581	————	47.6827	11.5246
CO2	12.7455	12.0305	0.5823	0.1496	————	12.7624	-0.1330
CH3OH	0.4770	0.4510	0.0218	0.0183	6.0302	6.5213	-1267.2000
OTHERS	0.7270	0.7034	0.0341	0.0028	0.2223	0.9626	-32.4026
TOTAL C	67.8433	58.6107	2.8370	0.2288	6.2525	67.9291	-0.1265
HYDROGEN:							
H2	74.7194	47.9237	2.3197	0.0282	————	50.2716	32.7194
H2O	0.0000	0.0000	0.0000	0.0006	0.1918	0.1924	n.a.
OTHERS	4.8518	4.6597	0.2256	0.0853	24.6859	29.6565	-511.2420
TOTAL H	79.5713	52.5834	2.5453	0.1142	24.8778	80.1206	-0.6904
OXYGEN:							
TOTAL O	79.8797	69.9587	3.3863	0.3765	6.2431	79.9647	-0.1064
NITROGEN:							
TOTAL N	1.9674	1.8862	0.0913	0.0018	————	1.9793	-0.6078
TOTAL MASS FLOW (ks/hr)	2204.8500	1903.6400	92.1446	8.9978	200.0650	2204.8500	0.0002

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.780	100.030
HYDROGEN	99.599	100.433
OXYGEN	99.934	100.155
NITROGEN	101.146	100.373

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

DATE :	22-Jun-85
TIME :	02:12 PM
TIME INTERVAL:	FROM: 0000 15-May
	TO: 2400 15-May
	24
NUMBER OF AVERAGED HOURS :	EU-X754
RUN ID NUMBER :	CO-RICH GAS
FEED GAS TYPE:	
REACTOR FEED GAS INLET TEMP. (des.C) :	145.3
OIL/SLURRY INLET TEMP. (des.C) :	245.3
Ave. REACTOR TEMPERATURE (des.C) :	250.2
REACTOR OUTLET TEMP. (des.C) :	248.2
REACTOR GAS INLET PRESSURE (kPa) :	5489
PRIMARY SEPARATOR GAS PRESSURE (kPa) :	5279
GAS SUPERFICIAL VELOCITY (cm/sec) :	9.4
LIQUID SUPERFICIAL VELOCITY (cm/sec) :	4.9
SLURRY CONCENTRATION (wt%):	25.5
SPACE VELOCITY (L/Ks-hr) :	10309
RECYCLE/FRESH FEED RATIO :	3.35
OIL/SLURRY CIRCULATION RATE (m3/hr) :	44.9
PROD.SEPARATOR GAS FLOWRATE <S0> + <SS> (ksmol/hr) :	85.50
PURGE GAS FLOW RATE <S0> (ksmol/hr) :	4.38

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	MECH PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<WTZ>
H2	60.15	28.78	35.23	35.17	26.94	26.58	5.73	—
CO	36.09	54.57	50.81	50.81	50.81	50.83	23.60	—
CO2	2.51	14.19	11.82	11.83	13.49	13.45	60.76	—
N2	0.11	1.17	0.96	0.95	1.09	1.09	0.37	—
CH4	0.09	0.93	0.76	0.76	0.86	0.87	0.92	—
H2O	0.00	0.00	0.00	0.00	0.02	0.03	0.12	0.86
CH3OH	0.00	0.48	0.42	0.38	7.13	7.07	7.43	95.16
DME	0.00	0.02	0.02	0.02	0.01	0.02	0.21	0.00
C2H5OH	—	—	—	—	—	—	—	0.79
C3OH'S	—	—	—	—	—	—	—	0.28
C4OH'S	—	—	—	—	—	—	—	0.28
C5OH'S	—	—	—	—	—	—	—	0.18
ALKAHENES	—	—	—	—	—	—	—	0.00
ESTERS	—	—	—	—	—	—	—	0.88
ALDEHYDES	—	—	—	—	—	—	—	0.00
OIL	—	—	—	—	—	—	—	1.58
TOTAL :	98.96	100.13	100.02	99.92	100.34	99.94	99.13	100.00
DENS, g/cc	0.005	0.047	0.033	0.033	0.029	0.029	0.004	0.790
AV.MOL.WT	12.61	22.72	20.67	20.68	23.37	23.43	36.53	32.64
M3/hr	542.9	1818.2	2331.6	2329.9	2062.2	2056.5	5.5	—
ksmol/hr	24.22	81.12	104.02	103.95	92.00	91.75	0.25	6.17
L/hr,prod	—	—	—	—	—	—	—	255.04

