```
         ---   Simulation  Input  File   ---
   *-STMT-*
             *XPSIM>  ...generated by XpsimWin v.1.07 ...
             *EXE-OPT> PAGELEN=66
             *
       100   RUN ID=DE-C3 CUSTOMER=STAFF PROJECT='LPG RECOVERY - DE C3'
       200   DESC DEPROPANIZER COLUMN OPTIMIZATION
       300   DESC LPG RECOVERY PLANT
       400   DIMENSION INPUT ENG
             *
             *
       500   System Data
             *
             *
       600   CHEMCOMP C1 / C2 / C3 / IC4 / NC4 / IC5 / NC5 / NC6 / NC7 / NC8 / NC9 +
              / NC10
       700   THERMSET UID=M1
       800   METHODS K=PR HS=LK
             *
             *
       900   Flowsheet Data
             *
             *
             *
      1000   STREAM=S1 TEMP=151.174 PRES=310 RATE(M)=2657.489 XBASIS=M
      1100   COMP C1:0 / C2:0.4878 / C3:54.7627 / IC4:9.9486 / NC4:21.6828 / +
              IC5:4.8852 / NC5:4.9738 / NC6:3.2444 / NC7:0.0041 / NC8:0.0099 / +
              NC9:0.00005 / NC10:0.00
             *
      1200   COLUMN IN S1 OUT C3 S3 UID=C1
      1300   PARA TRAY=33 CON REB NITER=20
      1400   FEED STR=S1 TRAY=17
      1500   DRAWOFF STR=C3 TRAY=0 PHASE=LIQ
      1600   DRAWOFF STR=S3 TRAY=34 PHASE=LIQ RATE(VAR)=1200
      1700   PSPEC PTOP=295 TRAY=0 DP=4 / TRAY=1 DP=0.2
      1800   PROFILE TRAY=0 LIQ=5000 TEMP=125 / TRAY=34 TEMP=260
      1900   HEAT TRAY=0 VAR HXID=COND
      2000   HEAT TRAY=34 DUTY(FIX)=30000 HXID=REB
      2100   CONDENSER TRET=125
      2200   SPEC RATE(W)=64200 STR=C3 COMP=C3
      2300   COLOPT LKEY=C3 HKEY=IC4
      2400   SPEC FRAC(M)=0.15 HEAVY OVERHEAD
      2500   SPEC FRAC(M)=0.0008 LIGHT BOTTOM
      2600   CALC MDMIN=1.1,1.5 POINTS=8
             *
      2700   COLUMN IN S1 OUT C3-A S3-A UID=C4
      2800   PARA TRAY=22 CON REB NITER=30
      2900   FEED STR=S1 TRAY=4
      3000   DRAWOFF STR=C3-A TRAY=0 PHASE=LIQ
      3100   DRAWOFF STR=S3-A TRAY=23 PHASE=LIQ RATE(VAR)=1200
      3200   PSPEC PTOP=295 TRAY=0 DP=4 / TRAY=1 DP=0.2
      3300   PROFILE TRAY=0 LIQ=5000 TEMP=156 / TRAY=23 TEMP=270
      3400   HEAT TRAY=0 VAR HXID=COND
      3500   CONDENSER TRET=125
      3600   HEAT TRAY=23 DUTY(FIX)=30000 HXID=REB
      3700   SPEC RATE(W)=64200 STR=C3-A COMP=C3
      3800   PRINT TRACE=PART STREAM=1
             *
             *
      3900   END
           ---   End of Simulation Input File   ---
```

I) * PROBLEM GENERAL DATA *

1) * PROBLEM/PROJECT *
'DEPROPANIZER COLUMN OPTIMIZATION '
'LPG RECOVERY PLANT '

2) * UNITS OF MEASURE *
- Input system BRITISH - Output system BRITISH

- INPUT AND OUTPUT UNITS -

Time	- HR	Weight	- LB
Temperature	- FAR	Pressure	- PSIA
Energy/Duty	- M-BTU	Work	- HP
Liq volums	- CUFT	Vap Volume	- CUFT
Viscosity	- CP	Thermal cond	- BTU/HFTF
Surface tens	- DYCM	Std Vap Vol	- S-CUFT

Standard Vapor Volume is 379.48318 FT3/LBM
Reference Status - Temperature 60°F - Pressure 1 atm

Enthalpy is 0.0 for ideal gas at 298.15 K
Std entropy is for ideal gas at 298.15 K and 1 Atm

II) * DEFINED COMPONENTS *

* No of Chemical Components 12
No of Hypothetical/Petroleum Components 0

No	1	2	3	4	5
CAS Registry no.	74-82-8	74-84-0	74-98-6	75-28-5	106-97-8
Name	METHANE	ETHANE	PROPANE	ISOBUTANE	BUTANE
Component Key	C1	C2	C3	IC4	NC4
Type	LIBRARY	LIBRARY	LIBRARY	LIBRARY	LIBRARY
Class	SHYD	SHYD	SHYD	SHYD	SHYD
Formula	CH4	C2H6	C3H8	C4H10	C4H10
Molecular weight	16.040	30.070	44.100	58.120	58.120
Boiling point,FAR	-258.74	-127.48	-43.78	10.89	31.10
Std spec. gravity	0.40749	0.35522	0.50430	0.55891	0.58434
Critical temp,FAR	-116.72	90.09	206.01	274.98	305.65
Critical pres,PSIA	666.450	707.640	616.266	529.099	550.854
Critical vol,CUFT	1.586025	2.372784	3.255364	4.212638	4.083302
Critical Z	0.287211	0.284617	0.280844	0.282728	0.273882
Acentric factor	0.011000	0.099000	0.153000	0.183000	0.200000
Lat. heat, BTU/LBM	3515.381	6249.101	8103.358	9083.074	9448.820
H form, BTU/LBM	-32066.078	-36120.053	-44649.647	-57869.895	-54071.870
G form, BTU/LBM	-55933.363	-65486.299	-79284.128	-95734.534	-93782.315
Std entr, BT/LBM-F	44.47293	54.71937	64.53590	70.55479	73.99416

No	6	7	8	9	10
CAS Registry no.	78-78-4	109-66-0	110-54-3	142-82-5	111-65-9
Name	ISOPENTANE	PENTANE	HEXANE	HEPTANE	OCTANE
Component Key	IC5	NC5	NC6	NC7	NC8
Type	LIBRARY	LIBRARY	LIBRARY	LIBRARY	LIBRARY
Class	SHYD	SHYD	SHYD	SHYD	SHYD
Formula	C5H12	C5H12	C6H14	C7H16	C8H18
Molecular weight	72.150	72.150	86.180	100.210	114.230
Boiling point,FAR	82.18	96.91	155.71	209.17	258.21
Std spec. gravity	0.62469	0.63094	0.65877	0.68637	0.70390
Critical temp,FAR	369.10	385.86	454.55	512.51	564.19
Critical pres,PSIA	490.664	488.778	439.755	396.824	360.855
Critical vol,CUFT	4.897169	4.876506	5.924768	6.919009	7.887020
Critical Z	0.270180	0.262694	0.265578	0.263181	0.259039
Acentric factor	0.227000	0.251000	0.294000	0.349000	0.397000
Lat. heat, BTU/LBM	10451.086	11028.154	12376.581	13618.673	14591.632
H form, BTU/LBM	-66411.231	-62968.146	-71766.975	-80693.280	-89772.831
G form, BTU/LBM	-110454.190	-107754.554	-121603.711	-135541.890	-149658.950
Std entr, BT/LBM-F	82.06712	83.45242	92.86291	102.20175	111.58835

No	11	12
CAS Registry no.	111-84-2	124-18-5
Name	NONANE	DECANE
Component Key	NC9	NC10
Type	LIBRARY	LIBRARY
Class	SHYD	SHYD
Formula	C9H20	C10H22
Molecular weight	128.260	142.290
Boiling point,FAR	303.48	345.54
Std spec. gravity	0.72446	0.73518
Critical temp,FAR	610.56	654.80
Critical pres,PSIA	332.137	313.253
Critical vol,CUFT	8.780034	9.657911
Critical Z	0.253920	0.252971
Acentric factor	0.445000	0.485000
Lat. heat, BTU/LBM	15731.095	16879.738
H form, BTU/LBM	-98372.706	-107298.215
G form, BTU/LBM	-163283.516	-177220.899
Std entr, BT/LBM-F	120.95107	130.28991

III) * PVT/THERMO/TRANSPORT PROPERTIES CALCULATION METHODS *

* CALCULATION SET 1 - M1 *

VLE K-values	PR	- PENG-ROBINSON
ENTHALPY - Vapor	LK	- LEE-KESLER
ENTHALPY - Liquid	LK	- LEE-KESLER
ENTROPY - Vapor	LK	- LEE-KESLER
ENTROPY - Liquid	LK	- LEE-KESLER

- LIMITS AND OPTIONS -
Temperature - Min -359.67 FAR - Max 2240.33 FAR
Pressure - Min 0.100000E-04 PSIA - Max 15000.0 PSIA

Lowest significant composition 0.10000000E-19

Water K-values are calculated based on
'Vapor Pressure curve '
Water thermo-props are calculated based on
'Saturated conditions '
Water solubility in hydr phases calculated based on
'API solubility in HC mixtures '

*** STREAM 'S1 ' ***
- Temperature 151.174 FAR - Pressure 310.0000 PSIA

* No *	Component	GLOBAL STREAM Mols	Mol fr	Weight	Wt fr
2	ETHANE	12.963	0.004878	389.807	0.002788
3	PROPANE	1455.322	0.547631	64179.717	0.459080
4	ISOBUTANE	264.385	0.099487	15366.036	0.109914
5	BUTANE	576.222	0.216829	33490.006	0.239555
6	ISOPENTANE	129.824	0.048852	9366.837	0.067001
7	PENTANE	132.179	0.049738	9536.717	0.068217
8	HEXANE	86.220	0.032444	7430.451	0.053150
9	HEPTANE	0.109	0.000041	10.919	0.000078
10	OCTANE	0.263	0.000099	30.053	0.000215
11	NONANE	0.001	0.000001	0.170	0.000001
	* TOTAL *	2657.489	1.000000	139800.713	1.000000
		LBM		LB	

*** UNIT 1 - 'C1 ' - ' DISTILLATION COLUMN ' ***

--- Feed Streams --- - Product Streams -
'S1 ' 'C3 '
'S3 '

1) * PARAMETERS *

No of theoretical trays 33
- condenser
- reboiler

No of Feeds 1
Products 2
Heater-Coolers 2
Pump-Arounds 0
Specifications 1

Calculation method 'SURE '
Maximum no of iterations 20
Max no of iterations with no error improvements 3

2) * CALCULATION TOLERANCES *
Bubble point 0.001000 Enthalpy balances 0.001000
Component balances 0.001000 Composition sums 0.001000

3) * COLUMN FEEDS *

1 - Stream S1 ON tray 17 - Flowrate FIXED - Temperature FIXED

4) * PRODUCT STREAMS *

1 - Stream C3 extracted as LIQUID from condenser - Flowrate NOT GIVEN
Material balance closed on this stream

2 - Stream S3 extracted as LIQUID from reboiler - Flowrate VARIABLE
Initial flowrate 1200.000 LBM /HR

