

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

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DATE : 07-Aug-85
 TIME : 02:03 PM
 TIME INTERVAL : FROM: 0700 17-Jul TO: 1100 17-Jul
 NUMBER OF AVERAGED HOURS : 4
 RUN ID NUMBER : E-40
 FEED GAS TYPE: CO-RICH GAS
 REACTOR FEED GAS INLET TEMP. (deg.C) : 151.0
 DIL/SLURRY INLET TEMP. (deg.C) : 245.6
 AVE. REACTOR TEMPERATURE (deg.C) : 250.1
 REACTOR OUTLET TEMP. (deg.C) : 247.7
 REACTOR GAS INLET PRESSURE (kPa) : 5725
 PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5274
 GAS SUPERFICIAL VELOCITY (cm/sec) : 15.6
 LIQUID SUPERFICIAL VELOCITY (cm/sec) : 6.3
 SLURRY CONCENTRATION (wt%) : 47.8
 SPACE VELOCITY (1/ks-hr) : 6152
 RECYCLE/FRESH FEED RATIO : 4.9%
 DIL/SLURRY CIRCULATION RATE (m3/hr) : 57.2
 PROD. SEPARATOR GAS FLOWRATE <50> + <55> (ksmol/hr) : 150.92
 PURGE GAS FLOW RATE <50> (ksmol/hr) : 5.59

STREAM #	1	55	10	15	25*	25*	32	69
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	V/L SEP	V/L SEP	FLASH GAS	MEDM PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT	=====							
	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<WT%>
H2	56.67	31.90	35.25	36.19	30.24	30.41	6.71	-----
CO	38.58	52.67	50.37	50.29	50.19	50.17	24.69	-----
CO2	3.12	14.12	12.28	12.23	13.61	13.58	59.94	-----
N2	0.13	0.63	0.53	0.54	0.59	0.59	0.15	-----
CH4	0.07	0.51	0.43	0.43	0.48	0.49	0.48	-----
H2O	0.00	0.00	0.00	0.00	0.01	0.05	0.00	0.86
CH3OH	0.00	0.67	0.48	0.55	5.30	5.26	6.32	92.78
DNE	0.00	0.06	0.04	0.05	0.03	0.04	0.52	0.00
C2H5OH	-----	-----	-----	-----	-----	-----	-----	1.68
C3OH'S	-----	-----	-----	-----	-----	-----	-----	0.84
C4OH'S	-----	-----	-----	-----	-----	-----	-----	0.78
C5OH'S	-----	-----	-----	-----	-----	-----	-----	0.52
ALKATENES	-----	-----	-----	-----	-----	-----	-----	0.00
ESTERS	-----	-----	-----	-----	-----	-----	-----	1.04
ALDEHYDES	-----	-----	-----	-----	-----	-----	-----	0.00
OIL	-----	-----	-----	-----	-----	-----	-----	1.50
TOTAL :	98.57	100.44	99.39	100.27	100.46	100.58	98.80	100.00
DENS,g/cc	0.005	0.047	0.034	0.033	0.029	0.028	0.004	0.790
AV.MOL.WT	13.56	22.01	20.74	20.56	22.52	22.47	36.25	33.00
M3/hr	655.9	3255.3	3851.7	3881.6	3544.4	3552.2	0.9	-----
ksmol/hr	29.26	145.23	171.84	173.18	158.13	158.48	0.04	7.37
l/hr,prod	-----	-----	-----	-----	-----	-----	-----	307.87

* Compositions correspond to STREAM#32

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

9700 17-Jul-85 - 1100 17-Jul-85

CONVERSIONS ACROSS REACTOR :

	GC#1	GC#2
HYDROGEN CONVERSION (Z) :		
CARBON MONOXIDE CONVERSION (Z) :	20.4	23.7
CARBON DIOXIDE CONVERSION (Z) :	8.1	8.9
RATIO H2 CONSUMED/CO CONSUMED :	-1.9	-1.7
	1.76	1.92

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

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL *
CO (+CO2) SELECTIVITY TO METHANOL (Z) :	106.8	98.8
CO (+CO2) SELECTIVITY TO ETHANOL (Z) :		1.2

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

METHANOL PRODUCTIVITIES : YIELDS

MEDH SOURCE	mol/hr-kg cat	kg/1000 Me3 fresh feed	kg/1000 Me3 reactor feed
As calculated ACROSS REACTOR	11.85	365.2	51.7
As Net MeDH produced, OVERALL balance	11.23	346.1	58.5

REACTOR FEED (H2/(CO+1.5CO2)) :	0.53
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.39
APPROACH TO METHANOL EQUILIBRIUM (deg.C) :	39.2
APPROACH TO WATER-GAS EQUILIBRIUM (deg.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	94.2
CALCULATED METHANOL PRODUCTION RATE (mol/hr) :	7.48

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

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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
	<% diff.>	<% diff.>	<% diff.>
H2	-3.88028	0.14178	-0.29437
CO	-0.09562	0.78050	-0.07906
CO2	-97.77450	1.12524	1.10320
N2	-143.11500	0.88296	-1.86354
CH4	n.a.	2.30644	-3.39690
H2O		n.a.	-487.62300
CH3OH		3.24081	3.85718

OVERALL ELEMENTAL BALANCE (Kg-atoms/hr) :

STREAM # STREAM NAME	INPUTS		OUTPUTS			TOTAL	(IN-OUT)/IN %
	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	62 FLASH GAS	58 MeOH PRODUCT		
CARBON:							
CO	87.0882	76.4849	2.9426	0.0104	-----	79.4379	8.7846
CO2	21.1746	29.5027	0.7898	0.0253	-----	21.3168	-0.6715
CH3OH	0.9457	0.9774	0.0376	0.0027	7.0452	9.0628	-752.5400
OTHERS	0.8187	0.8144	0.0313	0.0004	0.5455	1.3916	-69.9847
TOTAL C	110.0270	98.7794	3.8003	0.0388	7.5907	110.2090	-0.1453
HYDROGEN:							
H2	125.3420	92.3512	3.5530	0.0057	-----	95.9098	23.4814
H2O	0.0000	0.0000	0.0000	0.0000	0.2323	0.2323	n.a.
OTHERS	7.2196	7.3277	0.2819	0.0128	29.5972	37.2195	-415.5360
TOTAL H	132.5620	99.6788	3.8349	0.0184	29.8295	133.3620	-0.6036
OXYGEN:							
TOTAL O	130.4640	118.5480	4.5609	0.0639	7.4012	130.5740	-0.0841
NITROGEN:							
TOTAL N	1.8824	1.8226	0.0701	0.0001	-----	1.8929	-0.5574
TOTAL MASS FLOW (ks/hr)	3560.3000	3196.1300	122.9640	1.5290	239.6600	3560.2800	0.0004