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 15-May-85 - 2400 15-May-85

CONVERSIONS ACROSS REACTOR :

		<u>GC#1</u>	<u>GC#2</u>
HYDROGEN CONVERSION	(Z) :	33.5	32.2
CARBON MONOXIDE CONVERSION	(Z) :	11.8	11.5
CARBON DIOXIDE CONVERSION	(Z) :	-0.4	-0.9
RATIO H2 CONSUMED/CO CONSUMED	:	1.97	1.94

*** 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	(Z) :	100.7	98.1
CO (+CO2) SELECTIVITY TO ETHANOL	(Z) :		0.6

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

METHANOL PRODUCTIVITIES & YIELDS

<u>MEDH 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	27.02	360.4	84.0
As Net MeOH produced, OVERALL balance	26.66	355.6	82.9

REACTOR FEED $\{H_2/(CO+1.5CO_2)\}$:	0.51
REACTOR FEED $\{(H_2-CO_2)/(CO+CO_2)\}$:	0.37
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	26.1
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	98.0
CALCULATED METHANOL PRODUCTION RATE (Kmol/hr) :	6.11

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 15-May-85 - 2400 15-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	-8.09261	3.57595	0.65671
CO	-4.94741	0.36182	0.17572
CO2	-136.27300	-1.48770	2.26945
N2	-127.18200	-1.68137	-5.96394
CH4	n.a.	-1.61510	-18.80900
H2O	—	n.a.	-474.85400
CH3OH	—	-1.15606	2.24353

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 NaOH PRODUCT	TOTAL	Z
CARBON:							
CO	52.8180	44.2684	2.3925	0.0581	—	46.7191	11.5471
CO2	12.2964	11.5071	0.6219	0.1496	—	12.2787	0.1440
CH3OH	0.3919	0.3875	0.0209	0.0183	5.9854	6.4121	-1535.9700
OTHERS	0.8033	0.7692	0.0416	0.0028	0.2099	1.0235	-27.4019
TOTAL C	66.3097	56.9322	3.0770	0.2288	6.1953	66.4333	-0.1864
HYDROGEN:							
H2	73.1161	46.6884	2.5233	0.0282	—	49.2399	32.6571
H2O	0.0000	0.0000	0.0000	0.0000	0.1924	0.1930	n.a.
OTHERS	4.8160	4.6623	0.2520	0.0853	24.4722	29.4717	-511.9560
TOTAL H	77.9341	51.3506	2.7753	0.1142	24.6646	78.9047	-1.2453
OXYGEN:							
TOTAL O	77.8202	67.6880	3.6583	0.3765	6.1935	77.9162	-0.1234
NITROGEN:							
TOTAL N	1.9847	1.8967	0.1025	0.0018	—	2.0911	-0.8256
TOTAL MASS FLOW (kg/hr)	2149.8700	1842.9000	99.6017	8.9978	198.3690	2149.8700	0.0001

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.808	100.304
HYDROGEN	99.634	101.453
OXYGEN	99.939	100.432
NITROGEN	100.589	100.593

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

DATE : 22-Jun-85
TIME : 02:21 PM
TIME INTERVAL: FROM: 0000 16-May
TO: 2400 16-May
NUMBER OF AVERAGED HOURS : 24
RUN ID NUMBER : EU-X754
FEED GAS TYPE: CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (des.C) : 146.3
OIL/SLURRY INLET TEMP. (des.C) : 245.3
AVE. REACTOR TEMPERATURE (des.C) : 250.1
REACTOR OUTLET TEMP. (des.C) : 248.1
REACTOR GAS INLET PRESSURE (kPa) : 5485
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5279
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.5
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 4.9
SLURRY CONCENTRATION (wt%) : 25.3
SPACE VELOCITY (1/ks-hr) : 10531
RECYCLE/FRESH FEED RATIO : 3.44
OIL/SLURRY CIRCULATION RATE (m3/hr) : 44.9
PROD.SEPARATOR GAS FLOWRATE <S0> + <S5> (ksmol/hr) : 86.88
PURGE GAS FLOW RATE <S0> (ksmol/hr) : 4.77