5) * HEATER / COOLERS *

1 - CONDENSER - User Id COND
Duty is VARIABLE - Initial value 0.000 M-BTU /HR

2 - REBOILER - User Id REB
Duty IS FIXED at 30000.000 M-BTU /HR

6) * CONDENSER/REBOILER SPECS *
Liquid from condenser subcooled at 125.000 FAR
Reboiler is a KETTLE type

7) * INITIAL TEMPERATURE/FLOW-RATE ESTIMATES *

*** TRAY ***	OUTLET * LIQUID RATE * LBM /HR	* TEMPERATURE * FAR	* PRESSURE * PSIA
CON	5000.000	125.000	295.0000
1	NOT GIVEN	NOT GIVEN	299.0000
REB	NOT GIVEN	260.000	305.6000

8) * PERFORMANCE SPECIFICATIONS *

Spec 1
* Hold sum od partial WEIGHT flow-rates of component(s)
3) PROPANE
contained in stream(s)
'C3 '- LIQUID DRAW-OFF FROM CONDENSER
at EQUAL TO 64200.0 LB /HR
Tolerance (RELATIVE) 0.010000

*** UNIT 2 - 'C4 ' - ' DISTILLATION COLUMN ' ***

--- Feed Streams --- - Product Streams -
'S1 ' 'C3-A '
'S3-A '

1) * PARAMETERS *

No of theoretical trays 22
- condenser
- reboiler

No of Feeds 1
Products 2
Heater-Coolers 2
Pump-Arounds 0
Specifications 1

Calculation method 'SURE '
Maximum no of iterations 30
Max no of iterations with no error improvements 3

2) * CALCULATION TOLERANCES *
Bubble point 0.001000 Enthalpy balances 0.001000
Component balances 0.001000 Composition sums 0.001000

3) * COLUMN FEEDS *

1 - Stream S1 ON tray 4 - Flowrate FIXED - Temperature FIXED

4) * PRODUCT STREAMS *

1 - Stream C3-A extracted as LIQUID from condenser - Flowrate NOT GIVEN
Material balance closed on this stream

2 - Stream S3-A extracted as LIQUID from reboiler - Flowrate VARIABLE
Initial flowrate 1200.000 LBM /HR

5) * HEATER / COOLERS *

1 - CONDENSER - User Id COND
Duty is VARIABLE - Initial value 0.000 M-BTU /HR

2 - REBOILER - User Id REB
Duty IS FIXED at 30000.000 M-BTU /HR

6) * CONDENSER/REBOILER SPECS *
Liquid from condenser subcooled at 125.000 FAR
Reboiler is a KETTLE type

7) * INITIAL TEMPERATURE/FLOW-RATE ESTIMATES *

*** TRAY ***	OUTLET * LIQUID RATE * LBM /HR	* TEMPERATURE * FAR	* PRESSURE * PSIA
CON	5000.000	156.000	295.0000
1	NOT GIVEN	NOT GIVEN	299.0000
REB	NOT GIVEN	270.000	303.4000

8) * PERFORMANCE SPECIFICATIONS *

Spec 1
* Hold sum od partial WEIGHT flow-rates of component(s)
3) PROPANE
contained in stream(s)
'C3-A '- LIQUID DRAW-OFF FROM CONDENSER
at EQUAL TO 64200.0 LB /HR
Tolerance (RELATIVE) 0.010000

V) **** STREAM / UNITS DICTIONARY ****

1) STREAMS-UNITS CROSS-REFERENCE TABLE

No	Stream Id	Description/Service	Product of Unit	Feed of Unit(s)
1	S1	.....		1 C1 2 C4
2	C3	.....	1 C1	
3	S3	.....	1 C1	
4	C3-A	.....	2 C4	
5	S3-A	.....	2 C4	

2) UNITS-STREAMS CROSS-REFERENCE TABLE

No	Unit	Unit Description	Feed Streams	Product Streams
1	C1	.....	1 S1	2 C3 3 S3
2	C4	.....	1 S1	4 C3-A 5 S3-A

  VI) **** RUN STATISTICS ****

      * No of streams   5
             process operations   2
             topping structures   0
             control operations   0
             set operations   0

      The calculation is NOT a RECYCLE PROBLEM
      Calculation sequence defined by input sequence

*** SIMULATION TRACE FOLLOWS ***

... New/output binary file 'DE-C3   ' initialized ...

. Stream 'S1   ' flashed .
. Feed/Recycle streams processed .

Intermediate column calculation printout
... Feed S1   on tray 17 flashed at 302.2000 PSIA ...
  - Temp   151.17 FAR , Rate, Liquid   2657.489 LBM , Vapor   0.000 LBM

- at iter   0, err sum 4.01974   , max err sum 0.364151   - adj. factor 0.000000

- at iter   1, err sum 0.545371   , max err sum 0.478247E-01 - adj. factor 0.901800

- at iter   2, err sum 0.422687   , max err sum 0.307397E-01 - adj. factor 1.000000

- at iter   3, err sum 0.183677   , max err sum 0.112125E-01 - adj. factor 1.000000

- at iter   4, err sum 0.520361   , max err sum 0.314573E-01 - adj. factor 1.000000

- at iter   4, err sum 0.183677   , max err sum 0.112125E-01 - adj. factor 1.000000

- at iter   5, err sum 0.582144   , max err sum 0.389571E-01 - adj. factor 1.000000

 - at iter   5, err sum 0.180202   , max err sum 0.118942E-01 - adj. factor 1.000000

 - at iter   6, err sum 0.419984   , max err sum 0.240276E-01 - adj. factor 1.000000

 - at iter   6, err sum 0.175563   , max err sum 0.114278E-01 - adj. factor 1.000000

 - at iter   7, err sum 0.281335   , max err sum 0.163027E-01 - adj. factor 1.000000

 - at iter   7, err sum 0.159754   , max err sum 0.101760E-01 - adj. factor 1.000000

 - at iter   8, err sum 0.191740   , max err sum 0.111832E-01 - adj. factor 1.000000

 - at iter   8, err sum 0.150279   , max err sum 0.914960E-02 - adj. factor 1.000000

 - at iter   9, err sum 0.752367E-01, max err sum 0.445635E-02 - adj. factor 1.000000

 - at iter 10, err sum 0.305797   , max err sum 0.177326E-01 - adj. factor 1.000000

 - at iter 10, err sum 0.460295E-01, max err sum 0.321488E-02 - adj. factor 1.000000
    *** COLUMN CALCULATION RESOLVED ***

Unit op 1 - 'C1 ' calculated

Intermediate column calculation printout
... Feed S1 on tray 4 flashed at 299.6000 PSIA ...
- Temp 151.17 FAR , Rate, Liquid 2657.489 LBM , Vapor 0.000 LBM

- at iter 0, err sum 2.53197 , max err sum 0.386988 - adj. factor 0.000000
DK/K - max .17920E-02 - min .21893E-05 - avg 0.000354
Error sums, total 2.53197 , BP 0.885072 , H 0.403127 , Comp 1.24377
- Maximum Relative Errors -
* BP 0.104890 at tray 0 * H -0.159888 at tray 1
Tray Glob Mat Bal -0.122210 at tray 23 * Tray Part Mat Bal 0.039004 for comp 10 at tray 3
Coln Part Mat Bal 0.139224 for comp 10

*** INITIAL COLUMN STATUS ***

* TRAY *	TEMP	** -TOTAL LIQ &	VAP OUTLET- * - LIQ.	& VAP. DRAW-OFF - *	BP.ERROR *	ENT.BAL.ERR.*
0	156.000	5000.000	0.000	1457.489	0.000	0.104890	0.000000
1	160.957	3542.511	5000.000	0.000	0.000	0.088012	-0.159888
2	165.913	3542.511	5000.000	0.000	0.000	0.075762	0.025852
3	170.870	3542.511	5000.000	0.000	0.000	0.056363	0.029460
4	175.826	6200.000	5000.000	0.000	0.000	0.022231	-0.058452
5	180.783	6200.000	5000.000	0.000	0.000	0.032415	-0.005096
6	185.739	6200.000	5000.000	0.000	0.000	0.037091	-0.003316
7	190.696	6200.000	5000.000	0.000	0.000	0.036105	-0.001751
8	195.652	6200.000	5000.000	0.000	0.000	0.030098	-0.000736
9	200.609	6200.000	5000.000	0.000	0.000	0.020571	-0.000515
10	205.565	6200.000	5000.000	0.000	0.000	0.009721	-0.001103
11	210.522	6200.000	5000.000	0.000	0.000	-0.000025	-0.002259
12	215.478	6200.000	5000.000	0.000	0.000	-0.006613	-0.003617
13	220.435	6200.000	5000.000	0.000	0.000	-0.008797	-0.004898
14	225.391	6200.000	5000.000	0.000	0.000	-0.006244	-0.006018
15	230.348	6200.000	5000.000	0.000	0.000	0.000644	-0.007027
16	235.304	6200.000	5000.000	0.000	0.000	0.011004	-0.007968
17	240.261	6200.000	5000.000	0.000	0.000	0.023733	-0.008806
18	245.217	6200.000	5000.000	0.000	0.000	0.037584	-0.009384
19	250.174	6200.000	5000.000	0.000	0.000	0.051112	-0.009366
20	255.130	6200.000	5000.000	0.000	0.000	0.062377	-0.008056
21	260.087	6200.000	5000.000	0.000	0.000	0.068208	-0.004036
22	265.043	6200.000	5000.000	0.000	0.000	0.062493	0.004870
23	270.000	1200.000	5000.000	1200.000	0.000	0.032982	0.040653

* HEATERS / COOLERS *
TRAY 0 - DUTY -30670.991 M-BTU
TRAY 23 - DUTY 30000.000 M-BTU
* SPECIFICATIONS *

NO	TYPE	GIVEN VALUE	CALC VALUE	ERROR	CONV
1	RECOVERY	64200.0000 LB	58177.8251 LB	-0.049249	N

- at iter 1, err sum 1.64531 , max err sum 0.193149 - adj. factor 1.000000
DK/K - max .10099E-02 - min .14815E-07 - avg 0.000141
DT max - abs 24.7156 - rel 0.038952 DR max - abs 608.4563 - rel 0.207377
Error sums, total 1.64531 , BP 0.376540 , H 0.887191E-01, Comp 1.18006
- Maximum Relative Errors -
* BP 0.043274 at tray 13 * H 0.019761 at tray 1
Tray Glob Mat Bal 0.130114 at tray 10 * Tray Part Mat Bal 0.020689 for comp 10 at tray 4
Coln Part Mat Bal 0.006633 for comp 10

- at iter 2, err sum 1.13271 , max err sum 0.121218 - adj. factor 1.000000
DK/K - max .15763E-02 - min .69672E-06 - avg 0.000201
DT max - abs 10.7075 - rel 0.016692 DR max - abs 114.6777 - rel 0.044947
Error sums, total 1.13271 , BP 0.279244 , H 0.387674E-01, Comp 0.814700
- Maximum Relative Errors -
* BP -0.031837 at tray 13 * H 0.003472 at tray 9
Tray Glob Mat Bal -0.085909 at tray 11 * Tray Part Mat Bal 0.014095 for comp 10 at tray 7
Coln Part Mat Bal 0.006767 for comp 10

