

VI. REFERENCES

1. Topical Report, "LaPorte LPMEOH PDU Renovation, Installation, and Shakedown (Run F-1)," prepared by Air Products and Chemicals, Inc. for the U.S. DOE under Contract No. DE-AC22-81PC30019, 1 October 1985.
2. Topical Report, "Liquid-Entrained Operations in LaPorte LPMEOH PDU," prepared by Air Products and Chemicals, Inc. for the U.S. DOE under Contract No. DE-AC22-81PC30019, 31 January 1986.

APPENDIX A

RUN E-4 DETAILED DATA ACQUISITION SHEETS

REPORT: METHANOL PROCESS AVERAGE REPORT
 ENTRAINED MODE
 PROCESS VARIABLES & ANALYTICAL SUMMARY
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DATE : 07-Aug-85
 TIME : 10:59 AM
 TIME INTERVAL: FROM: 1900 15-01 TO: 2000 15-01
 NUMBER OF AVERAGED HOURS : 1
 RUN ID NUMBER : E-40
 FEED GAS TYPE: CO-RICH GAS
 REACTOR FEED GAS INLET TEMP. (deg.C) : 151.5
 OIL/SLURRY INLET TEMP. (deg.C) : 244.6
 AVE. REACTOR TEMPERATURE (deg.C) : 250.8
 REACTOR OUTLET TEMP. (deg.C) : 249.3
 REACTOR GAS INLET PRESSURE (kPa) : 5520
 PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5200
 GAS SUPERFICIAL VELOCITY (cm/sec) : 11.8
 LIQUID SUPERFICIAL VELOCITY (cm/sec) : 5.4
 SLURRY CONCENTRATION (wt%) : 47.0
 SPACE VELOCITY (1/hrs-hr) : 48.9
 RECYCLE/FRESH FEED RATIO : 1.15
 OIL/SLURRY CIRCULATION RATE (m3/hr) : 51.1
 PROD. SEPARATOR GAS FLOWRATE (50% + 55%) (kmol/hr) : 107.17
 PURGE GAS FLOW RATE (50%) (kmol/hr) : 4.54

STREAM #	1	55	10	15	25A	27A	32	40
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	VAL SEP	VAL SEP	FLASH GAS	MECH PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT	=====		=====		=====		=====	
	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<WT%>
H2	57.57	25.64	34.95	33.49	24.34	23.31	6.71	-----
CO	37.92	53.06	49.13	49.59	48.63	49.84	24.69	-----
CO2	2.04	15.33	12.22	11.91	14.93	14.26	59.94	-----
N2	0.12	4.74	3.49	3.90	3.92	4.47	0.15	-----
CH4	0.05	0.44	0.36	0.33	0.44	0.43	0.48	-----
H2O	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.94
CH3OH	0.00	0.72	0.54	0.50	8.06	8.06	6.32	94.62
DME	0.00	0.08	0.06	0.05	0.05	0.06	0.52	0.00
C2H5OH	-----	-----	-----	-----	-----	-----	-----	0.94
C3OH'S	-----	-----	-----	-----	-----	-----	-----	0.27
C4OH'S	-----	-----	-----	-----	-----	-----	-----	0.52
C5OH'S	-----	-----	-----	-----	-----	-----	-----	0.25
ALKANES	-----	-----	-----	-----	-----	-----	-----	0.06
ESTERS	-----	-----	-----	-----	-----	-----	-----	0.93
ALDEHYDES	-----	-----	-----	-----	-----	-----	-----	0.00
OIL	-----	-----	-----	-----	-----	-----	-----	1.50
TOTAL :	97.76	100.01	99.85	99.78	100.26	99.47	98.80	100.00
DENS, g/cc	0.004	0.049	0.033	0.033	0.030	0.030	0.004	0.790
AV. MOL. WT	13.02	23.79	21.09	21.19	24.35	24.59	36.25	32.68
Nm3/hr	704.3	2215.2	2900.4	2911.4	2533.4	2517.7	4.4	-----
kmol/hr	31.42	98.87	129.40	129.89	113.03	112.32	0.21	8.8e
1/hr*prod	-----	-----	-----	-----	-----	-----	-----	366.42

* Compositions correspond to STREAM#32

LEPORTE LE METHANOL PROCESS AVERAGE REPORT
 CONVERSION-SELECTIVITY-PRODUCTIVITY

1990 15-Jul-95 - 2000 15-Jul-95

CONVERSIONS ACROSS REACTOR

	60#1	60#2
HYDROGEN CONVERSION (%) :	40.2	36.9
CARBON MONOXIDE CONVERSION (%) :	12.7	14.7
CARBON DIOXIDE CONVERSION (%) :	-1.4	-9.4
RATIO H2 CONSUMED/CO CONSUMED :	2.95	1.69

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

SELECTIVITIES :

	ACROSS REACTOR Bl. Average	OVERALL *
CO (+CO2) SELECTIVITY TO METHANOL (%) :	101.6	94.9
CO (+CO2) SELECTIVITY TO ETHANOL (%) :		0.1

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

METHANOL PRODUCTIVITIES & YIELDS

MEOH SOURCE	gmol/hr-kg cat	kg/1000 Me3 fresh feed	kg/1000 Me3 reactor feed
As calculated ACROSS REACTOR	14.05	102.1	92.5
As Net MeOH produced OVERALL balance	14.39	101.1	94.6

REACTOR FEED (H2/(CO+1.5CO2)) :	0.50
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.25
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	16.5
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	0.2
METHANOL COLLECTED AS % OF CALCULATED :	101.8
CALCULATED METHANOL PRODUCTION RATE (Kmol/hr) :	8.40