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								
	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<WT>
H2	59.79	29.01	35.49	35.56	27.06	26.93	5.73	—
CO	36.31	54.50	50.76	50.75	50.74	50.80	23.60	—
CO2	2.52	13.77	11.43	11.46	13.09	13.01	60.76	—
N2	0.18	1.37	1.13	1.13	1.28	1.28	0.37	—
CH4	0.09	0.83	0.68	0.67	0.78	0.78	0.92	—
H2O	0.00	0.00	0.00	0.00	0.02	0.04	0.12	0.86
CH3OH	0.00	0.54	0.47	0.43	7.20	7.14	7.43	95.20
BME	0.00	0.03	0.02	0.02	0.01	0.02	0.21	0.90
C2H5OH	—	—	—	—	—	—	—	0.79
C3OH'S	—	—	—	—	—	—	—	0.27
C4OH'S	—	—	—	—	—	—	—	0.27
C5OH'S	—	—	—	—	—	—	—	0.16
ALKANES	—	—	—	—	—	—	—	0.00
ESTERS	—	—	—	—	—	—	—	0.91
ALDEHYDES	—	—	—	—	—	—	—	0.00
OIL	—	—	—	—	—	—	—	1.54
TOTAL :	98.89	100.05	99.98	100.03	100.17	99.99	99.13	100.00
DENS, g/cc	0.005	0.047	0.032	0.032	0.029	0.029	0.004	0.790
AV. MOL. WT	12.69	22.60	20.55	20.54	23.27	23.29	36.53	32.63
M3/hr	534.4	1840.4	2369.4	2369.5	2091.4	2090.4	5.2	—
ksmol/hr	23.84	82.11	105.71	105.71	93.31	93.26	0.23	6.20
L/hr:prod	—	—	—	—	—	—	—	256.14

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 16-May-85 - 2400 16-May-85

CONVERSIONS ACROSS REACTOR :

		<u>GC#1</u>	<u>GC#2</u>
HYDROGEN CONVERSION	(Z) :	33.1	32.8
CARBON MONOXIDE CONVERSION	(Z) :	11.7	11.8
CARBON DIOXIDE CONVERSION	(Z) :	-0.4	-0.8
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>%</u>
CO (+CO2) SELECTIVITY TO METHANOL (Z) :	99.7	96.9
CO (+CO2) SELECTIVITY TO ETHANOL (Z) :		0.6

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

METHANOL PRODUCTIVITIES & YIELDS

<u>MEOH SOURCE</u>	<u>kmol/hr-kat</u>	<u>kg/1000 Na3 fresh feed</u>	<u>kg/1000 Na3 reactor feed</u>
As calculated ACROSS REACTOR	27.60	372.4	84.0
As Net MeOH produced, OVERALL balance	26.92	363.2	81.9

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.39
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	26.2
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	96.8
CALCULATED METHANOL PRODUCTION RATE (Kmol/hr) :	6.21

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 16-May-85 - 2400 16-May-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	[PURE GASES - 1] FRESH FEED SAS	[(1+55)-15] REACTOR FEED	[25 - (50+51+62+68)] REACTOR EFFLUENT
	<Z diff.>	<Z diff.>	<Z diff.>
H2	-4.99906	1.25510	0.13351
CO	-2.17249	-0.46364	-0.02739
CO2	-127.64500	-1.69034	1.96230
N2	-192.64900	-2.15462	-3.92464
CH4	n.a.	-1.58200	-18.83980
H2O	-----	n.a.	-358.75900
CH3OH	-----	-1.60887	3.12140

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	53.6536	44.7491	2.6023	0.0547	-----	47.4061	11.6443
CO2	12.1124	11.3093	0.6577	0.1408	-----	12.1078	0.0374
CH3OH	0.4537	0.4465	0.0260	0.0172	6.0141	6.5038	-1333.5900
OTHERS	0.7367	0.7007	0.0407	0.0026	0.2085	0.9525	-29.2902
TOTAL C	66.9564	57.2056	3.3266	0.2154	6.2226	66.9702	-0.0206
HYDROGEN:							
H2	75.1850	47.6340	2.7700	0.0265	-----	50.4306	32.9247
H2O	0.0046	0.0000	0.0000	0.0006	0.1938	0.1944	-4143.7400
OTHERS	4.8111	4.6304	0.2693	0.0803	24.5829	29.5629	-514.4720
TOTAL H	80.0007	52.2644	3.0393	0.1074	24.7767	80.1879	-0.2339
OXYGEN:							
TOTAL O	78.3591	67.8352	3.9448	0.3543	6.2243	78.3585	0.0007
NITROGEN:							
TOTAL N	2.3805	2.2459	0.1306	0.0017	-----	2.3782	0.0969
TOTAL MASS FLOW (kg/hr)	2171.6200	1855.9200	107.9270	8.4676	199.3030	2171.6200	-0.0001