- at iter 3, err sum 0.436801 , max err sum 0.517671E-01 - adj. factor 1.000000
DK/K - max .91730E-03 - min .16962E-06 - avg 0.000108
DT max - abs 16.6160 - rel 0.024676 DR max - abs 141.8415 - rel 0.022876
Error sums, total 0.436801 , BP 0.103494 , H 0.284350E-01, Comp 0.304872
- Maximum Relative Errors -
* BP -0.012086 at tray 13 * H 0.005991 at tray 14
Tray Glob Mat Bal -0.033690 at tray 10 * Tray Part Mat Bal 0.005849 for comp 10 at tray 7
Coln Part Mat Bal 0.002082 for comp 10

- at iter 4, err sum 0.363963 , max err sum 0.428567E-01 - adj. factor 1.000000
DK/K - max .31613E-03 - min .16176E-07 - avg 0.000040
DT max - abs 8.3057 - rel 0.012131 DR max - abs 52.3745 - rel 0.011632
Error sums, total 0.363963 , BP 0.872665E-01, H 0.125627E-01, Comp 0.264134
- Maximum Relative Errors -
* BP 0.010292 at tray 13 * H 0.002107 at tray 14
Tray Glob Mat Bal 0.030458 at tray 10 * Tray Part Mat Bal 0.004997 for comp 10 at tray 7
Coln Part Mat Bal 0.002419 for comp 10

- at iter 5, err sum 3.34380 , max err sum 0.327862 - adj. factor 0.524749
DK/K - max .17875E-02 - min .75885E-06 - avg 0.000306
DT max - abs 30.0000 - rel 0.042722 DR max - abs 197.1686 - rel 0.094212
Error sums, total 3.34380 , BP 0.751956 , H 0.102966 , Comp 2.48888
- Maximum Relative Errors -
* BP 0.082347 at tray 12 * H 0.009890 at tray 1
Tray Glob Mat Bal 0.235625 at tray 8 * Tray Part Mat Bal 0.071085 for comp 10 at tray 4
Coln Part Mat Bal 0.076696 for comp 10

- at iter 5, err sum 0.363963 , max err sum 0.428567E-01 - adj. factor 0.524749
DK/K - max .13630E-03 - min .57250E-07 - avg 0.000017
DT max - abs 0.0000 - rel 0.000000 DR max - abs 0.0000 - rel 0.000000
Error sums, total 0.363963 , BP 0.872665E-01, H 0.125627E-01, Comp 0.264134
- Maximum Relative Errors -
* BP 0.010292 at tray 13 * H 0.002107 at tray 14
Tray Glob Mat Bal 0.030458 at tray 10 * Tray Part Mat Bal 0.004997 for comp 10 at tray 7
Coln Part Mat Bal 0.002419 for comp 10

- at iter 6, err sum 2.23674 , max err sum 0.179685 - adj. factor 0.472229
DK/K - max .13553E-02 - min .34005E-06 - avg 0.000265
DT max - abs 30.0000 - rel 0.043293 DR max - abs 248.6204 - rel 0.138795
Error sums, total 2.23674 , BP 0.474503 , H 0.867746E-01, Comp 1.67546
- Maximum Relative Errors -
* BP 0.054494 at tray 10 * H 0.013270 at tray 13
Tray Glob Mat Bal 0.111921 at tray 7 * Tray Part Mat Bal 0.048063 for comp 10 at tray 4
Coln Part Mat Bal 0.069807 for comp 10
* WARNING, A FAILURE FOUND IN SOLUTION IMPROUVING *

- at iter 7, err sum 2.23677 , max err sum 0.179687 - adj. factor 0.472229
DK/K - max .89523E-03 - min .95902E-07 - avg 0.000201
DT max - abs 30.0000 - rel 0.043293 DR max - abs 248.6204 - rel 0.138795
Error sums, total 2.23677 , BP 0.474508 , H 0.867752E-01, Comp 1.67548
- Maximum Relative Errors -
* BP 0.054495 at tray 10 * H 0.013270 at tray 13
Tray Glob Mat Bal 0.111923 at tray 7 * Tray Part Mat Bal 0.048063 for comp 10 at tray 4
Coln Part Mat Bal 0.069808 for comp 10

- at iter 8, err sum 0.512512E-01, max err sum 0.841567E-02 - adj. factor 1.000000
DK/K - max .84481E-04 - min .42304E-07 - avg 0.000013
DT max - abs 9.7712 - rel 0.014155 DR max - abs 257.6511 - rel 0.096593
Error sums, total 0.512512E-01, BP 0.530451E-02, H 0.364386E-01, Comp 0.950809E-02
- Maximum Relative Errors -
* BP 0.000459 at tray 2 * H 0.007123 at tray 2
Tray Glob Mat Bal -0.000834 at tray 23 * Tray Part Mat Bal 0.000397 for comp 10 at tray 4
Coln Part Mat Bal 0.000834 for comp 10

- at iter 9, err sum 0.294962E-01, max err sum 0.304492E-02 - adj. factor 1.000000
DK/K - max .95053E-04 - min .45201E-07 - avg 0.000022
DT max - abs 2.6095 - rel 0.003942 DR max - abs 63.4175 - rel 0.038191
Error sums, total 0.294962E-01, BP 0.481867E-02, H 0.672092E-02, Comp 0.179567E-01
- Maximum Relative Errors -
* BP -0.000604 at tray 4 * H 0.001207 at tray 6
Tray Glob Mat Bal 0.001234 at tray 7 * Tray Part Mat Bal 0.000513 for comp 10 at tray 4
Coln Part Mat Bal 0.001224 for comp 10

- at iter 10, err sum 0.380040 , max err sum 0.307296E-01 - adj. factor 0.733864
DK/K - max .45406E-03 - min .58124E-07 - avg 0.000097
DT max - abs 9.4588 - rel 0.013955 DR max - abs 207.7701 - rel 0.176471
Error sums, total 0.380040 , BP 0.567313E-01, H 0.103994E-01, Comp 0.312909
- Maximum Relative Errors -
* BP -0.005581 at tray 23 * H 0.002059 at tray 1
Tray Glob Mat Bal -0.023089 at tray 17 * Tray Part Mat Bal 0.002837 for comp 10 at tray 8
Coln Part Mat Bal 0.009105 for comp 10

- at iter 10, err sum 0.202268E-01, max err sum 0.201754E-02 - adj. factor 0.733864
DK/K - max .12050E-02 - min .13224E-05 - avg 0.000400
DT max - abs 2.5976 - rel 0.003872 DR max - abs 57.0589 - rel 0.042964
Error sums, total 0.202268E-01, BP 0.328534E-02, H 0.462701E-02, Comp 0.123145E-01
- Maximum Relative Errors -
* BP -0.000409 at tray 4 * H 0.000736 at tray 23
Tray Glob Mat Bal 0.000873 at tray 7 * Tray Part Mat Bal 0.000357 for comp 10 at tray 4
Coln Part Mat Bal 0.000830 for comp 10
*** COLUMN CALCULATION RESOLVED ***

*** FINAL COLUMN STATUS ***

TRAY	TEMP	TOTAL LIQ	VAP OUTLET	LIQ.	VAP. DRAW-OFF	BP.ERROR	ENT.BAL.ERR.
0	149.419	4281.312	0.000	1834.976	0.000	-0.000082	0.000000
1	161.841	2711.316	4281.312	0.000	0.000	-0.000193	0.000107
2	171.340	2615.813	4546.292	0.000	0.000	-0.000320	0.000177
3	179.307	2515.455	4450.788	0.000	0.000	-0.000380	-0.000037
4	186.739	5624.299	4350.431	0.000	0.000	-0.000409	-0.000284
5	195.778	5633.592	4801.786	0.000	0.000	-0.000356	0.000131
6	204.899	5673.746	4811.078	0.000	0.000	-0.000200	0.000400
7	213.322	5733.389	4851.232	0.000	0.000	-0.000006	-0.000098
8	220.506	5800.646	4910.875	0.000	0.000	0.000111	-0.000294
9	226.268	5863.987	4978.133	0.000	0.000	0.000117	-0.000367
10	230.711	5918.015	5041.474	0.000	0.000	0.000071	-0.000179
11	234.068	5960.835	5095.501	0.000	0.000	0.000022	0.000058
12	236.598	5992.631	5138.321	0.000	0.000	-0.000011	0.000212
13	238.535	6014.238	5170.118	0.000	0.000	-0.000036	0.000226
14	240.075	6027.080	5191.725	0.000	0.000	-0.000059	0.000204
15	241.380	6030.315	5204.566	0.000	0.000	-0.000077	-0.000197
16	242.590	6027.571	5207.802	0.000	0.000	-0.000091	0.000016
17	243.853	6015.353	5205.058	0.000	0.000	-0.000098	-0.000223
18	245.347	5993.313	5192.839	0.000	0.000	-0.000099	0.000024
19	247.331	5952.574	5170.800	0.000	0.000	-0.000098	-0.000213
20	250.229	5884.493	5130.061	0.000	0.000	-0.000092	0.000051
21	254.768	5767.968	5061.980	0.000	0.000	-0.000088	-0.000173
22	262.196	5582.928	4945.455	0.000	0.000	-0.000096	-0.000222
23	274.454	822.513	4760.414	822.513	0.000	-0.000176	0.000736

* HEATERS / COOLERS *
TRAY 0 - DUTY -26950.907 M-BTU
TRAY 23 - DUTY 30000.000 M-BTU
* SPECIFICATIONS *

NO	TYPE	GIVEN VALUE	CALC VALUE	ERROR	CONV
1	RECOVERY	64200.0000 LB	64194.3498 LB	-0.000044	Y

Unit op 2 - 'C4 ' calculated

*** SOLUTION OBTAINED ***

... Base case results loaded on binary file 'DE-C3 ' ...

*** UNIT 1 - 'C1 ' - ' DISTILLATION COLUMN ' ***
--- Feed Streams --- - Product Streams -
'S1 ' 'C3 '
'S3 '

1) * OPERATING CONDITIONS *

			*** OUTLET LIQUID ***		*** OUTLET VAPOR ***	
* Tray *	Temperature °F	Pressure psia	-Molar Rate- lbm/h	-Weight Rate- lb/h	-Molar Rate- lbm/h	-Weight Rate- lb/h
CON	145.46	295.	4387.8	202452.	0.0000	0.00000
1	154.99	299.	2927.6	139316.	4387.8	202452.
2	162.21	299.	2866.9	139876.	4659.5	219224.
3	168.00	299.	2828.7	140615.	4598.8	219782.
4	172.34	300.	2805.3	141303.	4560.5	220520.
5	175.45	300.	2791.3	141857.	4537.2	221206.
6	177.62	300.	2781.2	142187.	4523.2	221758.
7	179.14	300.	2773.8	142367.	4513.1	222087.
8	180.22	300.	2767.9	142442.	4505.7	222267.
9	181.01	301.	2762.6	142442.	4499.7	222343.
10	181.64	301.	2757.0	142371.	4494.5	222342.
11	182.18	301.	2750.3	142223.	4488.9	222272.
12	182.71	301.	2741.3	141983.	4482.2	222124.
13	183.33	301.	2727.6	141567.	4473.2	221884.
14	184.14	302.	2706.1	140887.	4459.4	221469.
15	185.33	302.	2668.1	139596.	4438.0	220789.
16	187.25	302.	2599.3	137152.	4400.0	219499.
17	190.63	302.	5735.0	307288.	4331.2	217056.
18	199.07	302.	5752.6	314916.	4809.4	247390.
19	207.53	303.	5793.5	323625.	4827.0	255017.
20	215.36	303.	5853.6	332781.	4867.9	263724.
21	222.11	303.	5920.7	341469.	4928.0	272877.
22	227.61	303.	5984.9	349048.	4995.1	281563.
23	231.94	303.	6039.7	355219.	5059.3	289140.
24	235.27	304.	6082.5	359956.	5114.1	295309.
25	237.84	304.	6113.2	363425.	5156.9	300046.
26	239.87	304.	6132.9	365862.	5187.6	303514.
27	241.55	304.	6142.6	367475.	5207.3	305949.
28	243.08	304.	6142.4	368436.	5217.0	307562.
29	244.65	305.	6130.1	368818.	5216.8	308523.
30	246.54	305.	6100.5	368569.	5204.5	308905.
31	249.14	305.	6043.2	367501.	5174.9	308656.
32	253.14	305.	5938.8	365145.	5117.6	307589.
33	259.76	305.	5760.6	360987.	5013.2	305235.
REB	271.07	306.	925.61	59905.9	4835.0	301080.