LSPORTE UPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	(PURE BASES - 1) FRESH FEED GAS	(14551-15) REACTOR FEED	(25 - 150+51443468) REACTOR EFFLUENT
	% diff.	% diff.	% diff.
H2	-1.60340	-0.13516	3.60869
CO	-0.50034	-0.05437	0.21148
CO2	-132.68400	2.09557	9.45401
H2O	-216.75000	-7.29469	-11.68640
CH4	n.a.	4.12764	-17.39390
H2O	-----	n.a.	n.a.
CH3OH	-----	9.34603	-2.11246

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	64.4167	52.4601	2.3870	0.0506	-----	54.8977	14.7692
CO2	15.4695	15.1567	0.6994	0.1229	-----	15.6692	-3.2304
CH3OH	0.6509	0.7192	0.0323	0.0139	9.5512	9.3067	-1329.7600
OTHERS	0.5027	0.5161	0.0235	0.0020	0.3753	0.9169	-82.4062
TOTAL C	91.0337	68.8431	3.1324	0.1885	9.9265	91.0905	-0.0701
HYDROGEN:							
H2	96.9979	50.7003	2.3069	0.0275	-----	53.0347	39.0391
H2O	0.0000	0.0000	0.0000	0.0000	0.3035	0.3035	n.a.
OTHERS	4.7546	5.0634	0.2304	0.0621	35.1594	40.5157	-752.1240
TOTAL H	91.7525	55.7636	2.5373	0.0896	35.4629	93.8534	-2.2897
OXYGEN:							
TOTAL O	96.0707	93.5628	3.8022	0.3104	8.8929	96.5674	-0.5179
NITROGEN:							
TOTAL N	10.1415	9.3788	0.4267	0.0006	-----	9.8061	3.3074
TOTAL MASS FLOW (ks/hr)	2751.7700	2352.0700	107.0220	7.4315	295.2330	2751.7600	0.0004

REACTOR GAS BALANCE (OUT/IN) :

	SC#1	SC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.826	100.397
HYDROGEN	97.547	102.146
OXYGEN	100.125	101.636
NITROGEN	111.128	87.464

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
ENTRAINED MODE
PROCESS VARIABLES & ANALYTICAL SUMMARY
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DATE : 00-04-85
 TIME : 01:05 PM
 TIME INTERVAL : FROM: 0000 16-Jul TO: 0100 16-Jul
 NUMBER OF AVERAGED HOURS : 1
 RUN ID NUMBER : E-4A
 FEED GAS TYPE: CO-RICH GAS
 REACTOR FEED GAS INLET TEMP. (deg.C) : 149.8
 OIL/SLURRY INLET TEMP. (deg.C) : 243.5
 AVE. REACTOR TEMPERATURE (deg.C) : 249.5
 REACTOR OUTLET TEMP. (deg.C) : 247.7
 REACTOR GAS INLET PRESSURE (kPa) : 5578
 PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5278
 GAS SUPERFICIAL VELOCITY (cm/sec) : 12.4
 LIQUID SUPERFICIAL VELOCITY (cm/sec) : 5.6
 SLURRY CONCENTRATION (wt%) : 47.4
 SPACE VELOCITY (1/kg-hr) : 5137
 RECYCLE/FRESH FEED RATIO : 3.35
 OIL/SLURRY CIRCULATION RATE (m3/hr) : 50.7
 PROD. SEPARATOR GAS FLOWRATE (50) + (55) (kmol/hr) : 141.85
 PURGE GAS FLOW RATE (50) (kmol/hr) : 5.00

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	MEOH PRODUCT
ON-LINE GC#	1	2	1	2	?	1		
COMPONENT								
	<MOL%>	<MOL%>	<MOL%>	<MOL%>	<MOL%>	<MOL%>	<MOL%>	<WT%>
H2	57.13	28.22	35.13	35.00	26.23	25.79	6.71	-----
CO	38.75	54.35	50.84	50.69	50.50	50.47	24.69	-----
CO2	1.83	14.74	11.68	11.90	13.84	13.93	59.04	-----
N2	0.12	1.40	1.07	1.15	1.22	1.31	0.15	-----
CH4	0.07	0.71	0.54	0.57	0.64	0.66	0.48	-----
H2O	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.71
CH3OH	0.00	0.69	0.53	0.51	7.52	7.44	6.32	92.34
DME	0.00	0.07	0.05	0.06	0.04	0.04	0.52	0.69
C2H5OH	-----	-----	-----	-----	-----	-----	-----	1.76
C3OH'S	-----	-----	-----	-----	-----	-----	-----	0.88
C4OH'S	-----	-----	-----	-----	-----	-----	-----	0.81
C5OH'S	-----	-----	-----	-----	-----	-----	-----	0.54
ALKATENES	-----	-----	-----	-----	-----	-----	-----	0.00
ESTERS	-----	-----	-----	-----	-----	-----	-----	0.97
ALDEHYDES	-----	-----	-----	-----	-----	-----	-----	0.00
OIL	-----	-----	-----	-----	-----	-----	-----	1.50
TOTAL :	97.89	100.17	99.86	99.89	100.04	99.58	98.80	100.00
DENS, g/cc	0.004	0.048	0.033	0.033	0.030	0.030	0.004	0.790
AV. MOL. WT	13.13	23.00	20.70	20.77	23.64	23.73	36.25	33.05
Nm3/hr	715.5	2394.9	3075.9	3072.0	2698.8	2689.4	4.3	-----
kmol/hr	31.92	106.85	137.23	137.06	120.40	119.09	0.19	8.22
l/hr,prod	-----	-----	-----	-----	-----	-----	-----	343.71