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.883	100.937
HYDROGEN	99.888	100.438
OXYGEN	100.006	100.182
NITROGEN	100.116	100.484

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

DATE : 22-Jun-85
TIME : 02:30 PM
TIME INTERVAL: FROM: 0600 17-May TO: 2400 17-May 19
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) : 245.2
AVE. REACTOR TEMPERATURE (deg.C) : 250.1
REACTOR OUTLET TEMP. (deg.C) : 248.1
REACTOR GAS INLET PRESSURE (kPa) : 5487
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5278
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.6
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 4.9
SLURRY CONCENTRATION (wt%): 25.1
SPACE VELOCITY (1/ks-hr) : 10673
RECYCLE/FRESH FEED RATIO : 3.50
OIL/SLURRY CIRCULATION RATE (m3/hr) : 45.1
PROD.SEPARATOR GAS FLOWRATE <S0> + <S5> (ksmol/hr) : 87.49
PURGE GAS FLOW RATE <S0> (ksmol/hr) : 4.72

STREAM #	1	S5	10	15	25*	25*	S2	S8
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	V/L SEP	V/L SEP	FLASH GAS	METH PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<MOL>	<WT>
H2	59.83	29.37	35.82	35.80	27.41	27.28	5.73	
CO	36.23	54.44	50.72	50.72	50.70	50.75	23.60	
CO2	2.67	13.80	11.48	11.52	13.12	13.07	60.76	
N2	0.12	1.07	0.87	0.87	0.99	0.99	0.37	
CH4	0.09	0.81	0.67	0.66	0.76	0.76	0.92	
H2O	0.00	0.00	0.00	0.00	0.02	0.04	0.12	0.87
CH3OH	0.00	0.48	0.42	0.39	7.17	7.08	7.43	95.31
BRE	0.00	0.02	0.02	0.02	0.01	0.02	0.21	0.00
C2H5OH								0.90
C3OH'S								0.27
C4OH'S								0.28
C5OH'S								0.17
ALKANES								0.00
ESTERS								0.87
ALDEHYDES								0.00
OIL								1.43
TOTAL :	98.94	100.00	99.99	99.98	100.17	99.99	99.13	100.00
DENSrs/cc	0.005	0.047	0.032	0.032	0.029	0.029	0.004	0.790
AV.MOL.WT	12.71	22.51	20.48	20.49	23.19	23.20	36.53	32.59
M3/hr	529.3	1855.3	2380.4	2380.1	2102.4	2101.2	5.4	
ksmol/hr	23.62	82.77	106.20	106.18	93.79	93.75	0.24	6.13
L/hr:prod								252.83

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 17-May-85 - 2400 17-May-85

CONVERSIONS ACROSS REACTOR :

		GC#1	GC#2
HYDROGEN CONVERSION	(Z) :	32.8	32.4
CARBON MONOXIDE CONVERSION	(Z) :	11.7	11.7
CARBON DIOXIDE CONVERSION	(Z) :	-0.5	-0.6
RATIO H2 CONSUMED/CO CONSUMED	:	1.98	1.95

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

SELECTIVITIES :

		ACROSS REACTOR GC Average	OVERALL %
CO (+CO2) SELECTIVITY TO METHANOL	(Z) :	100.3	96.9
CO (+CO2) SELECTIVITY TO ETHANOL	(Z) :		0.6

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

METHANOL PRODUCTIVITIES & YIELDS

MEOH SOURCE	smol/hr-ks cat	ks/1000 Nm3 fresh feed	ks/1000 Nm3 reactor feed
As calculated ACROSS REACTOR	28.02	378.3	84.1
As Net MeOH produced, OVERALL balance	26.83	362.2	80.6

REACTOR FEED (H2/(CO+1.5CO2)) :	0.53
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.39
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	26.9
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	95.1
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	6.25