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	100.810	100.030
HYDROGEN	104.302	99.996
OXYGEN	101.043	100.318
NITROGEN	102.400	99.798

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

=====

DATE : 07-Aug-85
 TIME : 02:00 PM
 TIME INTERVAL : FROM: 2000 17-Jul TO: 0400 18-Jul
 NUMBER OF AVERAGED HOURS : 8
 RUN ID NUMBER : E-40
 FEED GAS TYPE : CO-RICH GAS
 REACTOR FEED GAS INLET TEMP. (des.C) : 151.7
 OIL/SLURRY INLET TEMP. (des.C) : 245.3
 AVE. REACTOR TEMPERATURE (des.C) : 249.9
 REACTOR OUTLET TEMP. (des.C) : 247.6
 REACTOR GAS INLET PRESSURE (kPa) : 5707
 PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5275
 GAS SUPERFICIAL VELOCITY (cm/sec) : 15.3
 LIQUID SUPERFICIAL VELOCITY (cm/sec) : 5.0
 SLURRY CONCENTRATION (wt%) : 40.3
 SPACE VELOCITY (1/ks-hr) : 8049
 RECYCLE/FRESH FEED RATIO : 4.73
 OIL/SLURRY CIRCULATION RATE (m3/hr) : 54.6
 PROD. SEPARATOR GAS FLOWRATE <SO> + <SS> (ksmol/hr) : 145.49
 PURGE GAS FLOW RATE <SO> (ksmol/hr) : 5.46

STREAM # STREAM NAME ON-LINE GC# COMPONENT	2	55	10	15	25*	25*	62	68
	FRESH FEED 1	RECYCLE GAS 2	REACTOR FEED 1	REACTOR FEED 2	U/L SEP 2	U/L SEP 1	FLASH GAS	METH PRODUCT
	(MOL%)	(MOL%)	(MOL%)	(MOL%)	(MOL%)	(MOL%)	(MOL%)	(WT%)
H2	56.30	31.01	35.76	35.83	29.52	29.39	6.71	---
CO	38.27	53.16	50.55	50.61	50.51	50.49	24.69	---
CO2	3.05	13.93	11.95	11.92	13.30	13.20	59.00	---
N2	0.13	0.69	0.58	0.59	0.65	0.64	0.15	---
CH4	0.08	0.40	0.42	0.41	0.47	0.47	0.48	---
H2O	0.00	0.00	0.00	0.00	0.02	0.04	0.00	0.97
CH3OH	0.00	0.70	0.57	0.56	5.64	5.54	6.32	93.15
DME	0.00	0.05	0.03	0.04	0.03	0.03	0.52	0.00
C2H5OH	---	---	---	---	---	---	---	1.52
C3OH'S	---	---	---	---	---	---	---	0.74
C4OH'S	---	---	---	---	---	---	---	0.69
C5OH'S	---	---	---	---	---	---	---	0.45
ALKATENES	---	---	---	---	---	---	---	0.00
ESTERS	---	---	---	---	---	---	---	0.97
ALDEHYDES	---	---	---	---	---	---	---	0.00
OIL	---	---	---	---	---	---	---	1.50
TOTAL :	97.82	99.92	99.87	99.95	100.15	99.81	98.80	100.00
DENS _{g/cc}	0.005	0.047	0.033	0.033	0.029	0.029	0.004	0.790
AV. MOL. WT	13.54	22.14	20.59	20.58	22.65	22.64	36.25	32.89
M ₃ /hr	664.2	3138.7	3789.8	3790.6	3444.6	3445.1	2.7	---
ksmol/hr	29.63	140.03	169.08	169.11	153.68	153.70	0.12	7.88
l/hr:prod	---	---	---	---	---	---	---	327.81

* Compositions correspond to STREAM#32

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
 CONVERSION-SELECTIVITY-PRODUCTIVITY
 =====

CONVERSIONS ACROSS REACTOR :

	GC#1	GC#2
HYDROGEN CONVERSION (%) :	25.3	25.1
CARBON MONOXIDE CONVERSION (%) :	9.2	9.3
CARBON DIOXIDE CONVERSION (%) :	-0.5	-1.4
RATIO H2 CONSUMED/CO CONSUMED :	1.95	1.91

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

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL *
CO (+CO2) SELECTIVITY TO METHANOL (%) :	98.9	93.5
CO (+CO2) SELECTIVITY TO ETHANOL (%) :		1.0

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

METHANOL PRODUCTIVITIES & YIELDS

MEOH SOURCE	smol/hr-ks cat	kg/1000 Nm3 fresh feed	kg/1000 Nm3 reactor feed
As calculated ACROSS REACTOR	16.21	368.4	64.6
As Net MeOH produced, OVERALL balance	16.09	365.5	64.1

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.38
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	36.9
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	98.6
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	7.64

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

2000 17-Jul-85 - 0400 18-Jul-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	[PURE GASES - 1] FRESH FEED GAS	[1+55]-153 REACTOR FEED	[25 - (50+51+62+68)] REACTOR EFFLUENT
	<Z diff.>	<Z diff.>	<Z diff.>
H2	-1.57335	-0.87063	0.56438
CO	0.08133	0.22540	0.36885
CO2	-94.36980	0.57413	1.54742
H2	-146.67900	2.30579	-2.93764
CH4	n.a.	1.88641	-9.29895
H2O		n.a.	-282.18500
CH3OH		3.69124	1.26079

OVERALL ELEMENTAL BALANCE (Kg-atoms/hr) :

STREAM # STREAM NAME	INPUTS		OUTPUTS				(IN-OUT)/IN Z
	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	62 FLASH GAS	68 MeOH PRODUCT	TOTAL	
CARBON:							
CO	85.5806	74.4329	2.9005	0.0298	-----	77.3631	9.6020
CO2	20.1589	19.3710	0.7548	0.0723	-----	20.1981	-0.1992
CH3OH	0.9444	0.9806	0.0382	0.0076	7.5311	8.5576	-806.0960
OTHERS	0.7616	0.7525	0.0293	0.0012	0.5214	1.3044	-71.2671
TOTAL C	107.4450	95.5370	3.7229	0.1109	8.0522	107.4230	0.0189
HYDROGEN:							
H2	121.2020	86.8374	3.3839	0.0142	-----	90.2374	25.5477
H2O	0.0000	0.0000	0.0000	0.0000	0.2790	0.2790	n.a.
OTHERS	5.9528	7.0606	0.2751	0.0366	31.4772	38.8495	-458.7560
TOTAL H	128.1540	93.8980	3.6590	0.0527	31.7562	129.3660	-0.9453
OXYGEN:							
TOTAL O	126.9050	114.2200	4.4509	0.1827	7.9030	126.7540	0.1176
NITROGEN:							
TOTAL N	1.9528	1.9247	0.0750	0.0004	-----	2.0000	-2.4179
TOTAL MASS FLOW (kg/hr)	3480.1100	3099.7600	120.7910	4.3734	255.1780	3480.1100	0.0001