* Compositions correspond to STREAM#32

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

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0000 14-Jul-85 - 0100 14-Jul-85

CONVERSIONS ACROSS REACTOR :

	GC#1 ----	GC#2 ----
HYDROGEN CONVERSION (Z) :	35.9	34.2
CARBON MONOXIDE CONVERSION (Z) :	13.2	12.5
CARBON DIOXIDE CONVERSION (Z) :	-3.5	-2.9
RATIO H2 CONSUMED/CO CONSUMED :	1.97	1.89

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

SELECTIVITIES :

	ACROSS REACTOR GC Average -----	OVERALL * -----
CO (+CO2) SELECTIVITY TO METHANOL (Z) :	97.9	95.3
CO (+CO2) SELECTIVITY TO ETHANOL (Z) :	-----	1.2

* 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	13.85	371.1	96.4
As Net MeOH produced, OVERALL balance	13.24	354.6	82.6

REACTOR FEED (H2/(CO+1.5CO2)) :	0.51
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.37
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	24.2
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	95.0
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	8.29

LABORATORY METHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

0000 15-JUL-65 - 0100 15-JUL-65

COMPONENT BALANCE (IN-OUT/HR) :

STREAMS # STREAMS LOCATION COMPONENT :	PURE GASES - 11 FRESH FEED GAS	114551-151 REACTOR FEED	105 - 150451-6246212 REACTOR EFFLUENT
	% diff.	% diff.	% diff.
H2	-2.23707	0.86321	0.01489
O2	-0.68961	1.37071	0.02004
CO2	-149.27100	0.13793	1.19999
N2	-171.81100	-2.25722	-9.42124
CH4	n.a.	-0.12169	-17.94441
H2O		n.a.	-344.57000
CH3OH		5.29197	4.50154

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	58 MeOH PRODUCT		
CARBON:							
CO	49.4722	59.0692	2.7206	0.0476	-----	60.8368	12.4300
CO2	15.3093	15.7497	0.7377	0.1155	-----	16.6019	-1.7939
CH3OH	0.5957	0.7345	0.0344	0.0122	7.8702	9.6511	-1143.4200
OTHERS	0.8621	0.8302	0.0389	0.0019	0.6236	1.4946	-73.3699
TOTAL C	97.3393	75.3826	3.5309	0.1772	9.4939	87.5846	-9.2809
HYDROGEN:							
H2	95.9372	60.3023	2.8246	0.0259	-----	63.1527	34.1729
H2O	0.0000	0.0000	0.0000	0.0000	0.2141	0.2141	n.a.
OTHERS	6.3981	6.4062	0.3001	0.0584	33.1671	39.8718	-523.1950
TOTAL H	102.3354	66.7085	3.1246	0.0843	33.3213	103.2396	-0.8927
OXYGEN:							
TOTAL O	102.9700	90.3749	4.2332	0.2919	8.2467	103.1470	-0.2687
NITROGEN:							
TOTAL N	3.1604	2.9973	0.1399	0.0006	-----	3.1278	1.0318
TOTAL MASS FLOW (kg/hr)	2946.7900	2457.1400	115.6950	6.9975	257.5530	2846.7700	0.0006

REACTOR GAS BALANCE (OUT/IN) :

	50#1	50#2
MASS BALANCE (Z) :		
ELEMENTAL BALANCE (Z) :	100.000	100.000
CARBON	99.490	99.999
HYDROGEN	98.418	100.488
OXYGEN	100.142	100.430
NITROGEN	107.293	93.183

LAFORTE LPMETHANOL PROCESS AVERAGE REPORT
ENTRAINED MODE
PROCESS VARIABLES & ANALYTICAL SUMMARY
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DATE : 07-Aug-85
 TIME : 01:00 PM
 TIME INTERVAL : FROM: 0500 16-Jul TO: 0600 16-Jul
 NUMBER OF AVERAGED HOURS : 1
 RUN ID NUMBER : E-4A
 FEED GAS TYPE: CO-RICH GAS
 REACTOR FEED GAS INLET TEMP. (deg.C) : 150.5
 OIL/SLURRY INLET TEMP. (deg.C) : 244.1
 AVE. REACTOR TEMPERATURE (deg.C) : 250.0
 REACTOR OUTLET TEMP. (deg.C) : 247.9
 REACTOR GAS INLET PRESSURE (kPa) : 5562
 PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5372
 GAS SUPERFICIAL VELOCITY (cm/sec) : 12.2
 LIQUID SUPERFICIAL VELOCITY (cm/sec) : 5.6
 SLURRY CONCENTRATION (wt%) : 47.4
 SPACE VELOCITY (1/kg-hr) : 4370
 RECYCLE/FRESH FEED RATIO : 3.33
 OIL/SLURRY CIRCULATION RATE (kg3/hr) : 50.8
 PROD. SEPARATOR GAS FLOWRATE <50> + <55> (kgmol/hr) : 119.79
 PURGE GAS FLOW RATE <50> (kgmol/hr) : 5.45