- HEATER/COOLERS -

1 - Condenser -26447.578 kBtu/h
2 - Reboiler 30000.000 kBtu/h

- PRODUCT STREAMS -

Stream 'C3 ', LIQUID draw-off from condenser
Flow rate, molar 1731.876 lbm/h - weight 79907.470 lb/h

Stream 'S3 ', LIQUID draw-off from reboiler
Flow rate, molar 925.613 lbm/h - weight 59905.877 lb/h

- FEED STREAMS -

Stream 'S1 ', Feed on tray 17
Flow rate, molar 2657.489 lbm/h - weight 139800.713 lb/h

Condenser is subcooled,
Outlet liquid temperature 125.000 °F

- REFLUX DATA -

Molar rate 2655.973 lbm/h Weight rate 122544.614 lb/h

Ratios with respect to OVERHEAD product(s)
Molar 1.5336 Weight 1.5336

Ratios with respect to TOTAL FEED
Molar 0.9994 Weight 0.8766

2) * PRODUCT STREAMS *

* Stream 'C3 ', LIQUID draw-off from condenser
- Temperature 125.000 °F - Pressure 295.0000 psia

* No * Component *	-Molar Rate-	-Mol Fr-	- Weight Rate-	-Wt Fr-
2 ETHANE	12.958	0.007482	389.654	0.004876
3 PROPANE	1454.059	0.839586	64124.014	0.802478
4 ISOBUTANE	159.016	0.091817	9242.020	0.115659
5 BUTANE	105.828	0.061106	6150.713	0.076973
6 ISOPENTANE	0.014	0.000008	0.977	0.000012
7 PENTANE	0.001	0.000001	0.091	0.000001
8 HEXANE	0.000	0.000000	0.000	0.000000
9 HEPTANE	0.000	0.000000	0.000	0.000000
10 OCTANE	0.000	0.000000	0.000	0.000000
11 NONANE	0.000	0.000000	0.000	0.000000
* TOTAL *	1731.876	1.000000	79907.470	1.000000
	lbm/h		lb/h	

* Stream 'S3 ', LIQUID draw-off from reboiler
- Temperature 271.068 °F - Pressure 305.6000 psia

* No * Component *	-Molar Rate-	-Mol Fr-	- Weight Rate-	-Wt Fr-
2 ETHANE	0.000	0.000000	0.000	0.000000
3 PROPANE	0.693	0.000748	30.551	0.000510
4 ISOBUTANE	105.383	0.113853	6124.887	0.102242
5 BUTANE	470.698	0.508526	27356.974	0.456666
6 ISOPENTANE	129.906	0.140346	9372.744	0.156458
7 PENTANE	132.275	0.142905	9543.637	0.159311
8 HEXANE	86.284	0.093218	7435.913	0.124127
9 HEPTANE	0.109	0.000118	10.927	0.000182
10 OCTANE	0.263	0.000284	30.075	0.000502
11 NONANE	0.001	0.000001	0.171	0.000003
* TOTAL *	925.613	1.000000	59905.877	1.000000
	lbm/h		lb/h	

*** COLUMN OPTIMIZATION PROCEDURE ***

1) * KEY COMPONENTS *

Light Key component 3 'PROPANE '
Heavy Key component 4 'ISOBUTANE '

2) * CONDENSER SPECIFICATION *

SET NO 1
8 Values of MULTIPLIER TO MINIMUM CONDENSER DUTY, defined
Initial value 1.1000
Final value 1.5000

3) * HEATER/COOLERS SPECIFICATION *

Remark
heater/coolers are supposed to be in top-down order

NO HEATER/COOLERS SPECIFIED

4) * MATERIAL BALANCE SPECIFICATION *

SPEC 1
Hold HEAVY key component MOLAR FRACTION
of stream drawn-off from CONDENSER
at a value of 0.1500

SPEC 2
Hold LIGHT key component MOLAR FRACTION
of stream drawn-off from REBOILER
at a value of 0.0008

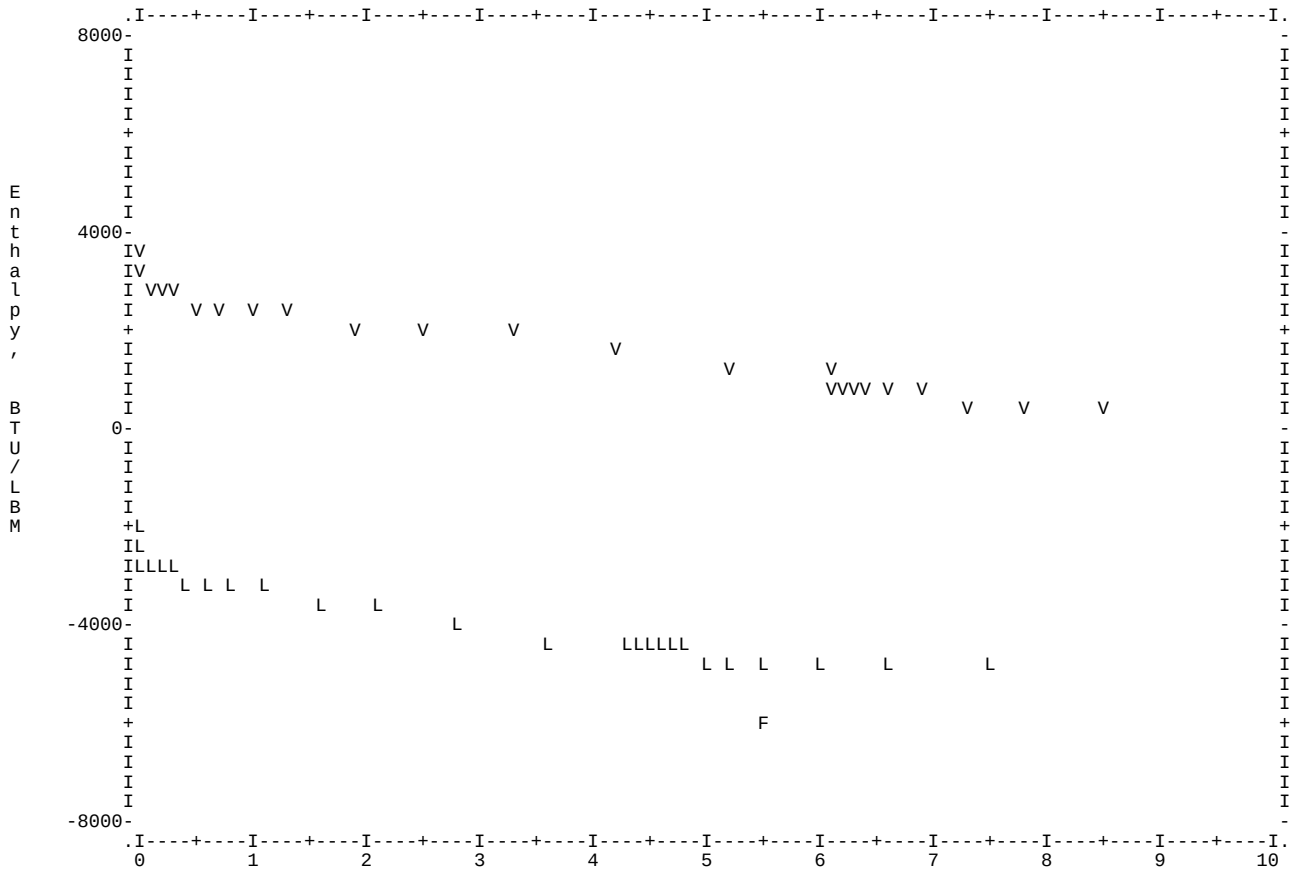
*** PSEUDO-BINARY SYSTEM ***

Tray	Temp FAR	- Light Comp Frac - Vapor	Liquid	- K value -	- Liq Enth - BTU/LBM	- Vap Enth - BTU/LBM
1	154.988	0.748133	0.847068	1.1322	-4985.9263	217.9655
2	162.206	0.663555	0.784906	1.1829	-4877.4566	383.9333
3	168.002	0.598279	0.732678	1.2246	-4779.8547	521.6942
4	172.345	0.551458	0.692800	1.2563	-4701.3670	627.2495
5	175.450	0.519426	0.664370	1.2790	-4643.0739	703.8110
6	177.624	0.498080	0.644976	1.2949	-4601.6107	757.8261
7	179.141	0.484047	0.632112	1.3059	-4572.6190	795.6495
8	180.218	0.474821	0.623695	1.3135	-4552.2296	822.4841
9	181.012	0.468674	0.618202	1.3190	-4537.5089	842.2135
10	181.636	0.464444	0.614588	1.3233	-4526.3539	857.7107
11	182.178	0.461346	0.612166	1.3269	-4517.2477	871.2391
12	182.714	0.458820	0.610484	1.3306	-4509.0130	884.8692
13	183.329	0.456392	0.609229	1.3349	-4500.5568	900.9765
14	184.137	0.453603	0.608201	1.3408	-4490.7046	922.8411
15	185.330	0.449808	0.607226	1.3500	-4477.7900	956.0548
16	187.255	0.444037	0.606242	1.3653	-4459.2963	1011.0030
17	190.625	0.434472	0.605252	1.3931	-4429.6367	1109.1429
18	199.067	0.356625	0.517883	1.4522	-4210.7062	1338.3249
19	207.528	0.281172	0.424818	1.5109	-3973.4465	1578.9621
20	215.356	0.213876	0.334463	1.5638	-3738.8932	1811.4638
21	222.106	0.157899	0.253894	1.6079	-3526.0989	2019.5032
22	227.613	0.113848	0.187020	1.6427	-3346.2185	2194.2600
23	231.940	0.080606	0.134547	1.6692	-3201.8990	2334.5126
24	235.274	0.056284	0.095069	1.6891	-3089.9215	2444.1255
25	237.844	0.038880	0.066261	1.7042	-3004.2835	2529.2926
26	239.868	0.026625	0.045692	1.7161	-2938.2797	2596.7482
27	241.550	0.018092	0.031231	1.7262	-2885.4337	2653.0568
28	243.077	0.012200	0.021174	1.7357	-2839.5591	2704.7341
29	244.654	0.008153	0.014235	1.7459	-2794.1401	2759.0952
30	246.543	0.005386	0.009472	1.7588	-2741.0158	2825.9334
31	249.143	0.003498	0.006217	1.7773	-2667.8566	2920.6940
32	253.142	0.002212	0.003996	1.8065	-2553.0075	3070.6551
33	259.764	0.001338	0.002483	1.8555	-2354.5285	3326.4583
34	271.068	0.000748	0.001451	1.9386	-1988.3941	3779.7670