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

0000 17-May-85 - 2400 17-May-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	[PURE GASES - 1] FRESH FEED GAS	[(1+SS)-15] REACTOR FEED	[25 - (50+S1+62+68)] REACTOR EFFLUENT
	<Z diff.>	<Z diff.>	<Z diff.>
H2	-3.78254	1.11833	-0.02417
CO	-0.65107	-0.45823	-0.16881
CO2	-111.36500	-1.45368	1.86334
N2	-153.68500	-1.25988	-7.07713
CH4	n.a.	-1.16188	-20.38620
H2O	—	n.a.	-364.32600
CH3OH	—	-3.29978	5.03925

OVERALL ELEMENTAL BALANCE (Kg-atoms/hr) :

		INPUTS		OUTPUTS			(IN-OUT)/IN	
STREAM #		15	55	50	62	68	TOTAL	
STREAM NAME		REACTOR FEED	RECYCLE	PURGE GAS	FLASH GAS	MeOH PRODUCT		Z
CARBON:								
CO		53.8604	45.0592	2.5705	0.0571	————	47.6868	11.4623
CO2		12.2304	11.4252	0.6518	0.1469	————	12.2239	0.0536
CH3OH		0.4129	0.3997	0.0228	0.0180	5.9432	6.3836	-1446.0800
OTHERS		0.7211	0.6912	0.0394	0.0027	0.2070	0.9403	-30.5944
TOTAL C		67.2249	57.5753	3.2845	0.2246	6.1501	67.2346	-0.0145
HYDROGEN:								
H2		76.0217	48.6222	2.7738	0.0277	————	51.4236	32.3567
H2O		0.0000	0.0000	0.0000	0.0006	0.1924	0.1930	n.a.
OTHERS		4.5756	4.4030	0.2512	0.0838	24.2967	29.0347	-534.5570
TOTAL H		80.5973	53.0252	3.0250	0.1121	24.4891	80.6513	-0.0671
OXYGEN:								
TOTAL O		78.7539	68.3290	3.8980	0.3696	6.1497	78.7463	0.0096
NITROGEN:								
TOTAL N		1.8431	1.7640	0.1006	0.0018	————	1.8664	-1.2672
TOTAL MASS FLOW								
(kg/hr)		2175.2800	1863.2000	106.2910	8.8321	196.9490	2175.2800	0.0003

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.939	100.104
HYDROGEN	99.861	100.815
OXYGEN	100.071	100.213
NITROGEN	100.805	100.267

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

DATE : 22-Jun-85
 TIME : 02:38 PM
 TIME INTERVAL: FROM: 0000 18-May
 TO: 1600 18-May
 16
 NUMBER OF AVERAGED HOURS :
 RUN ID NUMBER : EU-X754
 FEED GAS TYPE: CO-RICH GAS
 REACTOR FEED GAS INLET TEMP. (deg.C) : 144.7
 OIL/SLURRY INLET TEMP. (deg.C) : 245.2
 AVE. REACTOR TEMPERATURE (deg.C) : 250.1
 REACTOR OUTLET TEMP. (deg.C) : 248.1
 REACTOR GAS INLET PRESSURE (kPa) : 5487
 PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5278
 GAS SUPERFICIAL VELOCITY (cm/sec) : 9.6
 LIQUID SUPERFICIAL VELOCITY (cm/sec) : 4.9
 SLURRY CONCENTRATION (wt%): 25.2
 SPACE VELOCITY (1/kg-hr) : 10665
 RECYCLE/FRESH FEED RATIO : 3.52
 OIL/SLURRY CIRCULATION RATE (m3/hr) : 45.1
 PROD.SEPARATOR GAS FLOWRATE <S0> + <S5> (ksmol/hr) : 87.57
 PURGE GAS FLOW RATE <S0> (ksmol/hr) : 4.73