STREAM #	1	55	10	15	25*	25*	6'	49
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	V/L SEP	V/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	56.98	31.11	37.64	37.23	29.09	28.98	6.71	-----
CO	39.36	53.65	50.26	59.48	49.81	50.13	24.69	-----
CO2	1.85	12.99	10.39	10.24	12.20	12.08	59.94	-----
N2	0.12	0.81	0.64	0.62	0.73	0.70	0.15	-----
CH4	0.07	0.71	0.57	0.54	0.65	0.63	0.48	-----
H2O	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.71
CH3OH	0.06	0.63	0.49	0.46	7.38	7.29	6.32	92.84
DME	0.60	0.07	0.04	0.04	0.04	0.05	0.52	0.09
C2H5OH	-----	-----	-----	-----	-----	-----	-----	1.76
C3OH'S	-----	-----	-----	-----	-----	-----	-----	0.88
C4OH'S	-----	-----	-----	-----	-----	-----	-----	0.81
C5OH'S	-----	-----	-----	-----	-----	-----	-----	0.54
ALKANES	-----	-----	-----	-----	-----	-----	-----	0.00
ESTERS	-----	-----	-----	-----	-----	-----	-----	0.97
ALDEHYDES	-----	-----	-----	-----	-----	-----	-----	0.00
OIL	-----	-----	-----	-----	-----	-----	-----	1.59
TOTAL :	98.32	99.96	100.03	99.61	99.90	99.89	98.80	100.00
DENS, g/cc	0.005	0.045	0.031	0.031	0.028	0.028	0.003	0.790
AV. MOL. WT	13.24	21.95	19.85	19.90	22.62	22.63	36.25	33.05
Mo3/hr	709.8	2363.3	3028.2	3024.2	2660.6	2659.8	2.0	-----
kgmol/hr	31.67	105.44	135.16	134.92	118.70	118.67	0.09	7.68
l/hr:prod	-----	-----	-----	-----	-----	-----	-----	321.00

* Compositions correspond to STREAM#32

LAPORTE LMETHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY
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0500 15-Jul-95 - 0600 15-Jul-95

CONVERSIONS ACROSS REACTOR :

	GC#1	GC#2
HYDROGEN CONVERSION (%) :	32.4	31.2
CARBON MONOXIDE CONVERSION (%) :	12.4	13.2
CARBON DIOXIDE CONVERSION (%) :	-2.1	-4.6
RATIO H2 CONSUMED/CO CONSUMED :	1.96	1.75

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

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL x
CO (+CO2) SELECTIVITY TO METHANOL (%) :	98.2	92.7
CO (+CO2) SELECTIVITY TO ETHANOL (%) :		1.2

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

METHANOL PRODUCTIVITIES & YIELDS

MEOH SOURCE	kmol/hr-ks cat	kg/1000 Nm3 fresh feed	kg/1000 Nm3 reactor feed
As calculated ACROSS REACTOR	12.99	344.2	85.5
As Net MeOH produced, OVERALL balance	11.90	333.6	78.3

REACTOR FEED (H2/(CO+1.5CO2)) :	0.57
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.44
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	29.0
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.e.
METHANOL COLLECTED AS % OF CALCULATED :	91.1
CALCULATED METHANOL PRODUCTION RATE (Kkmol/hr) :	9.07

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

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COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	[PURE GASES - 13 FRESH FEED GAS	[1+55]-153 REACTOR FEED	E25 - (50451+62469)1 REACTOR EFFLUENT
	(% diff.)	(% diff.)	(% diff.)
H2	-4.07420	1.20532	0.14900
CO	-1.12966	1.30927	-0.52600
CO2	-149.15600	3.25705	0.61070
N2	-233.78400	5.77899	-5.40500
CH4	n.a.	5.09067	-7.52400
H2O	-----	n.a.	n.a.
CH3OH	-----	7.67140	9.02149

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	58.1076	56.5662	2.8686	0.0222	-----	59.4570	12.7013
CO2	13.8158	13.6961	0.6946	0.0538	-----	14.4445	-4.5506
CH3OH	0.6152	9.6664	0.0338	0.0057	7.3501	8.0560	-1209.4100
OTHERS	0.7866	0.8129	0.0412	0.0009	0.5824	1.4374	-82.7405
TOTAL C	63.3252	71.7416	3.6382	0.0826	7.9325	93.3949	-0.0837
HYDROGEN:							
H2	100.4610	65.6021	3.3269	0.0120	-----	68.9410	31.3756
H2O	0.0000	0.0000	0.0000	0.0000	0.2000	0.2000	n.a.
OTHERS	5.7260	6.0541	0.3070	0.0272	30.9194	37.3078	-551.5510
TOTAL H	106.1870	71.6562	3.6339	0.0393	31.1194	106.4490	-0.2461
OXYGEN:							
TOTAL O	96.4138	84.6933	4.2951	0.1360	7.7018	96.8261	-0.4277
NITROGEN:							
TOTAL N	1.6730	1.6996	0.0862	0.0003	-----	1.7861	-5.7589
TOTAL MASS FLOW (kg/hr)	2685.0900	2314.5800	117.3790	3.2554	249.8740	2685.0800	0.0004

REACTOR GAS BALANCE (OUT/IN) :

	50#1	60#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.817	99.814
HYDROGEN	99.083	101.209
OXYGEN	100.218	100.491
NITROGEN	96.937	103.725