*** PSEUDO-BINARY SYSTEM ***

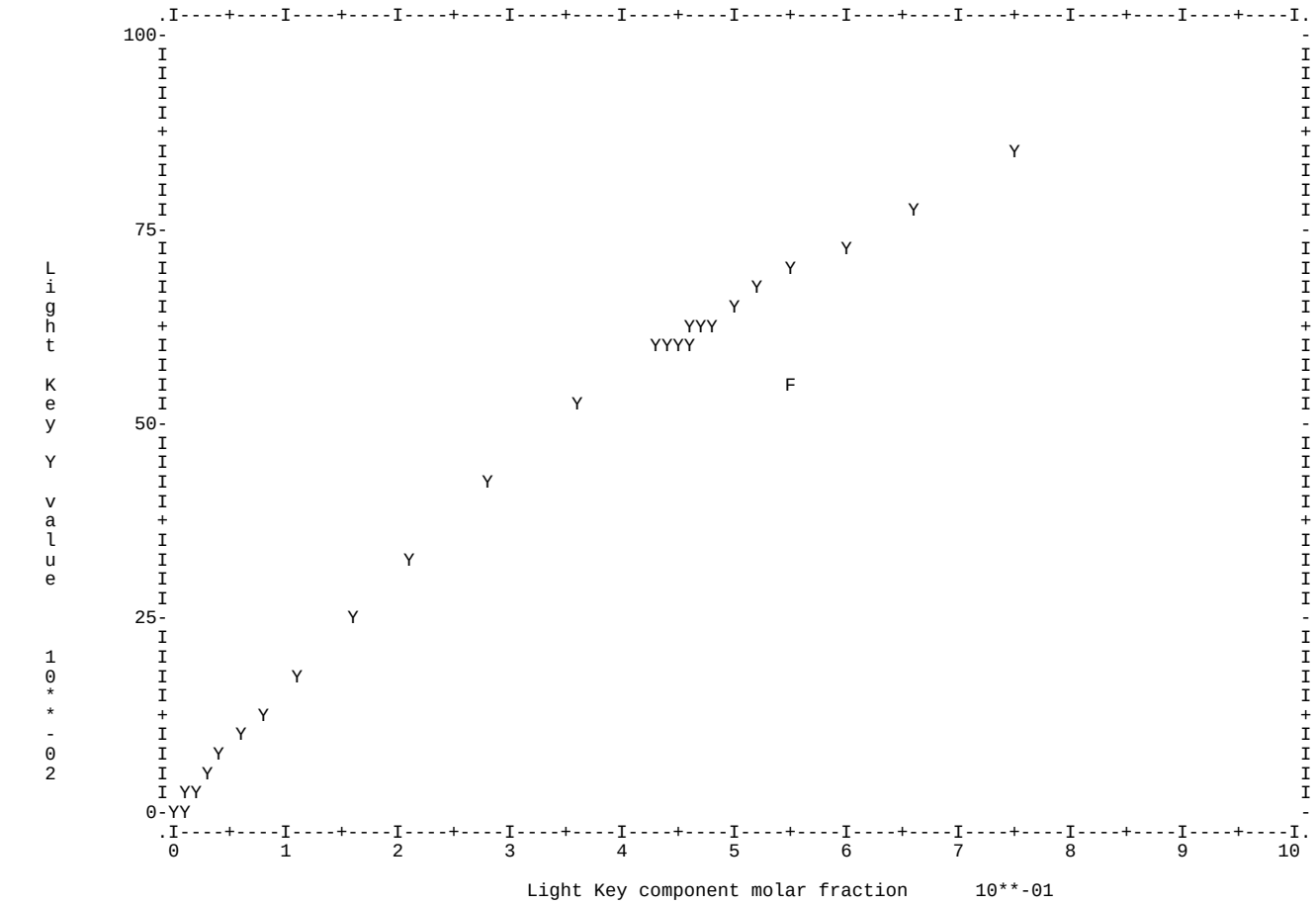
Feed	Stream	-Light Comp Frac-	Global Enthalpy BTU/LBM
1	S1	0.552509	-5812.44

*** ENTHALPY - COMPOSITION DIAGRAM ***



Light Key component molar fraction 10**-01

*** LIGHT KEY Y/X DIAGRAM ***



*** COLUMN SPECIFICATIONS AND OPERATING DATA ***

1) * Spec of stream from Condenser *
Molar flowrate 1726.5185 LBM
Light-key molar fraction 0.850000

2) * Spec of stream from Reboiler *
Molar flowrate 930.9705 LBM
Light-key molar fraction 0.000800

3) * TIE LINES DATA *

	Temperature FAR	Liq Enthalpy BTU/LBM	Vap Enthalpy BTU/LBM	LIGHT comp. molar fraction LIQUID	VAPOR	Global Enthalpy BTU/LBM
OVERHEAD	146.294	-5116.567	18.074	0.850000	0.921937	-5116.567
Feed 1 Stream S1	169.702	-4749.136	563.007	0.579954	0.717070	
BOTTOM	270.079	-2020.419	3740.117	0.000800	0.001541	-2020.419

*** CALCULATION SET 1 ***

1) * CONDENSER *
V/F ratio 0.000000
Minimum Duty -18697.42 M-BTU
Minimum reflux ratio 1.0331

3) * REBOILER *
Mimimum duty 23429.11 M-BTU

4) * MINIMUM REFLUX RATIO *
Section Over Feed 1 - 1.0331

*** TRAY-BY-TRAY CALCULATION ***

Duty Multiplier 1.1000
Condenser Duty - Actual -0.2057E+05 M-BTU - Minimum -0.1870E+05 M-BTU
Reboiler Duty - Actual 0.2530E+05 M-BTU - Minimum 0.2343E+05 M-BTU
Reflux Multiplier 1.1968
Reflux Ratio - Actual 1.2364 - Minimum 1.0331

NO.	TEMPERATURE FAR	LIGHT COMP. MOLAR FRACTION LIQUID	VAPOR	LIQ ENTHALPY BTU/LBM	VAP ENTHALPY BTU/LBM	LIQ FLOW RATE LBM	VAP FLOW RATE LBM
0	146.294	0.850000	0.921937	-5116.57	18.07	1726.52	0.00
1	154.647	0.752122	0.850000	-4991.04	210.14	2081.56	1726.52
2	160.860	0.679328	0.796499	-4897.68	352.98	2044.37	3808.07
3	165.251	0.629266	0.757471	-4826.19	456.30	2022.33	3770.89
4	168.193	0.596221	0.730924	-4776.40	526.34	2008.87	3748.85
Feed No 1 'S1 ' set on tray no 5 - Temp 151.17 FAR - Rate 2657.489 LBM							
5	170.089	0.575785	0.713519	-4742.15	572.41	5189.00	3735.38
6	171.398	0.561672	0.701499	-4718.49	604.22	5176.24	4258.03
7	173.233	0.542297	0.684669	-4684.70	649.15	5159.40	4245.26
8	175.770	0.516287	0.661519	-4636.98	711.75	5135.27	4228.43
9	179.356	0.482206	0.630433	-4568.55	801.00	4947.70	4204.30
10	191.734	0.424253	0.593783	-4400.90	1139.23	4960.63	4016.73
11	198.661	0.360368	0.522084	-4221.23	1327.31	4972.56	4029.66
12	205.857	0.296070	0.443193	-4020.29	1531.45	5002.16	4041.59
13	212.833	0.235569	0.363590	-3814.50	1736.51	5044.50	4071.19
14	219.190	0.182083	0.288702	-3618.03	1929.62	5094.36	4113.53
15	224.682	0.137298	0.222620	-3441.98	2101.23	5145.66	4163.39
16	229.227	0.101450	0.167449	-3292.39	2246.57	5193.20	4214.68
17	232.878	0.073760	0.123434	-3170.38	2365.37	5233.76	4262.23
18	235.767	0.052947	0.089546	-3073.50	2460.45	5266.02	4302.79
19	238.052	0.037620	0.064146	-2997.50	2536.23	5290.04	4335.05
20	239.893	0.026502	0.045484	-2937.52	2597.56	5305.78	4359.07
21	241.464	0.018529	0.031971	-2888.14	2650.17	5314.45	4374.80
22	242.907	0.012856	0.022294	-2844.67	2698.98	5315.89	4383.48
23	244.386	0.008842	0.015416	-2801.87	2749.84	5308.82	4384.92
24	246.114	0.006013	0.010552	-2753.06	2810.78	5290.03	4377.85
25	248.416	0.004025	0.007126	-2688.30	2894.21	5252.67	4359.06
26	251.838	0.002631	0.004720	-2590.47	3021.74	5183.75	4321.70
27	257.358	0.001655	0.003032	-2426.64	3233.52	5062.52	4252.78
28	266.714	0.000976	0.001848	-2129.42	3605.16	5061.22	4131.55
29	275.843	0.000499	0.001015	-1833.72	3971.27	930.97	4130.25

*** TRAY-BY-TRAY CALCULATION ***

Duty Multiplier 1.1571
Condenser Duty - Actual -0.2164E+05 M-BTU - Minimum -0.1870E+05 M-BTU
Reboiler Duty - Actual 0.2637E+05 M-BTU - Minimum 0.2343E+05 M-BTU
Reflux Multiplier 1.3093
Reflux Ratio - Actual 1.3525 - Minimum 1.0331

NO.	TEMPERATURE	LIGHT COMP. MOLAR FRACTION		LIQ ENTHALPY	VAP ENTHALPY	LIQ FLOW RATE	VAP FLOW RATE
	FAR	LIQUID	VAPOR	BTU/LBM	BTU/LBM	LBM	LBM
0	146.294	0.850000	0.921937	-5116.57	18.07	1726.52	0.00
1	154.647	0.752122	0.850000	-4991.04	210.14	2277.15	1726.52
2	161.112	0.676378	0.794331	-4893.90	358.77	2234.92	4003.67
3	165.853	0.622489	0.752048	-4816.05	470.60	2209.32	3961.44
4	169.133	0.586083	0.722290	-4759.41	549.19	2193.84	3935.84
Feed No 1 'S1 ' set on tray no 5 - Temp 151.17 FAR - Rate 2657.489 LBM							
5	171.309	0.562626	0.702312	-4720.09	602.07	5364.63	3920.36
6	173.678	0.537709	0.680597	-4676.35	660.11	5341.78	4433.66
7	176.945	0.504746	0.651032	-4614.56	740.96	5297.32	4410.81
8	182.171	0.461383	0.612195	-4517.36	871.08	5122.83	4366.35
9	194.643	0.397425	0.563674	-4325.45	1218.21	5144.38	4191.86
10	202.051	0.330015	0.485062	-4127.03	1423.19	5165.42	4213.41
11	209.471	0.264471	0.402395	-3915.24	1636.66	5203.06	4234.45
12	216.406	0.205168	0.321930	-3705.79	1843.83	5253.04	4272.09
13	222.494	0.154800	0.249189	-3513.44	2031.80	5308.11	4322.07
14	227.569	0.114200	0.187554	-3347.66	2192.86	5361.13	4377.14
15	231.653	0.082813	0.138031	-3211.48	2325.20	5407.61	4430.16
16	234.869	0.059241	0.099869	-3103.54	2430.80	5444.88	4476.64
17	237.395	0.041921	0.071294	-3019.25	2514.41	5472.78	4513.91
18	239.410	0.029400	0.050350	-2953.23	2581.47	5491.93	4541.81
19	241.084	0.020456	0.035238	-2900.08	2637.46	5503.03	4560.96
20	242.578	0.014124	0.024459	-2854.54	2687.86	5506.25	4572.06
21	244.063	0.009670	0.016835	-2811.16	2738.72	5500.64	4575.28
22	245.748	0.006550	0.011477	-2763.37	2797.80	5483.28	4569.67
23	247.937	0.004373	0.007726	-2701.78	2876.75	5447.73	4552.31
24	251.136	0.002857	0.005110	-2610.62	2995.43	5381.52	4516.76
25	256.243	0.001803	0.003287	-2460.08	3190.42	5264.11	4450.55
26	264.852	0.001073	0.002018	-2189.74	3530.48	5220.80	4333.14
27	274.564	0.000566	0.001132	-1875.14	3919.98	930.97	4289.82