REACTOR GAS BALANCE (OUT/IN) :

	50#1	50#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.807	100.025
HYDROGEN	99.809	100.371
OXYGEN	99.947	100.273
NITROGEN	99.558	102.441

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

DATE : 07-Aug-85
 TIME : 03:06 PM
 TIME INTERVAL: FROM: 1000 19-Jul TO: 1500 19-Jul
 NUMBER OF AVERAGED HOURS : 24
 RUN ID NUMBER : E-4E
 FEED GAS TYPE: CO-RICH GAS
 REACTOR FEED GAS INLET TEMP. (deg.C) : 153.0
 OIL/SLURRY INLET TEMP. (deg.C) : 245.3
 AVE. REACTOR TEMPERATURE (deg.C) : 249.9
 REACTOR OUTLET TEMP. (deg.C) : 247.8
 REACTOR GAS INLET PRESSURE (kPa) : 5702
 PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5274
 GAS SUPERFICIAL VELOCITY (cm/sec) : 15.4
 LIQUID SUPERFICIAL VELOCITY (cm/sec) : 5.7
 SLURRY CONCENTRATION (wt%): 34.2
 SPACE VELOCITY (1/kg-hr) : 10404
 RECYCLE/FRESH FEED RATIO : 4.71
 OIL/SLURRY CIRCULATION RATE (m3/hr) : 51.7
 PROD. SEPARATOR GAS FLOWRATE <50> + <55> (kgmol/hr) : 145.77
 PURGE GAS FLOW RATE <50> (kgmol/hr) : 4.61

STREAM #	1	55	10	15	25*	25*	62	58
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	57.41	30.89	35.93	35.87	29.26	29.17	6.71	-----
CO	37.25	53.36	50.51	50.52	50.47	50.46	24.60	-----
CO2	3.00	13.77	11.89	11.85	13.19	13.16	59.94	-----
N2	0.13	0.77	0.66	0.66	0.73	0.73	0.15	-----
CH4	0.09	0.61	0.52	0.52	0.58	0.58	0.48	-----
H2O	0.00	0.00	0.00	0.00	0.03	0.03	0.00	1.00
CH3OH	0.00	0.71	0.57	0.56	5.94	5.87	6.32	94.68
DME	0.00	0.04	0.03	0.03	0.02	0.02	0.52	0.00
C2H5OH	-----	-----	-----	-----	-----	-----	-----	1.03
C3OH'S	-----	-----	-----	-----	-----	-----	-----	0.45
C4OH'S	-----	-----	-----	-----	-----	-----	-----	0.35
C5OH'S	-----	-----	-----	-----	-----	-----	-----	0.25
ALKANENES	-----	-----	-----	-----	-----	-----	-----	0.00
ESTERS	-----	-----	-----	-----	-----	-----	-----	0.75
ALDEHYDES	-----	-----	-----	-----	-----	-----	-----	0.00
OIL	-----	-----	-----	-----	-----	-----	-----	1.50
TOTAL :	97.87	100.15	100.12	100.02	100.22	100.04	98.80	100.00
DENS,g/cc	0.005	0.047	0.033	0.033	0.029	0.029	0.004	0.790
AV.MOL.WT	13.24	22.15	20.55	20.55	22.70	22.70	36.25	32.64
Mm3/hr	371.5	3163.9	3818.0	3818.1	3456.8	3455.8	5.0	-----
kgmol/hr	29.96	141.16	170.34	170.34	154.22	154.18	0.22	8.18
l/hr,prod	-----	-----	-----	-----	-----	-----	-----	317.94

* Compositions correspond to STREAM#32

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
 CONVERSION-SELECTIVITY-PRODUCTIVITY

1000 18-Jul-85 - 1500 19-Jul-85

CONVERSIONS ACROSS REACTOR :

	GC#1	GC#2
HYDROGEN CONVERSION (Z) :		
CARBON MONOXIDE CONVERSION (Z) :	26.5	26.2
CARBON DIOXIDE CONVERSION (Z) :	9.6	9.5
RATIO H2 CONSUMED/CO CONSUMED :	-0.2	-0.7
	1.97	1.95

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

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL *
CO (+CO2) SELECTIVITY TO METHANOL (Z) :	100.0	96.9
CO (+CO2) SELECTIVITY TO ETHANOL (Z) :		0.7

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

METHANOL PRODUCTIVITIES & YIELDS

MEOH SOURCE	Smol/hr-kg cat	kg/1000 Nm3 fresh feed	kg/1000 Nm3 reactor feed
As calculated ACROSS REACTOR	22.18	388.4	68.3
As Net MeOH produced: OVERALL balance	21.63	378.8	66.6

REACTOR FEED (H2/(CO+1.5CO2)) :	0.53
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.39
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	35.0
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	96.9
CALCULATED METHANOL PRODUCTION RATE (Kmol/hr) :	8.14

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

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
	<% diff.>	<% diff.>	<% diff.>
H2	-1.60426	-0.49843	0.15590
CO	0.59800	0.48604	0.08434
CO2	-93.85350	0.71128	1.28418
N2	-133.00900	0.47408	-4.93522
CH4	n.a.	0.98326	-15.08770
H2O	-----	n.a.	-186.90300
CH3OH	-----	1.98765	2.44965

OVERALL ELEMENTAL BALANCE (Ks-atoms/hr) :

STREAM # STREAM NAME	INPUTS		OUTPUTS			TOTAL	(IN-OUT)/IN Z
	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	62 FLASH GAS	68 MeOH PRODUCT		
CARBON:							
CO	86.0531	75.3147	2.4609	0.0547	-----	77.8302	9.5556
CO2	20.1912	19.4367	0.6351	0.1327	-----	20.2045	-0.0659
CH3OH	0.9573	0.9970	0.0326	0.0140	7.8909	8.9345	-833.3160
OTHERS	0.9368	0.9203	0.0301	0.0022	0.3374	1.2990	-37.6985
TOTAL C	108.1380	96.6687	3.1586	0.2035	8.2283	108.2590	-0.1117
HYDROGEN:							
H2	122.2150	87.2137	2.8497	0.0297	-----	90.0931	26.2834
H2O	0.0000	0.0000	0.0000	0.0000	0.2969	0.2969	n.a.
OTHERS	7.6796	7.7740	0.2540	0.0671	32.4372	40.5322	-427.7900
TOTAL H	129.8950	94.9877	3.1037	0.0967	32.7341	130.9220	-0.7908
OXYGEN:							
TOTAL O	127.4440	115.2380	3.7653	0.3351	8.2023	127.5400	-0.0753
NITROGEN:							
TOTAL N	2.2509	2.1854	0.0714	0.0007	-----	2.2575	-0.2912
TOTAL MASS FLOW (ks/hr)	3500.3400	3127.0700	102.1760	8.0233	263.0630	3500.3300	0.0002