LAPORTE LPMETHANOL PROCESS AVERAGE REPORT
ENTRAINED MOPE
PROCESS VARIABLES & ANALYTICAL SUMMARY
=====

DATE :	07-Aug-85
TIME :	01:11 PM
TIME INTERVAL :	FROM: 1000 15-Jul
	TO: 1100 15-Jul
NUMBER OF AVERAGED HOURS :	1
RUN ID NUMBER :	E-4A
FEED GAS TYPE :	CO-RICH GAS
REACTOR FEED GAS INLET TEMP. (deg.C) :	150.6
OIL/SLURRY INLET TEMP. (deg.C) :	244.1
AVE. REACTOR TEMPERATURE (deg.C) :	249.8
REACTOR OUTLET TEMP. (deg.C) :	247.5
REACTOR GAS INLET PRESSURE (kPa) :	5572
PRIMARY SEPARATOR GAS PRESSURE (kPa) :	5271
GAS SUPERFICIAL VELOCITY (cm/sec) :	13.2
LIQUID SUPERFICIAL VELOCITY (cm/sec) :	5.5
SLURRY CONCENTRATION (wt%) :	47.4
SPACE VELOCITY (1/ks-hr) :	4929
RECYCLE/FRESH FEED RATIO :	3.55
OIL/SLURRY CIRCULATION RATE (m3/hr) :	50.4
PROD. SEPARATOR GAS FLOWRATE <SO> + <SS> (kscmol/hr) :	114.72
PURGE GAS FLOW RATE <SO> (kscmol/hr) :	6.26

STREAM # STREAM NAME ON-LINE GC# COMPONENT	1	55	10	15	25x	25x	62	e9
	FRESH FEED 1	RECYCLE GAS 2	REACTOR FEED 1	REACTOR FEED 2	V/L SEP 2	V/L SEP 1	FLASH GAS	MECH PRODUCT
	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<WTZ>
H2	55.73	31.26	37.44	36.22	29.24	29.25	6.71	-----
SO	41.05	55.39	51.94	52.62	51.73	52.75	24.69	-----
CO2	2.10	11.95	9.89	9.93	11.40	11.70	59.94	-----
H2	0.12	0.64	0.52	0.52	0.59	0.57	0.15	-----
CH4	0.08	0.50	0.40	0.40	0.47	0.48	0.48	-----
H2O	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.71
CH3OH	0.00	0.66	0.53	0.53	6.95	6.98	6.32	92.04
DME	0.00	0.06	0.04	0.05	0.04	0.04	0.52	0.00
C2H5OH	-----	-----	-----	-----	-----	-----	-----	1.76
C3OH'S	-----	-----	-----	-----	-----	-----	-----	0.88
C4OH'S	-----	-----	-----	-----	-----	-----	-----	0.21
C5OH'S	-----	-----	-----	-----	-----	-----	-----	0.54
ALKANENES	-----	-----	-----	-----	-----	-----	-----	0.00
ESTERS	-----	-----	-----	-----	-----	-----	-----	0.97
ALDEHYDES	-----	-----	-----	-----	-----	-----	-----	0.00
OIL	-----	-----	-----	-----	-----	-----	-----	0.00
TOTAL :	99.08	100.47	100.76	100.27	100.45	100.90	98.80	1.50
DENSr/s/cc	0.005	0.045	0.031	0.032	0.028	0.029	0.003	0.790
AV. MOL. WT	13.72	21.80	19.90	20.19	22.49	22.81	36.25	33.05
Mm3/hr	685.3	2431.1	3045.9	3035.7	2725.4	2696.8	0.5	-----
kscmol/hr	30.58	108.46	135.89	135.44	121.59	119.87	0.02	7.13
l/hr,prod	-----	-----	-----	-----	-----	-----	-----	298.29

* Compositions correspond to STREAM#32

LAPORTE LP-METHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY
=====

1000 16-Jul-85 - 1100 16-Jul-85

CONVERSIONS ACROSS REACTOR :

	<u>RC#1</u>	<u>RC#2</u>
HYDROGEN CONVERSION (Z) :	33.4	27.5
CARBON MONOXIDE CONVERSION (Z) :	10.4	11.7
CARBON DIOXIDE CONVERSION (Z) :	-4.4	-3.0
RATIO H2 CONSUMED/CO CONSUMED :	2.21	1.61

*** 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 (+CO2) SELECTIVITY TO METHANOL (Z) :	194.5	95.8
CO (+CO2) SELECTIVITY TO ETHANOL (Z) :	-----	1.3

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

METHANOL PRODUCTIVITIES & YIELDS

<u>METH SOURCE</u>	<u>g/mol/hr-kg cat</u>	<u>kg/1000 Nm3 fresh feed</u>	<u>kg/1000 Nm3 reactor feed</u>
As calculated ACROSS REACTOR	12.48	359.5	81.2
As Net MeOH produced, OVERALL balance	11.16	321.4	72.5

REACTOR FEED (H2/(CO+1.5CO2)) :	0.54
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.42
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	31.6
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	88.8
CALCULATED METHANOL PRODUCTION RATE (Kg/mol/hr) :	7.69

LEPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

1000 16-Jul-65 - 1100 16-Jul-65

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	(PURE GASES - 13 FRESH FEED GAS	[(1+55)-15] REACTOR FEED	025 - (50+51+62+68) REACTOR EFFLUENT
	% diff.	% diff.	% diff.
H2	-5.75435	3.70816	-0.87291
O2	-1.99749	1.97299	-1.02610
CO2	-108.64200	1.10782	1.09667
N2	-102.61500	5.01444	-3.55986
CH4	n.a.	5.93762	-2.50717
H2O	-----	n.a.	-232.21500
CH3OH	-----	-0.19964	10.16000