*** TRAY-BY-TRAY CALCULATION ***

Duty Multiplier 1.2143
Condenser Duty - Actual -0.2270E+05 M-BTU - Minimum -0.1870E+05 M-BTU
Reboiler Duty - Actual 0.2744E+05 M-BTU - Minimum 0.2343E+05 M-BTU
Reflux Multiplier 1.4217
Reflux Ratio - Actual 1.4687 - Minimum 1.0331

NO.	TEMPERATURE FAR	LIGHT COMP. MOLAR FRACTION LIQUID	VAPOR	LIQ ENTHALPY BTU/LBM	VAP ENTHALPY BTU/LBM	LIQ FLOW RATE LBM	VAP FLOW RATE LBM
0	146.294	0.850000	0.921937	-5116.57	18.07	1726.52	0.00
1	154.647	0.752122	0.850000	-4991.04	210.14	2472.74	1726.52
2	161.340	0.673703	0.792365	-4890.47	364.02	2425.36	4199.26
3	166.411	0.616198	0.747015	-4806.65	483.88	2396.03	4151.88
4	170.024	0.576483	0.714114	-4743.32	570.83	2378.35	4122.55
Feed No 1 'S1 ' set on tray no 5 - Temp 151.17 FAR - Rate 2657.489 LBM							
5	172.484	0.550022	0.691525	-4698.75	630.68	5539.63	4104.87
6	175.832	0.515680	0.660967	-4635.80	713.29	5501.86	4608.66
7	180.673	0.471300	0.620548	-4543.80	833.79	5300.41	4570.89
8	193.882	0.404440	0.571546	-4345.18	1197.56	5321.77	4369.44
9	201.600	0.334037	0.490023	-4139.68	1410.36	5342.93	4390.80
10	209.301	0.265930	0.404353	-3920.32	1631.62	5382.72	4411.96
11	216.453	0.204783	0.321375	-3704.33	1845.26	5436.02	4451.75
12	222.679	0.153316	0.246936	-3507.38	2037.69	5494.53	4505.05
13	227.827	0.112207	0.184430	-3339.10	2201.18	5550.51	4563.56
14	231.931	0.080677	0.134659	-3202.21	2334.21	5598.68	4619.54
15	235.144	0.057233	0.096609	-3094.29	2439.85	5637.16	4667.71
16	237.653	0.040170	0.068396	-3010.63	2522.98	5665.50	4706.19
17	239.650	0.027947	0.047911	-2945.40	2589.47	5684.46	4734.53
18	241.313	0.019292	0.033264	-2892.86	2645.14	5694.78	4753.49
19	242.814	0.013214	0.022906	-2847.46	2695.84	5696.50	4763.81
20	244.335	0.008972	0.015639	-2803.33	2748.09	5688.29	4765.53
21	246.107	0.006024	0.010571	-2753.28	2810.51	5666.37	4757.32
22	248.476	0.003982	0.007052	-2686.62	2896.39	5622.62	4735.40
23	252.030	0.002570	0.004613	-2584.94	3028.95	5541.79	4691.65
24	257.820	0.001595	0.002927	-2412.80	3251.36	5400.46	4610.82
25	267.680	0.000925	0.001760	-2098.12	3643.91	5418.59	4469.49
26	276.544	0.000463	0.000951	-1811.00	3999.40	930.97	4487.62

*** TRAY-BY-TRAY CALCULATION ***

Duty Multiplier 1.2714
Condenser Duty - Actual -0.2377E+05 M-BTU - Minimum -0.1870E+05 M-BTU
Reboiler Duty - Actual 0.2850E+05 M-BTU - Minimum 0.2343E+05 M-BTU
Reflux Multiplier 1.5342
Reflux Ratio - Actual 1.5849 - Minimum 1.0331

NO.	TEMPERATURE	LIGHT COMP. MOLAR FRACTION		LIQ ENTHALPY	VAP ENTHALPY	LIQ FLOW RATE	VAP FLOW RATE
	FAR	LIQUID	VAPOR	BTU/LBM	BTU/LBM	LBM	LBM
0	146.294	0.850000	0.921937	-5116.57	18.07	1726.52	0.00
1	154.647	0.752122	0.850000	-4991.04	210.14	2668.33	1726.52
2	161.548	0.671266	0.790574	-4887.35	368.80	2615.71	4394.85
3	166.931	0.610347	0.742333	-4797.90	496.23	2582.49	4342.22
Feed No 1 'S1 ' set on tray no 4 - Temp 151.17 FAR - Rate 2657.489 LBM							
4	170.867	0.567391	0.706370	-4728.08	591.33	5744.54	4309.01
5	174.074	0.533626	0.676973	-4668.92	669.87	5709.61	4813.57
6	178.514	0.489849	0.637431	-4584.61	780.01	5485.52	4778.64
7	192.117	0.420715	0.589813	-4390.95	1149.64	5497.14	4554.55
8	200.118	0.347258	0.506329	-4181.25	1368.20	5515.43	4566.17
9	208.152	0.275806	0.417613	-3954.74	1597.50	5555.16	4584.46
10	215.632	0.211589	0.331172	-3730.20	1819.96	5610.83	4624.19
11	222.137	0.157654	0.253522	-3525.10	2020.48	5672.94	4679.86
12	227.495	0.114789	0.188449	-3350.06	2190.53	5732.80	4741.97
13	231.747	0.082090	0.136890	-3208.34	2328.25	5784.33	4801.82
14	235.054	0.057895	0.097684	-3097.34	2436.87	5825.13	4853.35
15	237.621	0.040387	0.068755	-3011.70	2521.92	5855.06	4894.16
16	239.654	0.027923	0.047872	-2945.27	2589.60	5874.90	4924.09
17	241.340	0.019154	0.033031	-2892.01	2646.05	5885.47	4943.93
18	242.860	0.013037	0.022603	-2846.08	2697.39	5886.79	4954.50
19	244.404	0.008795	0.015336	-2801.35	2750.47	5877.33	4955.81
20	246.214	0.005867	0.010300	-2750.25	2814.32	5852.88	4946.36
21	248.657	0.003851	0.006825	-2681.53	2902.99	5804.36	4921.90
22	252.354	0.002465	0.004433	-2575.64	3041.11	5714.93	4873.39
23	258.421	0.001515	0.002789	-2394.78	3274.59	5559.48	4783.96
24	268.787	0.000867	0.001659	-2062.27	3688.30	5603.11	4628.51
25	277.314	0.000423	0.000881	-1786.07	4030.27	930.97	4672.14

*** TRAY-BY-TRAY CALCULATION ***

Duty Multiplier 1.3286
Condenser Duty - Actual -0.2484E+05 M-BTU - Minimum -0.1870E+05 M-BTU
Reboiler Duty - Actual 0.2957E+05 M-BTU - Minimum 0.2343E+05 M-BTU
Reflux Multiplier 1.6466
Reflux Ratio - Actual 1.7011 - Minimum 1.0331

NO.	TEMPERATURE	LIGHT COMP. MOLAR FRACTION		LIQ ENTHALPY	VAP ENTHALPY	LIQ FLOW RATE	VAP FLOW RATE
	FAR	LIQUID	VAPOR	BTU/LBM	BTU/LBM	LBM	LBM
0	146.294	0.850000	0.921937	-5116.57	18.07	1726.52	0.00
1	154.647	0.752122	0.850000	-4991.04	210.14	2863.92	1726.52
2	161.738	0.669037	0.788935	-4884.49	373.18	2805.97	4590.44
3	167.415	0.604894	0.737970	-4789.74	507.74	2768.73	4532.48
Feed No 1 'S1 ' set on tray no 4 - Temp 151.17 FAR - Rate 2657.489 LBM							
4	171.666	0.558777	0.699033	-4713.63	610.75	5922.97	4495.25
5	175.622	0.517736	0.662835	-4639.79	708.09	5869.00	4992.00
6	181.531	0.465154	0.615195	-4528.23	855.11	5655.78	4938.03
7	195.322	0.391167	0.556650	-4307.85	1236.63	5682.15	4724.81
8	203.633	0.315904	0.467657	-4082.66	1468.19	5711.87	4751.18
9	211.648	0.245753	0.377263	-3850.00	1701.33	5762.14	4780.90
10	218.834	0.185038	0.292956	-3629.27	1918.64	5824.51	4831.17
11	224.890	0.135631	0.220089	-3435.17	2107.84	5888.84	4893.54
12	229.763	0.097332	0.160949	-3274.52	2263.94	5947.21	4957.87
13	233.570	0.068716	0.115248	-3147.16	2388.10	5995.27	5016.24
14	236.511	0.047906	0.081201	-3048.70	2485.12	6031.74	5064.30
15	238.804	0.033067	0.056504	-2972.97	2561.29	6057.03	5100.77
16	240.655	0.022633	0.038927	-2913.56	2623.09	6072.04	5126.06
17	242.255	0.015371	0.026587	-2864.25	2676.92	6077.20	5141.07
18	243.797	0.010353	0.018007	-2818.83	2729.55	6071.59	5146.23
19	245.507	0.006903	0.012083	-2770.13	2789.30	6051.88	5140.62
20	247.709	0.004539	0.008012	-2708.20	2868.43	6010.45	5120.91
21	250.930	0.002923	0.005224	-2616.54	2987.70	5932.54	5079.48
22	256.106	0.001821	0.003318	-2464.17	3185.15	5794.48	5001.57
23	264.874	0.001071	0.002016	-2189.01	3531.38	5743.39	4863.51
24	274.650	0.000562	0.001124	-1872.36	3923.42	930.97	4812.42

*** TRAY-BY-TRAY CALCULATION ***

Duty Multiplier 1.3857
Condenser Duty - Actual -0.2591E+05 M-BTU - Minimum -0.1870E+05 M-BTU
Reboiler Duty - Actual 0.3064E+05 M-BTU - Minimum 0.2343E+05 M-BTU
Reflux Multiplier 1.7591
Reflux Ratio - Actual 1.8173 - Minimum 1.0331