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	MECH. PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT								
	<MOL%>	<MOL%>	<MOL%>	<MOL%>	<MOL%>	<MOL%>	<MOL%>	<WT%>
H2	59.68	29.25	35.66	35.69	27.33	27.14	5.73	—
CO	36.37	54.64	50.90	50.91	50.86	50.98	23.60	—
CO2	2.76	14.00	11.70	11.71	13.33	13.31	60.76	—
N2	0.12	0.91	0.74	0.73	0.85	0.84	0.37	—
CH4	0.08	0.79	0.65	0.65	0.73	0.75	0.92	—
H2O	0.00	0.00	0.00	0.00	0.02	0.04	0.12	0.86
CH3OH	0.00	0.45	0.38	0.36	7.09	6.99	7.43	95.37
DME	0.00	0.02	0.02	0.02	0.01	0.02	0.21	0.00
C2H5OH	—	—	—	—	—	—	—	0.79
C3OH'S	—	—	—	—	—	—	—	0.27
C4OH'S	—	—	—	—	—	—	—	0.27
C5OH'S	—	—	—	—	—	—	—	0.16
ALKATENES	—	—	—	—	—	—	—	0.00
ESTERS	—	—	—	—	—	—	—	0.85
ALDEHYDES	—	—	—	—	—	—	—	0.00
OIL	—	—	—	—	—	—	—	1.43
TOTAL :	99.01	100.07	100.05	100.06	100.22	100.07	99.13	100.00
DENS,g/cc	0.005	0.047	0.032	0.032	0.029	0.029	0.004	0.790
AV.MOL.WT	12.78	22.58	20.56	20.55	23.25	23.28	36.53	32.59
M3/hr	527.3	1856.9	2377.6	2378.2	2102.5	2099.7	5.5	—
ksmol/hr	23.52	82.84	106.07	106.10	93.80	93.68	0.25	6.06
l/hr:prod	—	—	—	—	—	—	—	249.68

* Compositions correspond to STREAM#32

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 18-May-85 - 1600 18-May-85

CONVERSIONS ACROSS REACTOR :

		<u>GC#1</u>	<u>GC#2</u>
HYDROGEN CONVERSION	(Z) :	32.8	32.3
CARBON MONOXIDE CONVERSION	(Z) :	11.5	11.7
CARBON DIOXIDE CONVERSION	(Z) :	-0.5	-0.6
RATIO H2 CONSUMED/CO CONSUMED	:	1.99	1.94

*** 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	(Z) :	100.1	97.0
CO (+CO2) SELECTIVITY TO ETHANOL	(Z) :		0.6

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

METHANOL PRODUCTIVITIES & YIELDS

<u>MEOH SOURCE</u>	<u>smol/hr-ks cat</u>	<u>kg/1000 Na3 fresh feed</u>	<u>kg/1000 Na3 reactor feed</u>
As calculated ACROSS REACTOR	27.84	377.3	83.6
As Net MeOH produced; OVERALL balance	26.51	359.3	79.7

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED (H2-CO2)/(CO+CO2) :	0.38
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	27.1
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS Z OF CALCULATED :	94.6
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	6.21

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

0000 18-May-85 - 1600 18-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	-4.93566	1.05809	0.00588
CO	-0.80193	-0.35023	-0.30228
CO2	-108.21200	-1.44825	1.90180
N2	-157.44900	0.74294	-6.83865
CH4	n.a.	-2.05571	-22.40600
H2O	—	n.a.	-375.49000
CH3OH	—	0.00657	5.49093

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	54.0107	45.2655	2.5842	0.0580	—	47.9077	11.2996
CO2	12.4249	11.5983	0.6621	0.1494	—	12.4098	0.1217
CH3OH	0.3767	0.3767	0.0215	0.0183	5.8728	6.2893	-1569.5700
OTHERS	0.7159	0.6743	0.0385	0.0028	0.1996	0.9151	-27.8298
TOTAL C	67.5282	57.9148	3.3063	0.2284	6.0724	67.5220	0.0092
HYDROGEN:							
H2	75.7340	48.4674	2.7669	0.0282	—	51.2625	32.3125
H2O	0.0000	0.0000	0.0000	0.0006	0.1884	0.1890	n.a.
OTHERS	4.4216	4.2388	0.2420	0.0852	23.9973	28.5633	-545.9880
TOTAL H	80.1556	52.7062	3.0089	0.1139	24.1857	80.0147	0.1757
OXYGEN:							
TOTAL O	79.2628	68.8563	3.9309	0.3758	6.0737	79.2367	0.0330
NITROGEN:							
TOTAL N	1.5449	1.5001	0.0856	0.0018	—	1.5875	-2.7545
TOTAL MASS FLOW (ks/hr)	2180.6100	1870.3600	106.7760	8.9812	194.4940	2180.6100	0.0001

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.958	100.023
HYDROGEN	99.810	100.726
OXYGEN	100.079	100.162
NITROGEN	100.021	103.098