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.873	100.090
HYDROGEN	99.954	100.640
OXYGEN	99.965	100.240
NITROGEN	100.334	100.270

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

DATE : 07-Aug-85
TIME : 03:13 PM
TIME INTERVAL: FROM: 0000 20-Jul TO: 2400 20-Jul
NUMBER OF AVERAGED HOURS : 22
RUN ID NUMBER : E-4F
FEED GAS TYPE: CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (deg.C) : 152.8
OIL/SLURRY INLET TEMP. (deg.C) : 241.7
AVE. REACTOR TEMPERATURE (deg.C) : 249.9
REACTOR OUTLET TEMP. (deg.C) : 248.1
REACTOR GAS INLET PRESSURE (kPa) : 5609
PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5273
GAS SUPERFICIAL VELOCITY (cm/sec) : 15.3
LIQUID SUPERFICIAL VELOCITY (cm/sec) : 1.9
SLURRY CONCENTRATION (wt%): 35.5
SPACE VELOCITY (1/kg-hr) : 1145^o
RECYCLE/FRESH FEED RATIO : 4.68
OIL/SLURRY CIRCULATION RATE (m3/hr) : 17.5
PROD.SEPARATOR GAS FLOWRATE <50> + <55> (ksmol/hr) : 144.24
PURGE GAS FLOW RATE <50> (ksmol/hr) : 4.54

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	MEDM PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT	<MOLZ>		<MOLZ>		<MOLZ>		<MOLZ>	<WTZ>
H2	57.55	30.09	35.35	35.35	28.45	28.35	6.71	---
CO	36.98	54.17	51.18	51.19	51.23	51.26	24.69	---
CO2	3.01	13.41	11.60	11.56	12.85	12.83	59.94	---
N2	0.14	0.85	0.73	0.73	0.81	0.80	0.15	---
CH4	0.11	0.76	0.64	0.65	0.71	0.72	0.48	---
H2O	0.00	0.00	0.00	0.00	0.04	0.01	9.00	1.03
CH3OH	0.00	0.70	0.57	0.57	6.05	5.98	6.32	95.05
DME	0.00	0.03	0.92	0.93	0.01	0.02	0.52	0.00
C2H5OH	---	---	---	---	---	---	---	0.89
C3OH'S	---	---	---	---	---	---	---	0.39
C4OH'S	---	---	---	---	---	---	---	0.27
C5OH'S	---	---	---	---	---	---	---	0.20
ALKATENES	---	---	---	---	---	---	---	0.00
ESTERS	---	---	---	---	---	---	---	0.67
ALDEHYDES	---	---	---	---	---	---	---	0.00
OIL	---	---	---	---	---	---	---	1.50
TOTAL :	97.78	100.02	100.09	100.06	100.16	99.97	98.80	100.00
DENS,g/cc	0.005	0.046	0.033	0.033	0.029	0.029	0.004	0.790
AV.MOL.WT	13.19	22.26	20.64	20.63	22.84	22.85	36.25	32.57
Mm3/hr	669.6	3131.2	3791.0	3792.8	3425.9	3423.9	5.7	---
ksmol/hr	29.87	139.70	169.13	169.21	152.84	152.75	0.25	8.35
l/hr*Prod	---	---	---	---	---	---	---	343.99

* Compositions correspond to STREAM#32

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
 CONVERSION-SELECTIVITY-PRODUCTIVITY
 =====

CONVERSIONS ACROSS REACTOR :

	GC#1	GC#2
HYDROGEN CONVERSION (Z) :	27.5	27.3
CARBON MONOXIDE CONVERSION (Z) :	9.5	9.6
CARBON DIOXIDE CONVERSION (Z) :	0.1	-0.4
RATIO H2 CONSUMED/CO CONSUMED :	1.99	1.97

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

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL *
CO (+CO2) SELECTIVITY TO METHANOL (Z) :	99.6	95.8
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	kg/1000 Nm3 fresh feed	kg/1000 Nm3 reactor feed
As calculated ACROSS REACTOR	24.85	393.6	69.5
As Net MeOH produced, OVERALL balance	24.51	388.2	68.5

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.38
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	33.6
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	98.0
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	8.23

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0050 20-Jul-85 - 3400 20-Jul-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
	% diff.	% diff.	% diff.
H2	-1.05902	-0.98107	0.15381
CO	0.84948	0.11622	0.22866
CO2	-03.11230	0.39420	1.47535
N2	-151.96900	0.08469	-4.32537
CH4	n.a.	-0.18177	-13.94220
H2O	-----	n.a.	-181.98500
CH3OH	-----	2.28889	1.67476

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	
CARBON:							
CO	86.6127	75.6675	2.4597	0.0623	-----	78.1894	9.7252
CO2	19.5590	18.7360	0.6090	0.1512	-----	19.4962	0.3214
CH3OH	0.9588	0.9812	0.0319	0.0159	8.0638	9.0929	-848.3740
OTHERS	1.1406	1.1044	0.0359	0.0025	0.2925	1.4353	-25.8384
TOTAL C	108.2710	96.4891	3.1365	0.2319	8.3563	108.2140	0.0529
HYDROGEN:							
H2	119.6160	84.0714	2.7329	0.0338	-----	86.8381	27.4023
H2O	0.0000	0.0000	0.0000	0.0000	0.3103	0.3103	n.a.
OTHERS	8.4912	8.4329	0.2741	0.0764	33.0131	41.7965	-392.2350
TOTAL H	128.1070	92.5043	3.0070	0.1102	33.3234	128.9450	-0.6543
OXYGEN:							
TOTAL O	126.7360	114.1660	3.7111	0.3818	8.3635	126.6220	0.0900
NITROGEN:							
TOTAL N	2.4606	2.3808	0.0774	0.0008	-----	2.4589	0.0693
TOTAL MASS FLOW (kg/hr)	3490.2900	3112.2000	101.1670	9.1413	267.7740	3490.2900	0.0002

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (%) :	100.000	100.000
ELEMENTAL BALANCE, (%) :		
CARBON	99.879	100.010
HYDROGEN	99.781	100.369
OXYGEN	99.888	100.132
NITROGEN	100.055	100.610