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	71.2450	60.0743	3.4685	0.0055	-----	13.5483	10.8282
CO2	13.4526	12.9606	0.7483	0.0133	-----	13.7222	-2.9044
CH3OH	0.7205	0.7191	0.0415	0.0014	4.8301	7.5921	-953.7140
OTHERS	0.6095	0.6095	0.0352	0.0002	0.5412	1.1861	-94.6202
TOTAL C	86.0476	74.3635	4.2935	0.0264	7.3712	86.0487	-0.0013
HYDROGEN:							
H2	99.1079	67.8973	3.9150	0.0030	-----	71.7253	26.8915
H2O	0.0000	0.0000	0.0000	0.0000	0.1858	0.1858	n.a.
OTHERS	5.4553	5.4402	0.3141	0.0067	28.7317	34.4929	-532.2850
TOTAL H	103.5630	73.2475	4.2291	0.0097	28.9176	106.4043	-2.7429
OXYGEN:							
TOTAL O	98.9525	86.7775	5.0102	0.0337	7.1568	98.9783	-0.0258
NITROGEN:							
TOTAL N	1.4904	1.3991	0.0808	0.0001	-----	1.4799	-5.6813
TOTAL MASS FLOW (kg/hr)	2734.2100	2364.6200	136.5200	0.8656	232.1940	2734.2100	0.0002

REACTOR GAS BALANCE (OUT/IN) :

	SC#1	SC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	101.054	99.725
HYDROGEN	96.925	103.844
OXYGEN	101.526	100.191
NITROGEN	97.541	102.801

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

DATE : 07-Aug-85
 TIME : 01:15 PM
 TIME INTERVAL: FROM: 1500 16-Jul TO: 1600 16-Jul
 NUMBER OF AVERAGED HOURS : 1
 RUN ID NUMBER : E-4A
 FEED GAS TYPE: CO-RICH GAS
 REACTOR FEED GAS INLET TEMP. (des.C) : 150.4
 OIL/SLURRY INLET TEMP. (des.C) : 243.9
 AVE. REACTOR TEMPERATURE (des.C) : 249.0
 REACTOR OUTLET TEMP. (des.C) : 246.0
 REACTOR GAS INLET PRESSURE (kPa) : 5581
 PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5276
 GAS SUPERFICIAL VELOCITY (cm/sec) : 12.3
 LIQUID SUPERFICIAL VELOCITY (cm/sec) : 5.0
 SLURRY CONCENTRATION (wt%) : 47.4
 SPACE VELOCITY (1/ks-hr) : 48e9
 RECYCLE/FRESH FEED RATIO : 3.50
 OIL/SLURRY CIRCULATION RATE (m3/hr) : 51.0
 PROD. SEPARATOR GAS FLOWRATE <S0> + <S5> (ksmol/hr) : 113.93
 PURGE GAS FLOW RATE <S0> (ksmol/hr) : 7.56

STREAM #	1	55	10	15	25*	25*	50	40
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	V/L SEP	V/L SEP	FLASH GAS	4504 PRODUCT
ON-LINE GC#	1	2	1	2	2	1		
COMPONENT	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<MOLZ>	<WPT>
H2	54.69	30.71	36.46	36.36	29.03	28.93	6.71	-----
CO	40.88	54.84	51.79	51.65	51.29	51.51	24.69	-----
CO2	3.15	13.31	11.04	11.00	12.45	12.64	59.94	-----
N2	0.13	0.52	0.43	0.43	0.48	0.48	0.15	-----
CH4	0.09	0.45	0.38	0.37	0.44	0.42	0.49	-----
H2O	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.72
CH3OH	0.00	0.73	0.53	0.53	6.57	6.32	6.32	92.91
DME	0.00	0.06	0.04	0.05	0.04	0.04	0.52	0.00
C2H5OH	-----	-----	-----	-----	-----	-----	-----	1.78
C3OH'S	-----	-----	-----	-----	-----	-----	-----	0.90
C4OH'S	-----	-----	-----	-----	-----	-----	-----	0.57
C5OH'S	-----	-----	-----	-----	-----	-----	-----	0.56
ALKANENES	-----	-----	-----	-----	-----	-----	-----	0.00
ESTERS	-----	-----	-----	-----	-----	-----	-----	1.07
ALDEHYDES	-----	-----	-----	-----	-----	-----	-----	0.00
OIL	-----	-----	-----	-----	-----	-----	-----	1.50
TOTAL :	98.93	100.62	100.68	100.39	100.52	100.29	98.80	100.00
DENS,s/cc	0.005	0.045	0.032	0.032	0.029	0.029	0.003	0.790
AV.MOL.WT	14.14	22.18	20.34	20.33	22.73	22.76	36.25	33.03
M3/hr	681.0	2384.1	3029.0	3023.2	2704.4	2700.7	0.8	-----
ksmol/hr	30.38	106.37	135.13	134.88	120.66	120.49	0.03	6.59
l/hr:prod	-----	-----	-----	-----	-----	-----	-----	275.57

* Compositions correspond to STREAM#32

PAGE : 2

LEPORTE LP-METHANOL PROCESS AVERAGE REPORT
 CONVERSION-SELECTIVITY-PRODUCTIVITY

1500 16-Jul-85 - 1600 16-Jul-85

CONVERSIONS ACROSS REACTOR :

	GC#1	GC#2
HYDROGEN CONVERSION (%) :		
CARBON MONOXIDE CONVERSION (%) :	29.5	28.4
CARBON DIOXIDE CONVERSION (%) :	11.3	11.2
RATIO H ₂ CONSUMED/CO CONSUMED :	-2.1	-2.8
	1.83	1.80

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

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL *
CO (+CO ₂) SELECTIVITY TO METHANOL (%) :		
CO (+CO ₂) SELECTIVITY TO ETHANOL (%) :	94.3	91.5
		1.2