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

DATE : 22-Jun-85
TIME : 02:46 PM
TIME INTERVAL : FROM: 0000 19-May TO: 2400 19-May
NUMBER OF AVERAGED HOURS : 24
RUN ID NUMBER : EU-X754
FEED GAS TYPE: CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (des.C) : 145.1
OIL/SLURRY INLET TEMP. (des.C) : 245.3
AVE. REACTOR TEMPERATURE (des.C) : 250.2
REACTOR OUTLET TEMP. (des.C) : 248.1
REACTOR GAS INLET PRESSURE (kPa) : 5485
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5278
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.5
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 4.9
SLURRY CONCENTRATION (wt%) : 25.1
SPACE VELOCITY (1/ks-hr) : 10628
RECYCLE/FRESH FEED RATIO : 3.51
OIL/SLURRY CIRCULATION RATE (m3/hr) : 45.0
PROD.SEPARATOR GAS FLOWRATE <S0> + <S5> (ksmol/hr) : 87.15
PURGE GAS FLOW RATE <S0> (ksmol/hr) : 4.90

STREAM # STREAM NAME ON-LINE GCS COMPONENT	1 FRESH FEED 1	55 RECYCLE GAS 2	10 REACTOR FEED 1	15 REACTOR FEED 2	25X V/L SEP 2	25X V/L SEP 1	62 FLASH GAS	68 MEOH PRODUCT
	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<WTZ>
H2	59.75	29.44	35.78	35.81	27.48	27.25	5.73	—
CO	36.32	54.48	50.79	50.77	50.75	50.75	23.60	—
CO2	2.77	14.11	11.74	11.79	13.37	13.36	60.76	—
N2	0.10	0.83	0.68	0.66	0.77	0.77	0.37	—
CH4	0.08	0.72	0.60	0.59	0.68	0.68	0.92	—
H2O	0.00	0.00	0.00	0.00	0.02	0.04	0.12	0.89
CH3OH	0.00	0.46	0.41	0.37	7.05	7.01	7.43	95.39
DME	0.00	0.02	0.01	0.02	0.01	0.02	0.21	0.00
C2H5OH	—	—	—	—	—	—	—	0.74
C3OH'S	—	—	—	—	—	—	—	0.27
C4OH'S	—	—	—	—	—	—	—	0.26
C5OH'S	—	—	—	—	—	—	—	0.16
ALKAHENES	—	—	—	—	—	—	—	0.00
ESTERS	—	—	—	—	—	—	—	0.86
ALDEHYDES	—	—	—	—	—	—	—	0.00
OIL	—	—	—	—	—	—	—	1.43
TOTAL :	99.02	100.07	100.02	100.01	100.12	99.89	99.13	100.00
DENS g/cc	0.005	0.047	0.032	0.032	0.029	0.029	0.004	0.790
AV.MOL.WT	12.76	22.56	20.54	20.54	23.21	23.26	36.53	32.57
M3/hr	525.3	1843.6	2369.6	2370.0	2096.4	2092.3	5.2	—
ksmol/hr	23.44	82.25	105.72	105.73	93.53	93.35	0.23	6.13
1/hrprod	—	—	—	—	—	—	—	252.83

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 19-May-85 - 2400 19-May-85

CONVERSIONS ACROSS REACTOR :

		<u>GC#1</u>	<u>GC#2</u>
HYDROGEN CONVERSION	(Z) :	32.7	32.1
CARBON MONOXIDE CONVERSION	(Z) :	11.8	11.6
CARBON DIOXIDE CONVERSION	(Z) :	-0.5	-0.3
RATIO H2 CONSUMED/CO CONSUMED	:	1.96	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 (+CO2) SELECTIVITY TO METHANOL	(Z) :	99.0	97.2
CO (+CO2) 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>kmol/hr-kg cat</u>	<u>kg/1000 Nm3 fresh feed</u>	<u>kg/1000 Nm3 reactor feed</u>
As calculated ACROSS REACTOR	27.61	375.6	83.3
As Net MeOH produced, OVERALL balance	26.85	365.3	81.0

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.38
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	27.5
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	96.6
CALCULATED METHANOL PRODUCTION RATE (Kmol/hr) :	6.16

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 19-Mar-85 - 2400 19-Mar-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	-4.48414	0.91678	0.11906
CO	-0.95197	-0.68097	-0.02649
CO2	-106.97100	-1.66510	1.59066
N2	-88.42110	1.18125	-8.30119
CH4	n.a.	-2.11310	-22.01760
H2O	—	n.a.	-330.18800
CH3OH	—	-1.93811	3.33750