NO.	TEMPERATURE	LIGHT COMP. MOLAR FRACTION		LIQ ENTHALPY	VAP ENTHALPY	LIQ FLOW RATE	VAP FLOW RATE
	FAR	LIQUID	VAPOR	BTU/LBM	BTU/LBM	LBM	LBM
0	146.294	0.850000	0.921937	-5116.57	18.07	1726.52	0.00
1	154.647	0.752122	0.850000	-4991.04	210.14	3059.52	1726.52
2	161.913	0.666990	0.787431	-4881.86	377.19	2996.15	4786.04
3	167.867	0.599801	0.733895	-4782.13	518.48	2954.75	4722.67
Feed No 1 'S1 ' set on tray no 4 - Temp 151.17 FAR - Rate 2657.489 LBM							
4	172.424	0.550645	0.692078	-4699.89	629.19	6100.53	4681.27
5	177.098	0.503241	0.649665	-4611.64	744.77	5849.78	5169.56
6	191.294	0.428310	0.598337	-4412.31	1127.28	5852.75	4918.81
7	199.859	0.349565	0.509175	-4188.51	1360.84	5872.67	4921.78
8	208.355	0.274060	0.415269	-3948.66	1603.53	5917.83	4941.70
9	216.143	0.207352	0.325073	-3714.09	1835.71	5980.60	4986.86
10	222.803	0.152326	0.245433	-3503.34	2041.61	6049.41	5049.63
11	228.201	0.109329	0.179886	-3326.60	2213.33	6114.15	5118.44
12	232.423	0.077080	0.128823	-3185.66	2350.41	6168.74	5183.18
13	235.670	0.053607	0.090638	-3076.75	2457.23	6210.93	5237.77
14	238.173	0.036888	0.062918	-2993.55	2540.26	6240.84	5279.96
15	240.156	0.025164	0.043215	-2929.23	2606.39	6259.49	5309.87
16	241.825	0.017031	0.029420	-2877.17	2662.36	6267.59	5328.52
17	243.375	0.011435	0.019863	-2830.98	2715.01	6264.67	5336.62
18	245.028	0.007605	0.013291	-2783.61	2772.34	6247.95	5333.70
19	247.082	0.004994	0.008796	-2725.83	2845.61	6210.67	5316.98
20	250.014	0.003218	0.005733	-2642.86	2953.33	6139.18	5279.70
21	254.655	0.002012	0.003650	-2507.67	3129.08	6010.37	5208.21
22	262.481	0.001196	0.002235	-2266.52	3435.42	5895.74	5079.40
23	273.044	0.000645	0.001271	-1924.39	3859.01	930.97	4964.77

*** TRAY-BY-TRAY CALCULATION ***

Duty Multiplier 1.4429
Condenser Duty - Actual -0.2698E+05 M-BTU - Minimum -0.1870E+05 M-BTU
Reboiler Duty - Actual 0.3171E+05 M-BTU - Minimum 0.2343E+05 M-BTU
Reflux Multiplier 1.8715
Reflux Ratio - Actual 1.9334 - Minimum 1.0331

NO.	TEMPERATURE	LIGHT COMP. MOLAR FRACTION		LIQ ENTHALPY	VAP ENTHALPY	LIQ FLOW RATE	VAP FLOW RATE
	FAR	LIQUID	VAPOR	BTU/LBM	BTU/LBM	LBM	LBM
0	146.294	0.850000	0.921937	-5116.57	18.07	1726.52	0.00
1	154.647	0.752122	0.850000	-4991.04	210.14	3255.11	1726.52
2	162.074	0.665104	0.786045	-4879.44	380.89	3186.25	4981.63
3	168.285	0.595233	0.730083	-4774.75	528.56	3140.79	4912.77
Feed No 1 'S1 ' set on tray no 4 - Temp 151.17 FAR - Rate 2657.489 LBM							
4	173.131	0.543349	0.685603	-4686.61	646.63	6278.53	4867.31
5	178.470	0.490255	0.637803	-4585.45	778.92	6020.28	5347.56
6	193.086	0.411785	0.579790	-4365.83	1175.93	6035.13	5089.31
7	201.898	0.331380	0.486746	-4131.33	1418.84	6062.47	5104.16
8	210.427	0.256249	0.391355	-3886.58	1665.07	6115.06	5131.50
9	218.066	0.191407	0.302123	-3653.48	1894.97	6183.09	5184.09
10	224.470	0.138994	0.225194	-3448.90	2094.50	6254.24	5252.12
11	229.580	0.098734	0.163162	-3280.60	2258.03	6318.86	5323.27
12	233.535	0.068968	0.115656	-3148.32	2386.96	6371.73	5387.89
13	236.562	0.047562	0.080632	-3047.00	2486.81	6411.38	5440.76
14	238.902	0.032472	0.055506	-2969.77	2564.57	6438.34	5480.41
15	240.783	0.021983	0.037826	-2909.53	2627.38	6453.68	5507.37
16	242.412	0.014766	0.025554	-2859.54	2682.23	6457.77	5522.71
17	243.999	0.009835	0.017119	-2813.02	2736.50	6449.31	5526.80
18	245.794	0.006482	0.011359	-2762.06	2799.45	6423.97	5518.34
19	248.162	0.004210	0.007445	-2695.46	2884.94	6372.08	5493.00
20	251.706	0.002674	0.004794	-2594.27	3016.78	6275.41	5441.11
21	257.498	0.001637	0.003000	-2422.45	3238.92	6106.69	5344.44
22	267.378	0.000941	0.001788	-2107.90	3631.81	6115.31	5175.72
23	276.379	0.000471	0.000966	-1816.35	3992.77	930.97	5184.34

*** TRAY-BY-TRAY CALCULATION ***

Duty Multiplier 1.5000
Condenser Duty - Actual -0.2805E+05 M-BTU - Minimum -0.1870E+05 M-BTU
Reboiler Duty - Actual 0.3278E+05 M-BTU - Minimum 0.2343E+05 M-BTU
Reflux Multiplier 1.9840
Reflux Ratio - Actual 2.0496 - Minimum 1.0331

NO.	TEMPERATURE	LIGHT COMP. MOLAR FRACTION		LIQ ENTHALPY	VAP ENTHALPY	LIQ FLOW RATE	VAP FLOW RATE
	FAR	LIQUID	VAPOR	BTU/LBM	BTU/LBM	LBM	LBM
0	146.294	0.850000	0.921937	-5116.57	18.07	1726.52	0.00
1	154.647	0.752122	0.850000	-4991.04	210.14	3450.71	1726.52
2	162.222	0.663376	0.784763	-4877.19	384.31	3376.32	5177.22
3	168.673	0.591049	0.726519	-4767.73	538.00	3326.91	5102.84
Feed No 1 'S1 ' set on tray no 4 - Temp 151.17 FAR - Rate 2657.489 LBM							
4	173.796	0.536496	0.679520	-4674.14	663.01	6454.66	5053.42
5	179.823	0.478205	0.626783	-4559.71	812.64	6192.39	5523.69
6	194.739	0.396538	0.562679	-4322.96	1220.82	6217.44	5261.42
7	203.763	0.314747	0.466230	-4079.02	1471.89	6252.00	5286.47
8	212.306	0.240102	0.369675	-3830.30	1720.86	6311.75	5321.03
9	219.793	0.177083	0.281505	-3599.02	1948.21	6384.77	5380.78
10	225.953	0.127124	0.207174	-3400.43	2141.59	6458.10	5453.80
11	230.797	0.089384	0.148402	-3240.01	2297.48	6522.52	5527.13
12	234.509	0.061868	0.104132	-3115.63	2418.96	6573.74	5591.55
13	237.337	0.042313	0.071943	-3021.17	2512.49	6611.00	5642.77
14	239.531	0.028665	0.049117	-2949.27	2585.52	6635.23	5680.02
15	241.319	0.019262	0.033213	-2892.68	2645.34	6647.53	5704.26
16	242.911	0.012841	0.022269	-2844.55	2699.11	6647.96	5716.56
17	244.525	0.008484	0.014802	-2797.85	2754.66	6634.48	5716.99
18	246.437	0.005540	0.009738	-2743.98	2822.21	6601.38	5703.51
19	249.062	0.003557	0.006318	-2670.14	2917.73	6536.47	5670.41
20	253.109	0.002223	0.004015	-2553.98	3069.39	6413.16	5605.50
21	259.962	0.001328	0.002464	-2348.13	3334.38	6218.63	5482.19
22	271.400	0.000731	0.001421	-1977.63	3793.10	930.97	5287.66

*** UNIT 2 - 'C4 ' - ' DISTILLATION COLUMN ' ***
--- Feed Streams --- - Product Streams -
'S1 ' 'C3-A '
'S3-A '

1) * OPERATING CONDITIONS *

* Tray * Temperature	Pressure	*** OUTLET LIQUID *** -Molar Rate-	-Weight Rate-	*** OUTLET VAPOR *** -Molar Rate-	-Weight Rate-
	°F	psia	lbm/h	lb/h	lbm/h	lb/h
CON	149.42	295.	4281.3	200619.	0.0000	0.00000
1	161.84	299.	2711.3	132298.	4281.3	200619.
2	171.34	299.	2615.8	131846.	4546.3	218284.
3	179.31	299.	2515.5	130267.	4450.8	217833.
4	186.74	300.	5624.3	299252.	4350.4	216256.
5	195.78	300.	5633.6	306916.	4801.8	245445.
6	204.90	300.	5673.7	316044.	4811.1	253112.
7	213.32	300.	5733.4	325546.	4851.2	262242.
8	220.51	300.	5800.6	334481.	4910.9	271744.
9	226.27	301.	5864.0	342133.	4978.1	280678.
10	230.71	301.	5918.0	348282.	5041.5	288329.
11	234.07	301.	5960.8	352986.	5095.5	294478.
12	236.60	301.	5992.6	356439.	5138.3	299181.
13	238.54	301.	6014.2	358862.	5170.1	302634.
14	240.07	302.	6027.1	360484.	5191.7	305057.
15	241.38	302.	6030.3	361383.	5204.6	306680.
16	242.59	302.	6027.6	361896.	5207.8	307579.
17	243.85	302.	6015.4	361950.	5205.1	308091.
18	245.35	302.	5993.3	361707.	5192.8	308145.
19	247.33	303.	5952.6	360909.	5170.8	307903.
20	250.23	303.	5884.5	359475.	5130.1	307105.
21	254.77	303.	5768.0	356835.	5062.0	305671.
22	262.20	303.	5582.9	352809.	4945.5	303032.
REB	274.45	303.	822.51	53802.4	4760.4	299006.