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
ENTRAINED MOLE
PROCESS VARIABLES & ANALYTICAL SUMMARY
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DATE : 07-Aug-85
 TIME : 03:18 PM
 TIME INTERVAL: FROM: 0000 21-Jul TO: 2400 21-Jul
 NUMBER OF AVERAGED HOURS : 24
 RUN ID NUMBER : E-4F
 FEED GAS TYPE: CO-RICH GAS
 REACTOR FEED GAS INLET TEMP. (deg.C) : 152.8
 OIL/SLURRY INLET TEMP. (deg.C) : 241.6
 AVE. REACTOR TEMPERATURE (deg.C) : 250.0
 REACTOR OUTLET TEMP. (deg.C) : 248.2
 REACTOR GAS INLET PRESSURE (kPa) : 5611
 PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5273
 GAS SUPERFICIAL VELOCITY (cm/sec) : 15.3
 LIQUID SUPERFICIAL VELOCITY (cm/sec) : 1.8
 SLURRY CONCENTRATION (wt%) : 32.9
 SPACE VELOCITY (1/ks-hr) : 11819
 RECYCLE/FRESH FEED RATIO : 4.67
 OIL/SLURRY CIRCULATION RATE (m3/hr) : 15.9
 PROD. SEPARATOR GAS FLOWRATE <50> + <55> (ksmol/hr) : 144.29
 PURGE GAS FLOW RATE <50> (ksmol/hr) : 4.56

STREAM #	1	55	10	15	25A	25B	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	<MOLZ>		<MOLZ>		<MOLZ>		<MOLZ>	
H2	57.42	30.24	35.44	35.52	28.61	28.50	6.71	-----
CO	36.87	53.77	50.86	50.83	50.87	50.88	24.69	-----
CO2	3.09	13.52	11.69	11.66	12.94	12.93	59.94	-----
N2	0.15	0.97	0.82	0.82	0.91	0.91	0.15	-----
CH4	0.11	0.78	0.66	0.66	0.74	0.74	0.48	-----
H2O	0.00	0.00	0.00	0.00	0.04	0.00	0.00	1.06
CH3OH	0.00	0.72	0.58	0.58	6.09	5.99	6.32	95.25
DME	0.00	0.03	0.02	0.03	0.01	0.02	0.52	0.00
C2H5OH	-----	-----	-----	-----	-----	-----	-----	0.82
C3OH'S	-----	-----	-----	-----	-----	-----	-----	0.35
C4OH'S	-----	-----	-----	-----	-----	-----	-----	0.23
C5OH'S	-----	-----	-----	-----	-----	-----	-----	0.17
ALKANENES	-----	-----	-----	-----	-----	-----	-----	0.00
ESTERS	-----	-----	-----	-----	-----	-----	-----	0.61
ALDEHYDES	-----	-----	-----	-----	-----	-----	-----	0.00
OIL	-----	-----	-----	-----	-----	-----	-----	1.50
TOTAL :	97.65	100.03	100.07	100.11	100.23	99.98	98.60	100.00
DENS,g/cc	0.005	0.046	0.033	0.033	0.029	0.029	0.004	0.790
AV.MOL.WT	13.22	22.26	20.52	20.60	22.81	22.83	36.25	32.53
M3/hr	670.3	3131.9	3790.3	3793.9	3426.5	3424.1	5.1	-----
ksmol/hr	29.91	139.73	169.10	169.26	152.87	152.76	0.23	8.35
l/hr,prod	-----	-----	-----	-----	-----	-----	-----	343.52

* Compositions correspond to STREAM#32

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

0990 21-Jul-85 - 2400 21-Jul-85

CONVERSIONS ACROSS REACTOR :

		<u>SC#1</u>	<u>SC#2</u>
HYDROGEN CONVERSION	(%) :	27.3	27.2
CARBON MONOXIDE CONVERSION	(%) :	9.4	9.6
CARBON DIOXIDE CONVERSION	(%) :	0.1	-0.2
RATIO H ₂ CONSUMED/CO CONSUMED	:	1.98	1.98

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

SELECTIVITIES :

		<u>ACROSS REACTOR</u> <u>SC Average</u>	<u>OVERALL</u> <u>*</u>
CO (+CO ₂) SELECTIVITY TO METHANOL	(%) :	99.8	95.8
CO (+CO ₂) SELECTIVITY TO ETHANOL	(%) :		0.6

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

METHANOL PRODUCTIVITIES & YIELDS

METH SOURCE	<u>kmol/hr-kg cat</u>	<u>kg/1000 Nm³ fresh feed</u>	<u>kg/1000 Nm³ reactor feed</u>
As calculated ACROSS REACTOR	25.68	394.1	69.6
As Net MeOH produced, OVERALL balance	25.29	389.0	68.6

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) :	33.4
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	97.9
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	8.24

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

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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
	<% diff.>	<% diff.>	<% diff.>
H2	-0.58454	-1.16645	0.22440
CO	1.04295	0.13923	0.22701
CO2	-93.07550	0.36538	1.39548
N2	-159.93300	0.16719	-3.88908
CH4	n.a.	-0.01592	-11.23440
H2O	-----	n.a.	-149.33100
CH3OH	-----	1.99446	1.98177

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	
CARBON:							
CO	86.0407	75.1343	2.4521	0.0560	-----	77.6424	9.7609
CO2	19.7375	18.8862	0.6164	0.1359	-----	19.6386	0.5012
CH3OH	0.9888	1.0089	0.0329	0.0143	8.0699	9.1261	-872.9650
OTHERS	1.1681	1.1321	0.0369	0.0023	0.2621	1.4334	-22.7141
TOTAL C	107.9350	96.1615	3.1383	0.2085	8.3320	107.8400	0.0877
HYDROGEN:							
H2	120.2340	84.5011	2.7578	0.0304	-----	87.2893	27.4004
H2O	0.0000	0.0000	0.0000	0.0000	0.3205	0.3205	n.a.
OTHERS	8.7162	8.6480	0.2822	0.0687	32.9598	41.9588	-381.3920
TOTAL H	128.9500	93.1491	3.0400	0.0991	33.2803	129.5590	-0.4797
OXYGEN:							
TOTAL O	126.5490	113.9580	3.7191	0.3434	8.3615	126.3820	0.1320
NITROGEN:							
TOTAL N	2.7916	2.7053	0.0883	0.0007	-----	2.7943	-0.0960
TOTAL MASS FLOW (kg/hr)	3486.8300	3109.7100	101.4890	8.2206	267.4070	3486.8300	0.0001

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.898	100.047
HYDROGEN	99.945	100.442
OXYGEN	99.896	100.134
NITROGEN	100.572	100.197