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	53.6827	44.8070	2.6686	0.0550	—	47.5307	11.4599
CO2	12.4619	11.6082	0.6914	0.1416	—	12.4412	0.1660
CH3OH	0.3887	0.3813	0.0227	0.0173	5.9481	6.3694	-1538.8400
OTHERS	0.6485	0.6162	0.0367	0.0026	0.1966	0.8521	-31.3989
TOTAL C	67.1817	57.4126	3.4194	0.2166	6.1447	67.1934	-0.0174
HYDROGEN:							
H2	75.7313	48.4253	2.8841	0.0267	—	51.3361	32.2128
H2O	0.0000	0.0000	0.0000	0.0006	0.1983	0.1988	n.a.
OTHERS	4.1906	4.0296	0.2400	0.0808	24.2890	28.6393	-583.4190
TOTAL H	79.9219	52.4549	3.1241	0.1081	24.4872	80.1743	-0.3158
OXYGEN:							
TOTAL O	79.0161	68.4246	4.0752	0.3564	6.1539	79.0102	0.0075
NITROGEN:							
TOTAL N	1.4000	1.3694	0.0816	0.0017	—	1.4527	-3.7638
TOTAL MASS FLOW (kg/hr)	2171.2700	1855.3000	110.4980	8.5173	196.9490	2171.2600	0.0003

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.779	100.007
HYDROGEN	99.697	100.593
OXYGEN	99.940	100.090
NITROGEN	100.080	102.956

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

DATE : 22-Jun-85
TIME : 02:53 PM
TIME INTERVAL: FROM: 1100 20-May
TO: 2400 20-May
11
NUMBER OF AVERAGED HOURS :
RUN ID NUMBER : EU-X754
FEED GAS TYPE: CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (des.C) : 145.0
OIL/SLURRY INLET TEMP. (des.C) : 244.9
AVE. REACTOR TEMPERATURE (des.C) : 249.9
REACTOR OUTLET TEMP. (des.C) : 247.7
REACTOR GAS INLET PRESSURE (kPa) : 5471
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5277
GAS SUPERFICIAL VELOCITY (cm/sec) : 9.5
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 4.9
SLURRY CONCENTRATION (wt%) : 25.2
SPACE VELOCITY (1/ks-hr) : 10395
RECYCLE/FRESH FEED RATIO : 3.47
OIL/SLURRY CIRCULATION RATE (m3/hr) : 45.0
PROD. SEPARATOR GAS FLOWRATE <S0> + <S5> (ksmol/hr) : 86.07
PURGE GAS FLOW RATE <S0> (ksmol/hr) : 5.01

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	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<WTZ>
H2	59.82	29.51	35.95	36.04	27.63	27.54	5.73	—
CO	36.33	54.32	50.59	50.44	50.65	50.57	23.60	—
CO2	2.89	14.20	11.87	11.88	13.54	13.45	60.76	—
N2	0.15	1.02	0.84	0.84	0.95	0.96	0.37	—
CH4	0.13	0.63	0.52	0.51	0.59	0.64	0.92	—
H2O	0.00	0.00	0.00	0.00	0.03	0.05	0.12	0.89
CH3OH	0.00	0.54	0.46	0.43	7.20	7.11	7.43	95.42
DME	0.00	0.02	0.02	0.02	0.01	0.02	0.21	0.00
C2H5OH	—	—	—	—	—	—	—	0.72
C3OH'S	—	—	—	—	—	—	—	0.26
C4OH'S	—	—	—	—	—	—	—	0.25
C5OH'S	—	—	—	—	—	—	—	0.15
ALKANES	—	—	—	—	—	—	—	0.00
ESTERS	—	—	—	—	—	—	—	0.87
ALDEHYDES	—	—	—	—	—	—	—	0.00
OIL	—	—	—	—	—	—	—	1.43
TOTAL :	99.33	100.24	100.26	100.16	100.60	100.35	99.13	100.00
DENS _{g/cc}	0.005	0.047	0.032	0.032	0.029	0.029	0.004	0.790
AV. MOL. WT	12.81	22.58	20.54	20.52	23.24	23.23	36.53	32.57
M ₃ /hr	523.9	1817.1	2348.9	2349.3	2073.8	2074.9	5.1	—
ksmol/hr	23.38	81.07	104.80	104.81	92.52	92.57	0.23	6.19
1/hr _{prod}	—	—	—	—	—	—	—	255.04

* Compositions correspond to STREAM#32