- HEATER/COOLERS -

1 - Condenser -26950.907 kBtu/h
2 - Reboiler 30000.000 kBtu/h

- PRODUCT STREAMS -

Stream 'C3-A ', LIQUID draw-off from condenser
Flow rate, molar 1834.976 lbm/h - weight 85985.618 lb/h

Stream 'S3-A ', LIQUID draw-off from reboiler
Flow rate, molar 822.513 lbm/h - weight 53802.412 lb/h

- FEED STREAMS -

Stream 'S1 ', Feed on tray 4
Flow rate, molar 2657.489 lbm/h - weight 139800.713 lb/h

Condenser is subcooled,
Outlet liquid temperature 125.000 °F

- REFLUX DATA -

Molar rate 2446.336 lbm/h Weight rate 114633.519 lb/h

Ratios with respect to OVERHEAD product(s)
Molar 1.3332 Weight 1.3332

Ratios with respect to TOTAL FEED
Molar 0.9205 Weight 0.8200

2) * PRODUCT STREAMS *

* Stream 'C3-A ', LIQUID draw-off from condenser
- Temperature 125.000 °F - Pressure 295.0000 psia

* No *	Component *	-Molar Rate-	-Mol Fr-	- Weight Rate-	-Wt Fr-
2	ETHANE	12.968	0.007067	389.952	0.004535
3	PROPANE	1455.654	0.793282	64194.350	0.746571
4	ISOBUTANE	180.600	0.098421	10496.466	0.122072
5	BUTANE	178.129	0.097074	10352.869	0.120402
6	ISOPENTANE	4.761	0.002595	343.520	0.003995
7	PENTANE	2.729	0.001487	196.906	0.002290
8	HEXANE	0.134	0.000073	11.553	0.000134
9	HEPTANE	0.000	0.000000	0.001	0.000000
10	OCTANE	0.000	0.000000	0.000	0.000000
11	NONANE	0.000	0.000000	0.000	0.000000
	* TOTAL *	1834.976	1.000000	85985.618	1.000000
		lbm/h		lb/h	

* Stream 'S3-A ', LIQUID draw-off from reboiler
- Temperature 274.454 °F - Pressure 303.4000 psia

* No *	Component *	-Molar Rate-	-Mol Fr-	- Weight Rate-	-Wt Fr-
2	ETHANE	0.000	0.000000	0.000	0.000000
3	PROPANE	0.210	0.000256	9.275	0.000172
4	ISOBUTANE	83.782	0.101861	4869.433	0.090506
5	BUTANE	397.828	0.483674	23121.777	0.429754
6	ISOPENTANE	124.961	0.151926	9015.952	0.167575
7	PENTANE	129.343	0.157254	9332.128	0.173452
8	HEXANE	86.015	0.104575	7412.741	0.137777
9	HEPTANE	0.109	0.000132	10.908	0.000203
10	OCTANE	0.263	0.000320	30.028	0.000558
11	NONANE	0.001	0.000002	0.170	0.000003
	* TOTAL *	822.513	1.000000	53802.412	1.000000
		lbm/h		lb/h	

 *** STREAM DATA CALCULATION AND STORING ***

    Stream 'S1   ' pvt/thermo/trans props calculated
    Stream 'C3   ' pvt/thermo/trans props calculated
    Stream 'S3   ' pvt/thermo/trans props calculated
    Stream 'C3-A   ' pvt/thermo/trans props calculated
    Stream 'S3-A   ' pvt/thermo/trans props calculated

* STREAM 'S1 ', feed of unit(s) 1 'C1 ' 2 'C4 '

- Temperature 151.17 °F - Pressure 310.0000 psia

Phase		LIQUID
Molar Flow Rate	lbm/h	2657.489
Weight Flow Rate	lb/h	139800.713
Molar Fraction		1.000000
Weight Fraction		1.000000
Molecular Weight		52.6063
Std Liq Vol Rate	ft3/h	4078.4262
Enthalpy	kBtu/h	-15446.4888
Spec. Enthalpy	Btu/lb	-110.489
	Btu/lbm	-5812.438
Spec. Entropy	btu/lb °F	1.1133
	btu/lbm °F	58.5643
Gravity at 60/60		0.549065

Reference Gas Status - Temperature 60°F - Pressure 1 atm

No	Components		TOTAL Mol. Rate lbm /h	TOTAL Mol. Fr	PHASE Wt. Rate lb /h	PHASE Wt. Fr.
2	ETHANE		12.963	0.004878	389.807	0.002788
3	PROPANE		1455.322	0.547631	64179.717	0.459080
4	ISOBUTANE		264.385	0.099487	15366.036	0.109914
5	BUTANE		576.222	0.216829	33490.006	0.239555
6	ISOPENTANE		129.824	0.048852	9366.837	0.067001
7	PENTANE		132.179	0.049738	9536.717	0.068217
8	HEXANE		86.220	0.032444	7430.451	0.053150
9	HEPTANE		0.109	0.000041	10.919	0.000078
10	OCTANE		0.263	0.000099	30.053	0.000215
11	NONANE		0.001	0.000001	0.170	0.000001
***	TOTAL	***	2657.489	1.000000	139800.713	1.000000

* STREAM 'C3 ', product of unit 1 'C1 '

- Temperature 125.00 °F - Pressure 295.0000 psia

Phase		LIQUID
Molar Flow Rate	lbm/h	1731.876
Weight Flow Rate	lb/h	79907.470
Molar Fraction		1.000000
Weight Fraction		1.000000
Molecular Weight		46.1393
Std Liq Vol Rate	ft3/h	2487.8369
Enthalpy	kBtu/h	-10061.3219
Spec. Enthalpy	Btu/lb	-125.912
	Btu/lbm	-5809.493
Spec. Entropy	btu/lb °F	1.1255
	btu/lbm °F	51.9302
Gravity at 60/60		0.514484

Reference Gas Status - Temperature 60°F - Pressure 1 atm

No	Components	----- TOTAL Mol. Rate lbm /h	Mol. Fr	PHASE Wt. Rate lb /h	Wt. Fr. -----
2	ETHANE	12.958	0.007482	389.654	0.004876
3	PROPANE	1454.059	0.839586	64124.014	0.802478
4	ISOBUTANE	159.016	0.091817	9242.020	0.115659
5	BUTANE	105.828	0.061106	6150.713	0.076973
6	ISOPENTANE	0.014	0.000008	0.977	0.000012
7	PENTANE	0.001	0.000001	0.091	0.000001
8	HEXANE	0.000	0.000000	0.000	0.000000
9	HEPTANE	0.000	0.000000	0.000	0.000000
10	OCTANE	0.000	0.000000	0.000	0.000000
11	NONANE	0.000	0.000000	0.000	0.000000
***	TOTAL ***	1731.876	1.000000	79907.470	1.000000

* STREAM 'S3 ', product of unit 1 'C1 '

- Temperature 271.07 °F - Pressure 305.6000 psia

Phase		LIQUID
Molar Flow Rate	lbm/h	925.613
Weight Flow Rate	lb/h	59905.877
Molar Fraction		1.000000
Weight Fraction		1.000000
Molecular Weight		64.7202
Std Liq Vol Rate	ft3/h	1590.7812
Enthalpy	kBtu/h	-1840.4831
Spec. Enthalpy	Btu/lb	-30.723
	Btu/lbm	-1988.394
Spec. Entropy	btu/lb °F	1.1401
	btu/lbm °F	73.7880
Gravity at 60/60		0.603206

Reference Gas Status - Temperature 60°F - Pressure 1 atm

No	Components		TOTAL Mol. Rate lbm /h	TOTAL Mol. Fr	PHASE Wt. Rate lb /h	PHASE Wt. Fr.
2	ETHANE		0.000	0.000000	0.000	0.000000
3	PROPANE		0.693	0.000748	30.551	0.000510
4	ISOBUTANE		105.383	0.113853	6124.887	0.102242
5	BUTANE		470.698	0.508526	27356.974	0.456666
6	ISOPENTANE		129.906	0.140346	9372.744	0.156458
7	PENTANE		132.275	0.142905	9543.637	0.159311
8	HEXANE		86.284	0.093218	7435.913	0.124127
9	HEPTANE		0.109	0.000118	10.927	0.000182
10	OCTANE		0.263	0.000284	30.075	0.000502
11	NONANE		0.001	0.000001	0.171	0.000003
***	TOTAL	***	925.613	1.000000	59905.877	1.000000

* STREAM 'C3-A ', product of unit 2 'C4 '

- Temperature 125.00 °F - Pressure 295.0000 psia

Phase		LIQUID
Molar Flow Rate	lbm/h	1834.976
Weight Flow Rate	lb/h	85985.618
Molar Fraction		1.000000
Weight Fraction		1.000000
Molecular Weight		46.8593
Std Liq Vol Rate	ft3/h	2655.2867
Enthalpy	kBtu/h	-10849.5563
Spec. Enthalpy	Btu/lb	-126.179
	Btu/lbm	-5912.643
Spec. Entropy	btu/lb °F	1.1217
	btu/lbm °F	52.5639
Gravity at 60/60		0.518706

Reference Gas Status - Temperature 60°F - Pressure 1 atm

No	Components	----- TOTAL Mol. Rate lbm /h	Mol. Fr	PHASE Wt. Rate lb /h	Wt. Fr. -----
2	ETHANE	12.968	0.007067	389.952	0.004535
3	PROPANE	1455.654	0.793282	64194.350	0.746571
4	ISOBUTANE	180.600	0.098421	10496.466	0.122072
5	BUTANE	178.129	0.097074	10352.869	0.120402
6	ISOPENTANE	4.761	0.002595	343.520	0.003995
7	PENTANE	2.729	0.001487	196.906	0.002290
8	HEXANE	0.134	0.000073	11.553	0.000134
9	HEPTANE	0.000	0.000000	0.001	0.000000
10	OCTANE	0.000	0.000000	0.000	0.000000
11	NONANE	0.000	0.000000	0.000	0.000000
***	TOTAL ***	1834.976	1.000000	85985.618	1.000000

* STREAM 'S3-A ', product of unit 2 'C4 '

- Temperature 274.45 °F - Pressure 303.4000 psia

Phase		LIQUID
Molar Flow Rate	lbm/h	822.513
Weight Flow Rate	lb/h	53802.412
Molar Fraction		1.000000
Weight Fraction		1.000000
Molecular Weight		65.4122
Std Liq Vol Rate	ft3/h	1422.9461
Enthalpy	kBtu/h	-1544.5864
Spec. Enthalpy	Btu/lb	-28.708
	Btu/lbm	-1877.886
Spec. Entropy	btu/lb °F	1.1399
	btu/lbm °F	74.5645
Gravity at 60/60		0.605648

Reference Gas Status - Temperature 60°F - Pressure 1 atm

No	Components		TOTAL Mol. Rate lbm /h	TOTAL Mol. Fr	PHASE Wt. Rate lb /h	PHASE Wt. Fr.
2	ETHANE		0.000	0.000000	0.000	0.000000
3	PROPANE		0.210	0.000256	9.275	0.000172
4	ISOBUTANE		83.782	0.101861	4869.433	0.090506
5	BUTANE		397.828	0.483674	23121.777	0.429754
6	ISOPENTANE		124.961	0.151926	9015.952	0.167575
7	PENTANE		129.343	0.157254	9332.128	0.173452
8	HEXANE		86.015	0.104575	7412.741	0.137777
9	HEPTANE		0.109	0.000132	10.908	0.000203
10	OCTANE		0.263	0.000320	30.028	0.000558
11	NONANE		0.001	0.000002	0.170	0.000003
***	TOTAL	***	822.513	1.000000	53802.412	1.000000

*** STREAM INDEX ***

- Calculation time 0.51 sec

- Simulation no. 242 - Ended at 14.17.09 on MAR 19, 2009 -

XPSIM, Steady State Process Simulation Software
Version 1.07