LaPORTE LPMETHANOL PROCESS AVERAGE REFGPT
ENTRAINED MOPE
PROCESS VARIABLES & ANALYTICAL SUMMARY

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DATE : 07-Aug-85
 TIME : 03:22 PM
 TIME INTERVAL : FROM: 0000 22-Jul TO: 2400 22-Jul
 NUMBER OF AVERAGED HOURS : 23
 RUN ID NUMBER : E-4F
 FEED GAS TYPE: CO-RICH GAS
 REACTOR FEED GAS INLET TEMP. (deg.C) : 152.8
 OIL/SLURRY INLET TEMP. (deg.C) : 241.7
 AVE. REACTOR TEMPERATURE (deg.C) : 250.1
 REACTOR OUTLET TEMP. (deg.C) : 248.3
 REACTOR GAS INLET PRESSURE (kPa) : 5616
 PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5273
 GAS SUPERFICIAL VELOCITY (cm/sec) : 15.3
 LIQUID SUPERFICIAL VELOCITY (cm/sec) : 1.8
 SLURRY CONCENTRATION (wt%) : 33.7
 SPACE VELOCITY (1/ks-hr) : 11437
 RECYCLE/FRESH FEED RATIO : 4.68
 OIL/SLURRY CIRCULATION RATE (m3/hr) : 16.9
 PROD. SEPARATOR GAS FLOWRATE <50> + <55> (ksmol/hr) : 144.53
 PURGE GAS FLOW RATE <50> (ksmol/hr) : 4.58

STREAM #	1	55	10	15	25*	25*	62	68
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	W/L SEP	W/L SEP	FLASH GAS	MEDIA PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT	=====		=====		=====		=====	
	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<WTZ>
H2	57.30	39.09	35.33	35.34	28.50	28.42	6.71	-----
CO	36.89	53.70	50.79	50.80	50.86	50.88	24.69	-----
CO2	3.17	13.70	11.85	11.84	13.15	13.12	59.94	-----
N2	0.15	0.98	0.83	0.83	0.93	0.92	0.15	-----
CH4	0.12	0.60	0.67	0.68	0.75	0.75	0.48	-----
H2O	0.00	0.00	0.00	0.00	0.04	0.04	0.00	1.09
CH3OH	0.00	0.73	0.58	0.58	6.06	5.96	6.32	95.31
DME	0.00	0.03	0.02	0.02	0.01	0.02	0.52	0.00
C2H5OH	-----	-----	-----	-----	-----	-----	-----	0.80
C3OH'S	-----	-----	-----	-----	-----	-----	-----	0.35
C4OH'S	-----	-----	-----	-----	-----	-----	-----	0.20
C5OH'S	-----	-----	-----	-----	-----	-----	-----	0.16
ALKANES	-----	-----	-----	-----	-----	-----	-----	0.00
ESTERS	-----	-----	-----	-----	-----	-----	-----	0.61
ALDEHYDES	-----	-----	-----	-----	-----	-----	-----	0.00
OIL	-----	-----	-----	-----	-----	-----	-----	1.48
TOTAL :	97.63	100.02	100.98	100.08	100.30	100.11	98.80	100.00
DENS,g/cc	0.005	0.047	0.033	0.033	0.029	0.029	0.094	0.790
AV.MOL.WT	13.26	22.32	20.68	20.67	22.89	22.88	36.25	32.50
Mm3/hr	669.8	3136.9	3796.6	3797.2	3431.3	3430.9	3.7	-----
ksmol/hr	29.89	139.95	169.38	169.41	153.08	153.07	0.16	8.43
l/hr-prod	-----	-----	-----	-----	-----	-----	-----	346.83

* Compositions correspond to STREAM#32

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
 CONVERSION-SELECTIVITY-PRODUCTIVITY

0000 22-Jul-85 - 2400 22-Jul-85

CONVERSIONS ACROSS REACTOR :

	GC#1	GC#2
	---	---
HYDROGEN CONVERSION (Z) :	27.3	27.1
CARBON MONOXIDE CONVERSION (Z) :	9.5	9.5
CARBON DIOXIDE CONVERSION (Z) :	-0.1	-0.4
RATIO H2 CONSUMED/CO CONSUMED :	2.01	1.98

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

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL *
	---	---
CO (+CO2) SELECTIVITY TO METHANOL (Z) :	101.2	96.3
CO (+CO2) SELECTIVITY TO ETHANOL (Z) :		0.6

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

METHANOL PRODUCTIVITIES & YIELDS

MEDH SOURCE	smol/hr-kg cat	kg/1000 Nm3 fresh feed	kg/1000 Nm3 reactor feed
	---	---	---
As calculated ACROSS REACTOR	24.75	393.2	59.4
As Net MeOH produced, OVERALL balance	24.69	392.2	59.2

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.38
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	33.2
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	99.2
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	8.22

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	[PURE GASES - 1] FRESH FEED GAS	[(1+55)-153] REACTOR FEED	[25 - (50+51+62+68)] REACTOR EFFLUENT
	<% diff.>	<% diff.>	<% diff.>
H2	-0.27793	-1.07277	0.27579
CO	1.08923	0.13615	0.32971
CO2	-93.55940	0.29154	1.67679
N2	-165.66600	0.45480	-2.56584
CH4	n.a.	0.77562	-9.48295
H2O		n.a.	-144.56500
CH3OH		4.41031	0.60832

OVERALL ELEMENTAL BALANCE (Ks-atoms/hr) :

STREAM # STREAM NAME	INPUTS		OUTPUTS			TOTAL	(IN-OUT)/IN %
	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	62 FLASH GAS	68 MeOH PRODUCT		
CARBON:							
CO	86.0520	75.1467	2.4585	0.0408	---	77.6459	9.7686
CO2	20.0574	19.1684	0.6271	0.0990	---	19.8945	0.8124
CH3OH	0.9748	1.0197	0.0334	0.0104	9.1528	9.2163	-845.5040
OTHERS	1.1862	1.1584	0.0379	0.0016	0.2560	1.4539	-22.5688
TOTAL C	108.2700	96.4932	3.1569	0.1518	8.4088	108.2110	0.0552
HYDROGEN:							
H2	119.7330	94.2224	2.7554	0.0221	---	86.9999	27.3386
H2O	0.0000	0.0000	0.0000	0.0000	0.3308	0.3306	n.a.
OTHERS	8.7282	8.7943	0.2877	0.0500	33.2755	42.4075	-385.8680
TOTAL H	128.4620	93.0166	3.0432	0.0722	33.6063	129.7380	-0.9937
OXYGEN:							
TOTAL O	127.1840	114.5440	3.7474	0.2500	9.4479	126.9890	0.1529
NITROGEN:							
TOTAL N	2.8227	2.7434	0.0898	0.0605	---	2.8337	-0.3891
TOTAL MASS FLOW (ks/hr)	3501.9000	3123.6900	102.1950	5.9846	270.0380	3501.9100	-0.0000

REACTOR GAS BALANCE (OUT/IN) :

	5C#1	6C#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.993	100.132
HYDROGEN	99.959	100.553
OXYGEN	100.057	100.242
NITROGEN	100.397	100.677