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

METHANOL PRODUCTIVITIES & YIELDS

MEOH SOURCE	kmol/hr-ks cat	kg/1000 N ₂ fresh feed	kg/1000 N ₂ reactor feed
As calculated ACROSS REACTOR	11.36	351.8	74.8
As Net MeOH produced, OVERALL balance	10.26	299.8	67.5

REACTOR FEED (H ₂ /(CO+1.5CO ₂)) :	0.53
REACTOR FEED ((H ₂ -CO ₂)/(CO+CO ₂)) :	0.40
APPROACH TO METHANOL EQUILIBRIUM (des.C) :	33.3
APPROACH TO WATER-GAS EQUILIBRIUM (des.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	99.5
CALCULATED METHANOL PRODUCTION RATE (Kmol/hr) :	7.05

LAPOURTE METHANOL PROCESS AVERAGE PERCENT
MATERIAL BALANCE SUMMARY

COMPONENT BALANCE (IN-OUT) / IN :

STREAMS # STREAMS LOCATION COMPONENT :	[PURE GASES - 1] FRESH FEED GAS	[1455]-151 REACTOR FEED	[25 - 150+51+62+68] REACTOR EFFLUENT
	(% diff.)	(% diff.)	(% diff.)
H2	-6.01549	0.48298	0.10509
CO	-0.87855	1.53252	-0.95946
CO2	-100.05200	1.82562	0.64856
N2	-63.27570	1.01094	-2.33575
CH4	n.a.	1.51597	-1.61689
H2O	-----	n.a.	-140.46900
CH3OH	-----	9.00963	9.73548

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	69.6660	58.3296	4.1471	0.0085	-----	62.4852	10.3074
CO2	14.8369	14.1569	1.0065	0.0207	-----	15.1941	-2.3403
CH3OH	0.7162	0.7786	0.0554	0.0022	6.3147	7.1508	-898.4160
OTHERS	0.5584	0.5456	0.0388	0.0003	0.4859	1.0707	-91.7400
TOTAL C	85.7775	73.8108	5.2478	0.0317	6.8006	85.8909	-0.1322
HYDROGEN:							
H2	98.0854	65.3283	4.6447	0.0046	-----	69.9776	29.6565
H2O	0.0000	0.0000	0.0000	0.0000	0.1741	0.1741	n.a.
OTHERS	5.2199	5.4309	0.3861	0.0104	26.5245	32.2519	-519.7820
TOTAL H	103.3050	70.7592	5.0308	0.0151	26.6985	102.5040	0.7760
OXYGEN:							
TOTAL O	100.1170	87.4891	6.2203	0.0522	6.6200	100.3820	-0.2646
NITROGEN:							
TOTAL N	1.1654	1.0977	0.0780	0.0001	-----	1.1758	-0.8960
TOTAL MASS FLOW (kg/hr)	2742.6900	2359.2000	167.7330	1.2495	214.5140	2742.7000	-0.0001

REACTOR GAS BALANCE (OUT/IN) :

	50#1	60#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.161	99.815
HYDROGEN	98.618	100.839
OXYGEN	99.636	100.293
NITROGEN	100.205	100.012

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

DATE : 07-Aug-95
 TIME : 01:58 PM
 TIME INTERVAL: FROM: 2200 16-Jul
 TO: 0200 17-Jul
 NUMBER OF AVERAGED HOURS : 4
 RUN ID NUMBER : E-48
 FEED GAS TYPE: CO-RICH GAS
 REACTOR FEED GAS INLET TEMP. (des.C) : 149.7
 OIL/SLURRY INLET TEMP. (des.C) : 245.0
 AVE. REACTOR TEMPERATURE (des.C) : 250.1
 REACTOR OUTLET TEMP. (des.C) : 247.9
 REACTOR GAS INLET PRESSURE (kPa) : 5595
 PRIMARY SEPARATOR GAS PRESSURE (kPa) : 5274
 GAS SUPERFICIAL VELOCITY (cm/sec) : 12.3
 LIQUID SUPERFICIAL VELOCITY (cm/sec) : 6.5
 SLURRY CONCENTRATION (wt%) : 47.4
 SPACE VELOCITY (1/kg-hr) : 4822
 RECYCLE/FRESH FEED RATIO : 3.68
 OIL/SLURRY CIRCULATION RATE (m3/hr) : 59.5
 PROD. SEPARATOR GAS FLOWRATE <50> + <55> (kmol/hr) : 115.38
 PURGE GAS FLOW RATE <50> (kmol/hr) : 7.57