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

DATE : 07-Aug-85
 TIME : 04:19 PM
 TIME INTERVAL: FROM: 0000 23-Jul TO: 2300 23-Jul
 25
 E-4F
 FEED GAS TYPE: CO-RICH GAS
 REACTOR FEED GAS INLET TEMP. (des.C) : 152.9
 OIL/SLURRY INLET TEMP. (des.C) : 242.0
 AVE. REACTOR TEMPERATURE (des.C) : 250.3
 REACTOR OUTLET TEMP. (des.C) : 249.6
 REACTOR GAS INLET PRESSURE (kPa) : 5616
 PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5272
 GAS SUPERFICIAL VELOCITY (cm/sec) : 15.3
 LIQUID SUPERFICIAL VELOCITY (cm/sec) : 1.9
 SLURRY CONCENTRATION (wt%) : 34.0
 SPACE VELOCITY (1/ks-hr) : 11231
 RECYCLE/FRESH FEED RATIO : 4.67
 OIL/SLURRY CIRCULATION RATE (m3/hr) : 17.0
 PROD. SEPARATOR GAS FLOWRATE <50> + <55> (ksmol/hr) : 144.59
 PURGE GAS FLOW RATE <50> (ksmol/hr) : 4.57

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	57.60	30.21	35.48	35.46	28.62	28.32	6.71	-----
CO	36.80	53.59	50.78	50.75	50.84	50.84	24.60	-----
CO2	3.16	13.76	11.90	11.87	13.18	13.17	59.94	-----
N2	0.13	0.82	0.69	0.69	0.77	0.77	0.15	-----
CH4	0.11	0.74	0.62	0.63	0.70	0.70	0.48	-----
H2O	0.00	0.00	0.00	0.00	0.05	0.07	0.00	1.99
CH3OH	0.00	0.72	0.58	0.57	6.08	6.01	6.32	95.37
DME	0.00	0.03	0.02	0.02	0.01	0.02	0.52	0.00
C2H5OH	-----	-----	-----	-----	-----	-----	-----	0.78
C3OH'S	-----	-----	-----	-----	-----	-----	-----	0.34
C4OH'S	-----	-----	-----	-----	-----	-----	-----	0.21
C5OH'S	-----	-----	-----	-----	-----	-----	-----	0.15
ALKATENES	-----	-----	-----	-----	-----	-----	-----	0.00
ESTERS	-----	-----	-----	-----	-----	-----	-----	0.60
ALDEHYDES	-----	-----	-----	-----	-----	-----	-----	0.00
OIL	-----	-----	-----	-----	-----	-----	-----	1.45
TOTAL :	97.79	99.97	100.08	100.00	100.25	99.90	98.80	100.00
DENS,g/cc	0.005	0.046	0.033	0.033	0.029	0.029	0.004	0.790
AV.MOL.WT	13.20	22.30	20.65	20.64	22.85	22.90	36.25	32.49
M3/hr	671.5	3138.4	3791.9	3795.9	3429.0	3421.3	2.6	-----
ksmol/hr	29.96	140.02	169.17	169.35	152.98	152.64	0.12	8.35
l/hr,prod	-----	-----	-----	-----	-----	-----	-----	343.05

* Compositions correspond to STREAM#32

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

0000 23-Jul-85 - 2300 23-Jul-85

CONVERSIONS ACROSS REACTOR :

	GC#1	GC#2
HYDROGEN CONVERSION (Z) :	28.0	27.1
CARBON MONOXIDE CONVERSION (Z) :	9.7	9.5
CARBON DIOXIDE CONVERSION (Z) :	0.2	-0.3
RATIO H2 CONSUMED/CO CONSUMED :	2.02	1.99

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

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL *
CO (+CO2) SELECTIVITY TO METHANOL (Z) :	100.4	96.8
CO (+CO2) SELECTIVITY TO ETHANOL (Z) :	-----	0.5

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

METHANOL PRODUCTIVITIES & YIELDS

MECH SOURCE	gmo1/hr-kg cat	kg/1000 Nm3 fresh feed	kg/1000 Nm3 reactor feed
As calculated ACROSS REACTOR	24.44	394.3	69.7
As Net MeOH produced, OVERALL balance	23.99	387.0	68.5

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.38
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	33.0
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS Z OF CALCULATED :	97.7
CALCULATED METHANOL PRODUCTION RATE (Ksmo1/hr) :	8.26

LAPORTE LP-METHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 23-Jul-85 - 2300 25-Jul-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	[PURE GASES - 11 FRESH FEED GAS	[(1455)-15] REACTOR FEED	[25 - (50451+62+69)] REACTOR EFFLUENT
	<% diff.>	<% diff.>	<% diff.>
H2	-1.08152	-0.82201	0.19414
CO	1.07473	0.29000	0.18933
CO2	-93.32850	0.58758	1.31743
N2	-111.81100	0.61832	-2.54790
CH4	n.a.	-0.45029	-6.45903
H2O	-----	100.00000	-118.15300
CH3OH	-----	4.30414	1.97401

OVERALL ELEMENTAL BALANCE (Kg-atoms/hr) :

STREAM # STREAM NAME	INPUTS		OUTPUTS			TOTAL	(IN-OUT)/IN %
	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	62 FLASH GAS	68 MeOH PRODUCT		
CARBON:							
CO	85.9445	75.1708	2.4528	0.0790	-----	77.6526	9.6480
CO2	20.0995	19.2709	0.6288	0.0704	-----	19.9701	0.6436
CH3OH	0.9662	1.0097	0.0329	0.0074	8.0691	9.1191	-843.8070
OTHERS	1.1086	1.0675	0.0348	0.0012	0.2483	1.3519	-21.9473
TOTAL C	108.1190	96.5189	3.1494	0.1080	8.3174	108.0940	0.0232
HYDROGEN:							
H2	120.0990	84.6066	2.7607	0.0158	-----	87.3831	27.2408
H2O	0.0000	0.0000	0.0000	0.0000	0.3294	0.3294	n.a.
OTHERS	8.3817	8.3819	0.2735	0.0356	32.9200	41.6110	-396.4500
TOTAL H	128.4810	92.9885	3.0342	0.0513	33.2494	129.3230	-0.6559
OXYGEN:							
TOTAL O	127.1510	114.7590	3.7446	0.1779	8.3599	127.0410	0.0863
NITROGEN:							
TOTAL N	2.3482	2.2875	0.0746	0.0004	-----	2.3625	-0.6073
TOTAL MASS FLOW (kg/hr)	3496.0300	3122.7000	101.8930	4.2583	267.1740	3496.0300	0.0001

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (%) :	100.000	100.000
ELEMENTAL BALANCE, (%) :		
CARBON	99.862	100.170
HYDROGEN	99.553	100.633
OXYGEN	99.928	100.275
NITROGEN	100.714	100.502

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

DATE :	07-Aug-85
TIME :	05:36 PM
TIME INTERVAL:	
	FROM: 1200 24-Jul
	TO: 0500 25-Jul
NUMBER OF AVERAGED HOURS :	16
RUN ID NUMBER :	E-46
FEED GAS TYPE:	BALANCED GAS
REACTOR FEED GAS INLET TEMP. (deg.C) :	152.5
OIL/SLURRY INLET TEMP. (deg.C) :	241.7
AVE. REACTOR TEMPERATURE (deg.C) :	250.1
REACTOR OUTLET TEMP. (deg.C) :	248.2
REACTOR GAS INLET PRESSURE (kPa) :	5515
PRIMARY SEPARATOR GAS PRESSURE (kPa) :	5273
GAS SUPERFICIAL VELOCITY (cm/sec) :	15.4
LIQUID SUPERFICIAL VELOCITY (cm/sec) :	1.9
SLURRY CONCENTRATION (wt%) :	33.9
SPACE VELOCITY (1/kg-hr) :	11134
RECYCLE/FRESH FEED RATIO :	4.66
OIL/SLURRY CIRCULATION RATE (m ³ /hr) :	17.0
PROD.SEPARATOR GAS FLOWRATE <S0> + <S5> (kmol/hr) :	144.52
PURGE GAS FLOW RATE <S0> (kmol/hr) :	4.52

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 GC#	1	2	1	2	2	1		
COMPONENT								
	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<WTZ>
H2	63.67	53.07	55.99	55.16	50.15	50.41	6.71	---
CO	28.90	17.99	19.94	19.98	16.97	16.91	24.69	---
CO2	2.55	5.45	4.92	4.91	5.19	5.19	59.94	---
N2	3.71	22.17	18.83	18.86	20.88	20.90	0.15	---
CH4	0.10	0.66	0.57	0.55	0.62	0.63	0.48	---
H2O	0.00	0.00	0.00	0.00	0.13	0.19	0.00	2.65
CH3OH	0.00	0.65	0.51	0.50	6.10	6.08	6.32	95.50
DME	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00
C2H5OH	---	---	---	---	---	---	---	0.18
C3OH'S	---	---	---	---	---	---	---	0.07
C4OH'S	---	---	---	---	---	---	---	0.03
C5OH'S	---	---	---	---	---	---	---	0.01
ALKANENES	---	---	---	---	---	---	---	0.00
ESTERS	---	---	---	---	---	---	---	0.18
ALDEHYDES	---	---	---	---	---	---	---	0.00
OIL	---	---	---	---	---	---	---	1.39
TOTAL :	98.94	99.99	99.87	99.97	100.00	100.32	98.90	100.00
DENS,g/cc	0.004	0.031	0.022	0.022	0.020	0.020	0.004	0.790
AV.MOL.WT	11.68	15.03	14.41	14.41	15.96	15.93	36.25	31.85
m ³ /hr	673.5	3138.2	3802.0	3807.7	3437.0	3444.8	4.1	---
kmol/hr	30.95	140.01	169.62	169.88	153.34	153.69	0.18	8.55
l/hr,prod	---	---	---	---	---	---	---	344.47

* Compositions correspond to STREAM#32

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
 CONVERSION-SELECTIVITY-PRODUCTIVITY
 =====

1000 24-Jul-85 - 0500 25-Jul-85

CONVERSIONS ACROSS REACTOR :

	SC#1	SC#2
HYDROGEN CONVERSION (Z) :	17.1	17.9
CARBON MONOXIDE CONVERSION (Z) :	23.2	23.5
CARBON DIOXIDE CONVERSION (Z) :	4.3	4.8
RATIO H2 CONSUMED/CO CONSUMED :	2.04	2.10

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

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL *
CO (+CO2) SELECTIVITY TO METHANOL (Z) :	102.5	100.1
CO (+CO2) SELECTIVITY TO ETHANOL (Z) :		0.1

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

METHANOL PRODUCTIVITIES & YIELDS

MEOH SOURCE	smol/hr-kg cat	kg/1000 Na3 fresh feed	kg/1000 Na3 reactor feed
As calculated ACROSS REACTOR	24.83	404.1	71.5
As Net MeOH produced, OVERALL balance	23.84	387.9	68.6

REACTOR FEED (H2/(CO+1.5CO2)) :	2.02
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	2.02
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	33.8
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	95.5
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	8.49

LaPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

=====

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	[PURE GASES - 1] FRESH FEED GAS	[(1+55)-15] REACTOR FEED	E25 - (50+51+62+68) REACTOR EFFLUENT
	<% diff.>	<% diff.>	<% diff.>
H2	-3.64413	-0.28786	0.25157
CO	1.74706	-0.18556	-0.20467
CO2	-88.24980	0.56265	1.10849
N2	n.a.	0.36265	-0.24907
CH4	n.a.	1.79292	-11.54360
H2O		n.a.	-100.10400
CH3OH		5.40098	3.23657

OVERALL ELEMENTAL BALANCE (Kg-atoms/hr) :

STREAM # STREAM NAME	INPUTS		OUTPUTS			TOTAL	(IN-OUT)/IN %
	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	52 FLASH GAS	68 MeOH PRODUCT		
CARBON:							
CO	33.9364	25.1897	0.8124	0.0449	-----	26.0470	23.2477
CO2	8.3440	7.6254	0.2459	0.1090	-----	7.9804	4.3577
CH3OH	0.8545	0.9032	0.0291	0.0115	8.1132	9.0571	-959.9740
OTHERS	0.9469	0.9312	0.0300	0.0018	0.0527	1.0157	-7.2668
TOTAL C	44.0818	34.6495	1.1175	0.1672	8.1659	44.1001	-0.0417
HYDROGEN:							
H2	187.4100	148.6060	4.7927	0.0244	-----	153.4230	18.1355
H2O	0.0000	0.0000	0.0000	0.0000	0.8012	0.8012	n.a.
OTHERS	7.2295	7.3490	0.2370	0.0551	32.5885	40.2297	-457.1630
TOTAL H	194.6310	155.9550	5.0297	0.0795	33.3898	194.4540	0.0911
OXYGEN:							
TOTAL O	51.4862	41.3493	1.3336	0.2754	8.5450	51.5032	-0.0330
NITROGEN:							
TOTAL N	64.0867	62.0908	2.0025	0.0005	-----	64.0938	-0.0112
TOTAL MASS FLOW (kg/hr)	2447.7500	2104.8200	67.8831	6.5930	268.4560	2447.7500	0.0002

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	100.644	100.306
HYDROGEN	191.327	100.430
OXYGEN	100.422	99.891
NITROGEN	100.550	99.902