STREAM #	1	55	10	15	25*	25*	62	48
STREAM NAME	FRESH FEED	RECYCLE GAS	REACTOR FEED	REACTOR FEED	U/L SEP	U/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	53.56	30.36	34.93	35.68	28.79	28.59	6.71	-----
CO	40.99	54.66	51.95	51.66	51.46	51.43	24.69	-----
CO2	3.18	13.19	11.20	11.01	12.52	12.62	59.94	-----
H2	0.13	0.50	0.41	0.41	0.47	0.46	0.15	-----
CH4	0.06	0.39	0.35	0.32	0.36	0.37	0.48	-----
H2O	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.73
CH3OH	0.00	0.62	0.54	0.48	6.01	5.99	6.32	92.79
DME	0.00	0.06	0.04	0.05	0.04	0.04	0.52	0.80
C2H5OH	-----	-----	-----	-----	-----	-----	-----	1.79
C3OH'S	-----	-----	-----	-----	-----	-----	-----	0.90
C4OH'S	-----	-----	-----	-----	-----	-----	-----	0.65
C5OH'S	-----	-----	-----	-----	-----	-----	-----	0.56
ALKATENES	-----	-----	-----	-----	-----	-----	-----	0.00
ESTERS	-----	-----	-----	-----	-----	-----	-----	1.08
ALDEHYDES	-----	-----	-----	-----	-----	-----	-----	0.00
OIL	-----	-----	-----	-----	-----	-----	-----	1.50
TOTAL :	97.92	99.77	99.43	99.60	99.59	99.51	98.80	100.00
DENS.g/cc	0.005	0.046	0.033	0.033	0.029	0.029	0.003	0.790
AV.MOL.WT	14.31	22.20	20.67	20.46	22.71	22.78	36.25	33.05
M3/hr	457.5	2416.4	3025.7	3042.9	2740.6	2733.0	1.2	-----
kmol/hr	29.33	107.81	134.54	135.76	122.27	121.93	0.05	6.56
l/hr,prod	-----	-----	-----	-----	-----	-----	-----	274.44

* Compositions correspond to STREAM#32

LaPORTE 1-METHANOL PROCESS AVERAGE REPORT
CONVERSION-SELECTIVITY-PRODUCTIVITY

=====

2200 14-Jul-85 - 0200 17-Jul-85

CONVERSIONS ACROSS REACTOR :

	GC#1	GC#2
	-----	-----
HYDROGEN CONVERSION (X) :	25.9	27.7
CARBON MONOXIDE CONVERSION (Z) :	10.3	10.4
CARBON DIOXIDE CONVERSION (Z) :	-2.1	-2.4
RATIO H2 CONSUMED/CO CONSUMED :	1.69	1.82

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

SELECTIVITIES :

	ACROSS REACTOR GC Average	OVERALL #
	-----	-----
CO (+CO2) SELECTIVITY TO METHANOL (Z) :	96.2	94.7
CO (+CO2) SELECTIVITY TO ETHANOL (Z) :	-----	1.3

* 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	10.52	323.4	69.9
As Net MeOH produced, OVERALL balance	10.03	308.5	66.7

REACTOR FEED (H2/(CO+1.5CO2)) :	0.52
REACTOR FEED ((H2-CO2)/(CO+CO2)) :	0.39
APPROACH TO METHANOL EQUILIBRIUM (deg.C) :	34.5
APPROACH TO WATER-GAS EQUILIBRIUM (deg.C) :	n.a.
METHANOL COLLECTED AS % OF CALCULATED :	94.6
CALCULATED METHANOL PRODUCTION RATE (Ksmol/hr) :	6.64

LEPORTE LPMETHANOL PROCESS AVERAGE REPORT
MATERIAL BALANCE SUMMARY

2200 16-Jul-85 - 0200 17-Jul-85

COMPONENT BALANCE (IN-OUT)/IN :

STREAMS # STREAMS LOCATION COMPONENT :	PURE GASES - 13 FRESH FEED GAS	(1455)-153 REACTOR FEED	225 - (50451+62468) REACTOR EFFLUENT
	(% diff.)	(% diff.)	(% diff.)
H2	-2.04456	0.00377	0.45210
CO	-1.43720	1.15736	-0.35904
CO2	-96.91750	1.24922	0.71693
N2	-178.69500	4.10469	-4.56390
CH4	n.a.	1.19194	-9.08624
H2O	-----	n.a.	-277.02360
CH3OH	-----	2.72847	4.67135

OVERALL ELEMENTAL BALANCE (kg-atoms/hr) :

STREAM # STREAM NAME	INPUTS		OUTPUTS			TOTAL	(IN-OUT)/IN Z
	15 REACTOR FEED	55 RECYCLE	50 PURGE GAS	52 FLASH GAS	58 METH PRODUCT		
CARBON:							
CO	70.1303	58.9283	4.1385	0.0130	-----	63.0798	10.0535
CO2	14.9465	14.2032	0.0975	0.0315	-----	15.2322	-1.9115
CH3OH	0.6529	0.6712	0.0471	0.0033	6.2803	7.0019	-972.5120
OTHERS	0.4952	0.4917	0.0338	0.0005	0.4969	1.0126	-104.4980
TOTAL C	96.2249	74.2939	5.2179	0.0484	6.7772	86.3265	-9.1179
HYDROGEN:							
H2	94.8670	65.4531	4.5948	0.0071	-----	70.0569	27.6772
H2O	0.0000	0.0000	0.0000	0.0000	0.1752	0.1752	n.a.
OTHERS	4.7183	4.7356	0.3326	0.0159	26.4147	31.4988	-567.5880
TOTAL H	101.5853	70.1887	4.9293	0.0230	26.5999	101.7310	-9.1454
OXYGEN:							
TOTAL O	100.7390	98.0685	6.1850	0.0797	6.5892	100.9226	-0.1819
NITROGEN:							
TOTAL N	1.1159	1.0867	0.0763	0.0002	-----	1.1631	-4.2335
TOTAL MASS FLOW (kg/hr)	2777.2300	2393.5800	168.1010	1.9972	213.6300	2777.7200	0.0006

REACTOR GAS BALANCE (OUT/IN) :

	GC#1	GC#2
MASS BALANCE, (Z) :	100.000	100.000
ELEMENTAL BALANCE, (Z) :		
CARBON	99.612	99.692
HYDROGEN	101.945	100.228
OXYGEN	100.047	100.133
NITROGEN	101.569	101.897